Logic Pro User Guide

for iPad



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What’s new in Logic Pro for iPad

What’s new in Logic Pro for iPad 2.2

Learn MIDI

With Learn MIDI you can assign faders, knobs, switches, and other hardware controls to app and plug-in parameters in Logic Pro. You can make assignments starting with either an onscreen control or a hardware control. Focused-track assignments are saved globally with the app that so you can use them in all your projects. Pinned assignments are saved locally with the project and can be used only in the project where the assignment was made. See Intro to Learn MIDI.

Capture an audio performance with Flashback Capture

You can capture your most recent audio performance even when Logic Pro is not recording. With Flashback Capture, you can capture audio on the focused track whenever the project is playing and an audio signal is present. See Capture a recent audio performance.

Stem Splitter enhancements

With Stem Splitter, you can now extract stems for guitar and piano, for a total of six stems. Stem Splitter includes a variety of presets that you can use to quickly extract different combinations of stems. You can also combine multiple stems into a custom submix. See Extract vocal and instrumental stems with Stem Splitter.

New sound pack

The Dancefloor Rush sound pack is available to download from the Sound Library. See Download additional sound packs.

Other features

- *New Quantec Room Simulator parameters:* The Quantec Room Simulator now features emulation of its original AD/DA converters, including a drive control and a new option to reverse the phase of the first reflection output. The Yardstick adds an Off option to its correlation pattern menu so that you can mute the reverb output channel independently of the dry and first reflection outputs. See Quantec Room Simulator.
- *Export button in the control bar:* The control bar includes an Export button, giving you quick access to export options and the export process. Also, the Customize Control Bar options now include an Other section with switches to show and hide the Export, Undo, Redo, and Learn MIDI buttons. See Customize the control bar.
- *Search for and select tracks:* You can search for and select a track by name using the Search and Select Track option in the More menu above the track headers (or using the corresponding key command). See Select tracks.
- *Normalize the gain of audio regions:* You can nondestructively normalize the gain of audio regions in the Tracks area, and choose the type of processing and the method of normalization as well as the target level. See Normalize audio regions in the Tracks area.
- *Renaming tracks also renames regions with default names:* Renaming a track also renames the regions on the track that have the track name as their region name. See Rename tracks.
- *Inspector parameters show units:* Many parameters in the inspector now show units for their displayed values. These include the Gain, Transpose, Fine Tune, Delay, and Time values.
- *Duplicate tracks enhancement:* The Duplicate Tracks button has dual functionality. It can be configured to duplicate a selected track with or without its content. See Duplicate tracks.
- *New lessons:* The Lesson Browser includes a lesson for the Learn MIDI feature as well as a What's New in Logic Pro 2.2 lesson. The Stem Splitter lesson has been revised to include enhancements to this feature. Also, the Lesson Browser features a Search field, making it easy to search for lessons by name or description text. See the Use Lessons section of How to get help in Logic Pro.

You can view the Release Notes for this release here.

What's new in Logic Pro for iPad 2.1

Quantec Room Simulator

The Quantec Room Simulator plug-in provides advanced digital reverb effects with a high degree of customization. It uses a unique algorithmic reverb technology to replicate how sound waves behave in different acoustic environments, and it includes both the classic QRS and the later YardStick models.

The Quantec technology has been used in studios around the world for countless pop music recordings, radio plays, classical music broadcasts, and movie soundtracks. See Quantec Room Simulator.

Reorder channel strips in the Mixer

You can reorder channel strips in the Mixer by dragging them. You can select multiple channel strips, including nonadjacent ones, and reorder them together. When you reorder channel strips assigned to tracks, the corresponding tracks are reordered in the Tracks area. See Reorder channel strips in the Mixer.

Reorder plug-ins in the Plug-ins area

You can reorder plug-in tiles directly in the Plug-ins area by dragging them, in addition to using Edit mode to quickly reorder or delete multiple tiles. See Reorder plug-ins in the Plug-ins area.

Add your own sample folders to the Browser

You can access your own collections of samples in the Browser and quickly add samples to the Tracks area or to a plug-in such as Sampler or Quick Sampler. You can nest folder locations to create a folder hierarchy. See Add your own loops and samples to Logic Pro.

Other features

- *New options for Bounce regions in place:* The Bounce in Place dialog includes a Destination File pop-up menu with options to bounce regions to a single file, one file per track, or one file per selected region. See Bounce regions in place.
- *Bypass low frequencies in Beat Breaker:* Using the Bypass Below controls, you can set Beat Breaker to bypass frequencies below a chosen threshold while affecting mid and high frequencies. See Beat Breaker Main Editor.
- *Copy and paste position or length values:* You can copy and paste position or length values in the Region inspector to apply the values from one region to another region (or group of regions). You can also copy and paste position values between the display and the Region inspector to move the playhead to the pasted value, or to move regions so that they start at the pasted value. See Copy and paste position and length values.
- *Regenerate a Session Player performance:* In the Session Player Editor, the "Perform Again" button is now called "Regenerate." The name is shown as text on the button. See Regenerate a Session Player performance.

- *Loop command in region shortcut menu:* In addition to using the Loop switch in the Region inspector, you can loop and unloop a selected region using the Loop command in the region shortcut menu. See Loop regions.
- *New Lessons:* The Lesson Browser includes a lesson on using the Quantec Room Simulator plug-in as well as a What's New in Logic Pro for iPad 2.1 lesson that walks you through the main new features of the release. Also, the Lesson Browser now features an In Progress row showing lessons that have been started but not completed. See the Use Lessons section of How to get help in Logic Pro.
- *New sound pack:* The Modular Melodies sound pack is available to download from the Sound Library. See Download additional sound packs.

You can view the Release Notes for this release here.

What's new in Logic Pro for iPad 2

Session Players: Keyboard Player and Bass Player

Bass Player and Keyboard Player join Drummer to provide a set of Session Players you can use to create professional, nuanced performances that are in sync with each other and responsive to your control. Each Session Player's performance can be edited using a variety of performance controls, and all can follow common chord progressions to deliver realistic musical interplay. See Intro to Session Players.

- Bass Player provides a set of bass players covering a wide range of styles, from Motown to Indie Disco, with intuitive control over performance factors.
- Keyboard Player provides a set of keyboard players covering a range of playing styles using newly sampled acoustic pianos, with intuitive control over performance factors.

Studio Bass and Studio Piano plug-ins

The Studio Bass plug-in contains six newly recorded bass models inspired by the bass guitars found on countless recordings, with intuitive controls for palm mutes, articulations, and more. See Studio Bass. The Studio Piano plug-in contains three newly recorded piano models with multi-microphone volume adjustment and controls for pedal noise, key noise, and sympathetic resonance. See Studio Piano. The Studio Bass and Studio Piano plug-ins are optimized for use with the Session Players, but they can also be played and recorded independently, just like other instrument plug-ins.

Global Chord track and region chords

You can add chords to a Logic Pro project and have the Session Players in the project follow the chords, playing in sync harmonically. When you edit the chords, the Session Players' performances change to reflect your edits. Session Player regions can have their own chords, allowing the region to play when no chords exist on the Chord track or to play different chord extensions, scales, and fills from regions following the Chord track. See Intro to chords.

Many Apple Loops also contain chords, and many Apple Loops designed to be used together share compatible chords. Apple Loops containing chords are indicated by a glyph next to the key signature in the Browser.

Control transposition with the Pitch Source parameter

You can control the transposition of regions and loops in a project using the Pitch Source parameter in the Region inspector. Different region types have different Pitch Source options, including following key signature changes and following the chords on the global Chord track. See Control transposition with the Pitch Source parameter.

Extract stems from an audio region with Stem Splitter

Using Stem Splitter you can separate a stereo audio region, such as a band recording, into stems for vocals, bass, drums, and other instrumental parts and use the individual stems on different tracks in your project. Use Stem Splitter to recover moments from demos or unfinished projects and use them as a basis for new ideas. See Extract vocal and instrumental stems with Stem Splitter.

ChromaGlow

Use the ChromaGlow saturation plug-in to add warmth and vintage character to your mixes by simulating analog audio hardware and overdriven circuits. You can choose from five saturation models to create both modern and vintage saturation. See ChromaGlow.

Route MIDI internally using Internal MIDI In

You can route and record the MIDI output of a MIDI effect plug-in or software instrument plug-in on a software instrument track to a software instrument track in your project using the Internal MIDI In track parameter. This is similar to using aux sends to route audio internally from a track to a receiving track, in addition to sending it to the main output. You can also tap the MIDI signal from different points along the MIDI signal path of a software instrument track (similar to tapping the signal from different points in the signal flow in an aux send). See Route MIDI internally to software instrument tracks.

New Lessons for Session Players, Chords, Stem Splitter, ChromaGlow, and other features

Logic Pro for iPad features interactive Lessons covering the Session Players, working with chords, Stem Splitter, ChromaGlow, and Sample Alchemy. Your progress in each Lesson is now saved when you end the lesson before completing it. You can also choose whether or not to save the Lesson project to the Projects browser. See the Use Lessons section of How to get help in Logic Pro.

New Producer packs

The Kount Producer pack features sonic explorations with meticulously crafted drum kits and loops from The Kount's vast collection of percussion, rare instruments, and unique sounds. The Cory Wong Producer pack shows his passion for classic funk with tight rhythm guitars, deep bass grooves, smacking drums, and blazing horn lines for a collection of loops and playable drum kits. The Hardwell Producer pack includes everything from signature kick drums to custom Alchemy patches and drum loops from Hardwell's released tunes. You can download these and other sound packs from the Sound Library. See Download additional sound packs.

Other features

- *Real-time bounce for external instruments:* When bouncing a project in place, Logic Pro now supports including the output from external instruments, the I/O plug-in, and external inserts in the bounce. When the Automatic Mode option is chosen in the Export > Processing Details dialog, Logic Pro determines whether to perform the bounce in real time or offline, depending on whether channels contain plug-ins requiring a real-time bounce. See Export a project to an audio file.
- *Input monitoring for software instrument tracks:* You can use input monitoring on software instrument tracks as well as on audio tracks. On software instrument tracks, input monitoring is useful for playing multiple tracks simultaneously, or when used in conjunction with MIDI Input and MIDI In Channel settings to play a software instrument with an external source independent of the focused track. See Use input monitoring on tracks.
- *WAV now default audio recording format:* The default format for audio recording is now WAV (BWF), which allows for longer recordings without interruption and provides increased compatibility with third-party audio products.
- *Duplicate a project in the Projects browser:* In addition to moving and copying a project, you can now duplicate a project directly in the Projects browser. See Manage projects.

You can view the Release Notes for this release here.

What's new in Logic Pro for iPad 1.1

Mastering Assistant

Mastering Assistant is an effect plug-in that offers a quick and easy way to add final professional polish for a release-ready mix. Mastering Assistant, which is available in the stereo output channel of a project, analyzes the audio and fine-tunes the sound through dynamic adjustments, frequency balance corrections, and timbre enhancements. See Mastering Assistant overview.

Quick Sampler Recorder mode

The Quick Sampler plug-in features Recorder mode, that lets you create instruments and drum kits by directly recording audio with the built-in microphone or a connected audio input. You can set when recording starts and turn on monitoring to hear the signal while recording. See Recorder mode in Quick Sampler.

Interact with other apps using Split View and Stage Manager

Move seamlessly between Logic Pro and other apps with added support for Split View and Stage Manager.

Add multiple audio files using drag and drop

Select and drag multiple files from the Files app to quickly build drum kits or add stems to a project. See Import media.

Preview multiple patches, loops, or samples in the Browser

Quickly preview multiple samples, loops, or instruments in the Browser by touching and holding a Preview button, then dragging up or down. See Overview of patches, Add Apple Loops to your project, and Work with samples in the Browser.

32-bit recording

You can record in 32-bit depth (floating point) with a compatible audio interface. The advantages of 32-bit recording are that you can later remove digital clipping that occurred during the recording later by lowering the gain of the audio region, and that you can increase the gain of recordings made at a low level without increasing the noise floor. See Recording settings.

New content, including in-app Lessons and sound packs

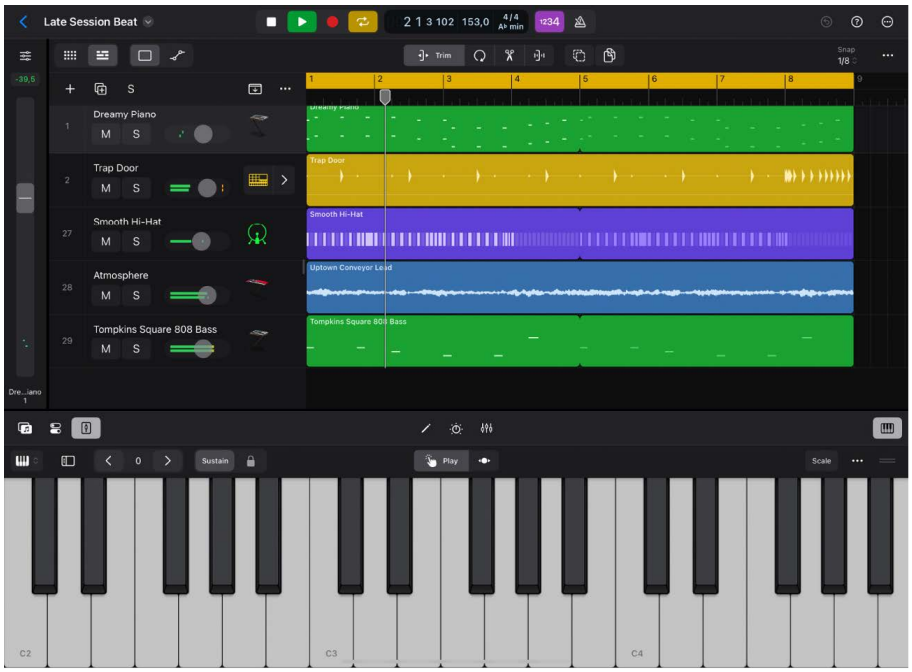
Logic Pro features new Lessons covering a broad range of topics, including the Mastering Assistant, Sample Alchemy, and Beat Breaker plug-ins, beat making, automation, sound packs, and Play Surfaces. Two sound packs are now available: the Hybrid Textures sound pack contains 70 patches as well as over 80 Apple Loops featuring Sample Alchemy. The Vox Melodics sound pack contains a diverse collection of over 475 lyrical phrases, hooks, layered harmonies, FX, and one-shots.

Other features

- *Step Sequencer enhancements:* You can drag sounds, such as kit pieces or samples, from the Browser to Step Sequencer. In addition, you can add a range of note rows in one operation in Step Sequencer. See Pattern creation basics.
- *Copy and paste plug-in settings in Details view:* In the Plug-ins area, you can copy and paste plug-in settings between plug-ins in Details view. See Work with plug-in presets.
- *Bypass plug-ins and sends in Setup mode in the Mixer:* In the Mixer, you can bypass plug-ins directly in Setup mode without having to switch to Mix mode. See Intro to mixing.
- *Show Routing Destination:* You can show the routing destination for a send in the Mixer. When Send/Routing Destination is selected, the aux channel strip for the selected send appears on the right side of the Mixer, next to the output channel strip. See Intro to signal flow.
- *Edit properties and automation settings for Mixer groups:* You can view and edit Mixer group properties (including selection editing, record state, input state, and track color) and group automation settings (including automation mode, volume, pan, and mute and solo state) in the Group Settings dialog. See View and edit group settings.
- *Use MIDI Learn with Drum Machine Designer:* With learn input note in Drum Machine Designer, you can set a pad's input note by playing a note on your external MIDI controller. See Drum Machine Designer Play Surface.
- *Enhanced MIDI 2.0 support:* Choose whether to display MIDI data in Piano Roll Editor inspectors using higher-resolution MIDI 2.0 percentage or decimal values, or using standard MIDI 1.0 values. See View settings.
- *Toggle between function modes using Apple Pencil:* Support for Apple Pencil includes using double-tap on the side to toggle between two function modes. See Use Apple Pencil.

Logic Pro basics

What is Logic Pro for iPad?



Logic Pro for iPad features a complete collection of sophisticated creative tools for professional songwriting, beat making, editing, and mixing—all with an interface that's been designed from the ground up for iPad. Use Multi-Touch in Logic Pro to perform powerful software instruments with the tap of a finger and interact naturally with intuitive controls.

Creative production tools make it easy to quickly make beats and explore new sonic territories, and a full-featured Mixer gives you everything you need to create a professional-sounding mix entirely on iPad.

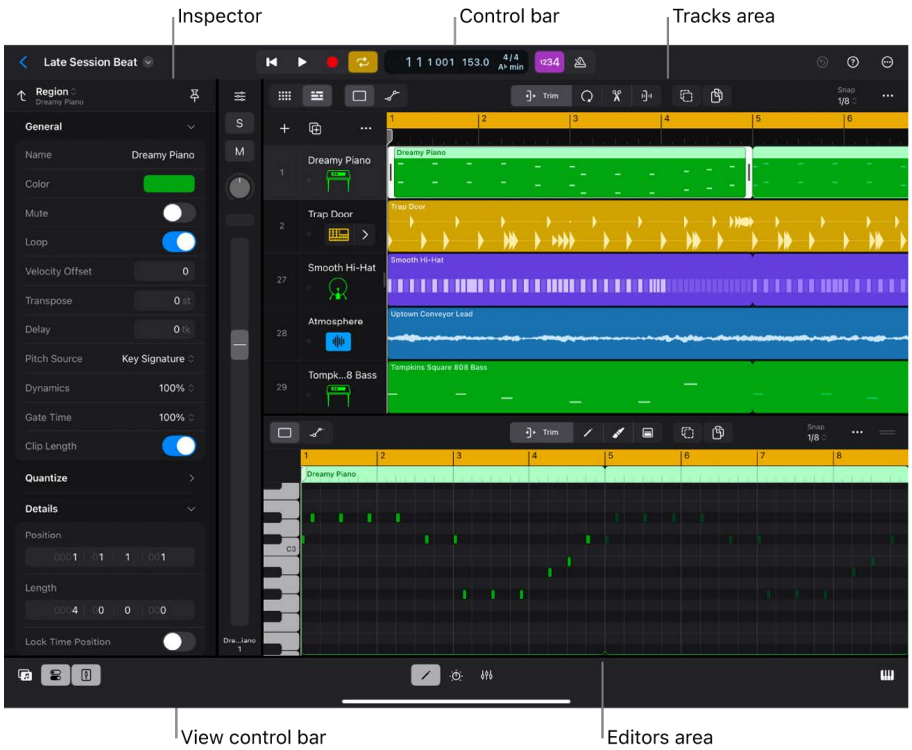
These are some of the things you can do with Logic Pro:

- Find sounds in the Browser, which includes a large collection of patches, loops, presets, and other musical material to add and use in your projects.
- Use advanced beat-making and production tools with Sample Alchemy and Beat Breaker.
- Play and record a wide variety of software instruments using Multi-Touch gestures with onscreen Play Surfaces, or with a connected USB or Bluetooth music keyboard. You can also play and record third-party Audio Unit Extensions you have installed on your iPad.
- Record vocals, instruments, or any sound that can be captured by a microphone, and edit the recorded regions in the Audio Editor.
- Create a multitrack arrangement from your recordings, loops, and other musical material in the Tracks area.
- Arrange and play with musical ideas in real time in the Live Loops grid. Cells in the grid contain musical phrases or loops that you can start and stop freely while keeping everything in sync with the beat and the project tempo.
- Use virtual Session Players to create dynamic, realistic bass, keyboard, and drum performances in a variety of styles that adapt to the material of the project and to adjustments you make in the Session Player Editor.
- Create repeating patterns in Step Sequencer by editing steps in a grid. Each row can trigger either MIDI note events or automation parameter changes. You can edit individual steps, rows, and the overall pattern.
- Edit regions and cells using a set of editors optimized for different tasks and region types.
- View and edit plug-ins and sends for a track in the Plug-ins area, where you can quickly shape and tweak your sound using plug-in tiles.
- Mix your project in the Mixer, where you can view and edit channel strip controls, customize routing options, and add and configure plug-ins.
- Automate changes to mix, effect, and instrument plug-in settings over time using total recall mix automation. You can record automation changes in real time and edit them later.
- Control settings for the overall project (including tempo, key, and time signature). Use markers to define different sections of a project.
- Share your projects in a variety of ways, including working with projects shared from Logic Pro for Mac.
- Discover Logic Pro features and strengthen your skills with integrated guided Lessons.
- Open projects created with GarageBand for iOS/iPadOS and import recordings from Voice Memos.
- Create precision edits and detailed track automation with Apple Pencil.

Logic Pro at a glance

Logic Pro interface

Logic Pro is organized into different working areas to help you focus on different aspects of your project, such as recording, arranging, and mixing. Buttons in the view control bar and the Tracks area menu bar show or hide different areas of the app.



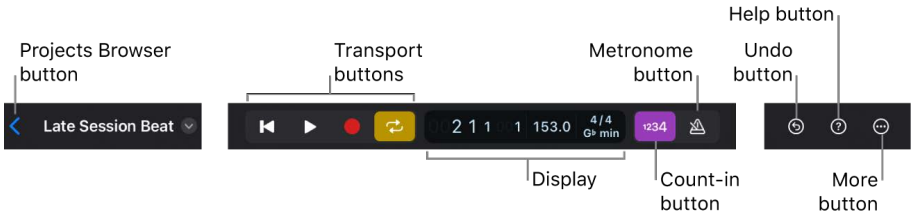
The working areas of Logic Pro include:

- *Control bar:* Features the transport buttons you use to control playback of your project and buttons for frequently used commands. You can customize the control bar to suit your way of working.
- *View control bar:* Contains buttons to show and hide the different working areas of Logic Pro, including the Browser, inspector, Fader, Plug-ins area, Mixer, and Play Surfaces.
- *Tracks area:* Where you record audio and MIDI regions, add Apple Loops and other media files, and arrange the regions in a timeline to build your project.
- *Live Loops grid:* Arrange and play with musical ideas in real time in a grid of cells, each containing a musical phrase or loop. You can trigger cells freely or in groups, while keeping everything in sync with the beat and the project tempo.
- *Browser:* Where you find and audition patches, loops, presets, samples, and other sound categories, choose the ones you want to use, and add them to your project.
- *Editors:* Logic Pro features a set of editors, including the Audio Editor, Piano Roll Editor, Session Player Editor, and Step Sequencer, which you can use to make precise changes to individual regions and their contents.

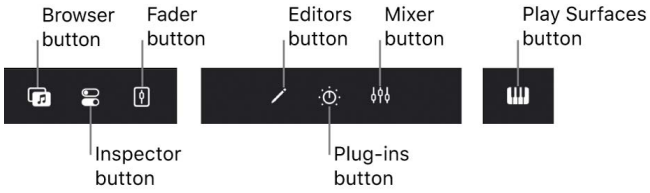
- *Inspector:* Shows parameters for selected regions, tracks, and other items. The available parameters change depending on what type of item is selected.
- *Fader:* Quickly access controls for the selected track while you're recording, arranging, or performing other tasks. You can configure which controls appear in the Fader.
- *Plug-ins area:* View and edit plug-in tiles for the selected track, and expand them to view and edit all plug-in parameters. View sends for the track, add sends, and adjust send levels. Edit audio effect plug-ins for the track's output channel.
- *Mixer:* Shows channel strips for each track in the project, as well as auxiliary, output, and master channel strips. In the Mixer, you can view and edit channel strip controls, add and edit plug-ins, and customize routing options.
- *Play Surfaces:* Logic Pro includes a variety of onscreen Play Surfaces that you can use to play the included software instruments. Choose between a keyboard, a fretboard, chord strips, drum pads, or other Play Surfaces.

Control bar and view control bar

The control bar runs across the top of the Logic Pro interface. It includes the transport buttons you use to control playback; the display showing the playhead position and the project tempo, time signature, and key; the Metronome and Count-in buttons; and other controls. You can customize the control bar to suit your way of working.



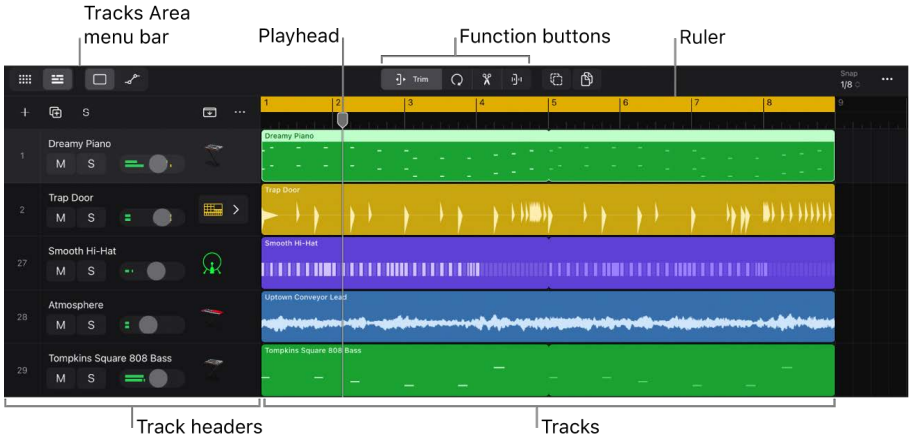
The view control bar runs across the bottom of the Logic Pro interface. It contains buttons to show and hide different working areas of Logic Pro, including the Browser, inspector, Fader, editors, Plug-ins area, Mixer, and Play Surfaces.



Tip: You can quickly close all working areas except the Tracks area or the Live Loops grid by double-tapping the view control bar, and reopen them by double-tapping it again.

Tracks area

You record and arrange audio and MIDI regions in a timeline-based format in the Tracks area, which occupies the central area of the Logic Pro interface. The main elements of the Tracks area include:



- *Tracks area menu bar:* Contains buttons for showing different views of the Tracks area, function buttons for editing regions, the Snap menu, and a More button.
- *Ruler:* Shows bars, beats, and other divisions of time. The time divisions shown change depending on the zoom level of the Tracks area. You can align items in the Tracks area to specific musical positions using the time divisions in the ruler.
- *Playhead:* The thin vertical line extending from the top to the bottom of the Tracks area, the playhead shows the part of the project currently playing or where playback starts. You can use the playhead to help align regions and other items and for editing tasks, such as splitting regions.
- *Track headers:* Each track has a header that shows the track number and icon and includes controls for muting and soloing the track, enabling the track for recording, and other functions.
- *Tracks*: All regions in the project appear on horizontal lanes called *tracks*, aligned to time positions in a grid. This is the primary area for recording and arranging regions, loops, and other material.

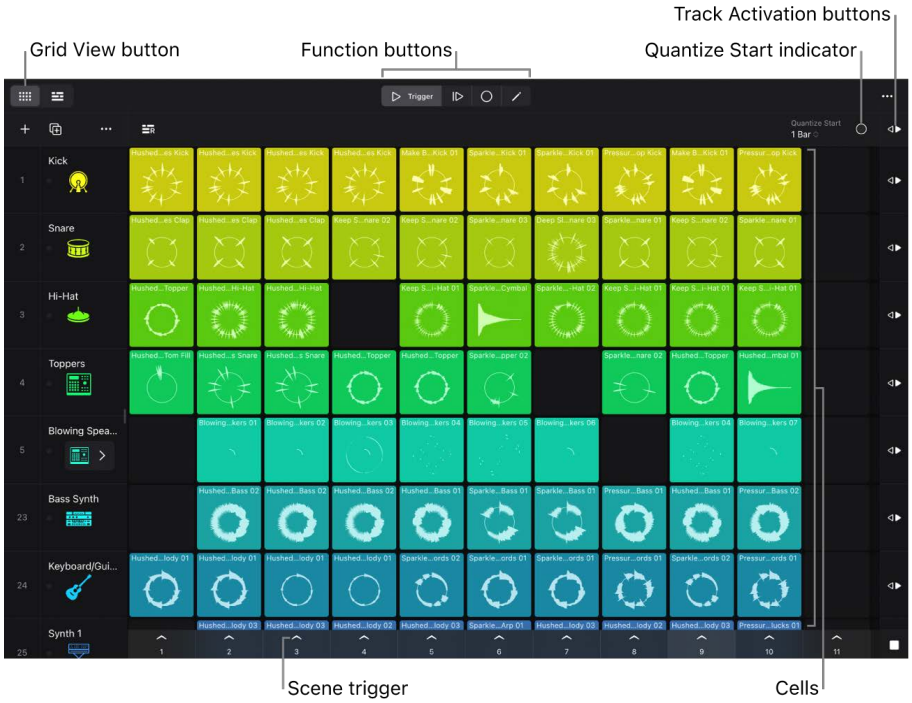
Open the Tracks area

- Tap the Tracks view button on the left side of the Tracks area menu bar.

For information about working in the Tracks area, see Intro to the Tracks area.

Live Loops

You can arrange and play with musical ideas in the Live Loops grid of cells, each containing a musical phrase or loop. Each grid row shares signal routing and channel strip settings with a track in the Tracks area. Cells in grid columns, called *scenes*, can be triggered together to act as musical sections. An extensive set of parameters gives you full control over playback, recording, and looping, so you can spontaneously take your music in new directions.



- *Cells:* Cells can be triggered to play individually or as part of a scene and can be queued for later playback.
- *Scene triggers:* All cells in a scene (column) can be started or stopped simultaneously using the scene trigger.
- *Function buttons:* Tap to work in different edit modes in the Live Loops grid: Includes the Cell Trigger, Cell Queue, Cell Record, and Cell Edit buttons.
- *Quantize Start indicator:* Sets the start position to ensure that cells start at musically meaningful positions (beats or bars).
- *Track Activation buttons:* Indicate whether cells or regions are active (audible) on the track.

Open Live Loops

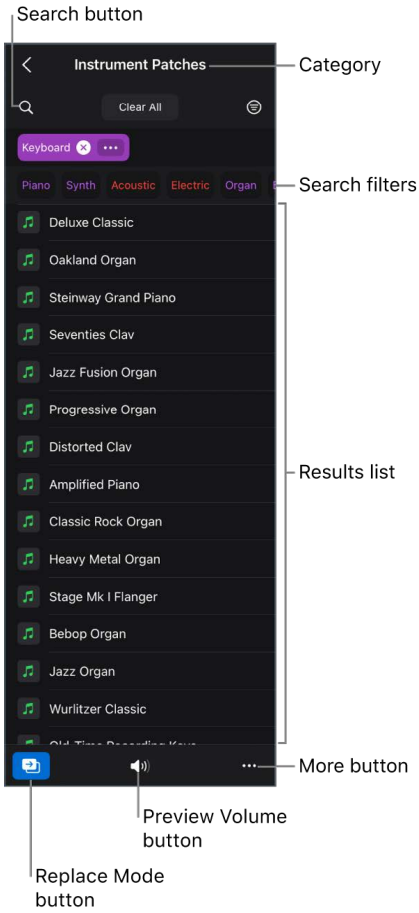
- Tap the Grid View button on the left side of the Tracks area menu bar.

For information about working in Live Loops, see Intro to Live Loops.

Browser

Logic Pro for iPad features an extensive collection of patches, drum kits, Apple Loops, presets, and other sounds that you can use in your projects. You can browse or search for patches, loops, and other musical material in the Browser. When you choose a sound category to view, individual items for that category appear in the results list.

An advanced search function lets you use keywords, filters, and other criteria to quickly find material for your projects. You can preview patches, loops, and samples before adding them.



- *Sound categories:* At the top level, the Browser lists different categories of sounds. You choose a category to browse or search in its view.
- *Search button:* Shows the Search field so that you can search for items by name.
- *Search filters:* Select filters to restrict search results to a specific combination of search criteria.
- *All Filters button:* Show all available search filters and choose the ones you want to use.
- *Results list:* Shows sounds matching your selected search criteria.
- *Replace Mode button:* When active, selecting a patch replaces the current patch on the selected track.

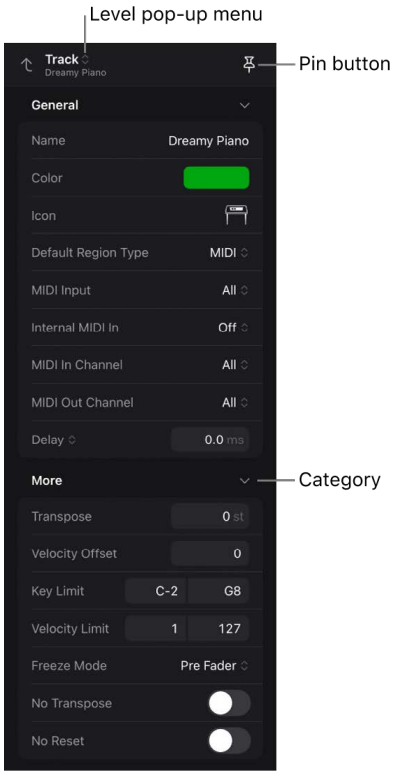
Open the Browser

- Tap the Browser button on the left side of the view control bar.

For information about working in the Browser, see Browser overview.

Inspector

You can view and edit parameters for regions, tracks, and other items in the inspector. The parameters displayed in the inspector change depending on the level selected.



- *Level pop-up menu:* Choose a type of item to view its parameters in the inspector. You can also tap items to select them directly.
- *Pin button:* Using the Pin button you can “pin” the inspector to retain the selected inspector type, even when you select a different type of item in Logic Pro.
- *Categories:* Tap the disclosure arrow for a category to view parameters in that category.
- *Parameters:* The parameter name appears on the left, and the value appears on the right. Most parameter values can be edited directly in the inspector.

Note: When an event on a global track is selected, only global track events are available in the inspector.

Open the inspector

- Tap the Inspector button on the left side of the view control bar.

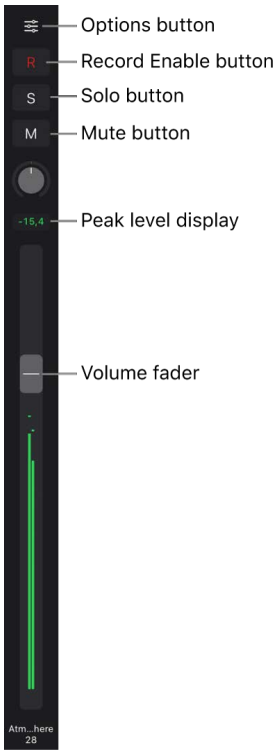
For information about region parameters, see Edit region parameters. For information about track parameters, see Edit track parameters.

Fader

The Fader lets you easily access channel strip controls for the selected track without having to open the Mixer. This can be useful during recording and when you're arranging in the Tracks area.

The available controls include a Volume fader, a Pan/Balance knob, Mute and Solo buttons, and a Record Enable button (when an audio track is selected). An Options button above the controls lets you access audio routing and other options for the track.

You can show a second Fader to the right of the track Fader. Using the second Fader, you can access the output channel for the track, a send on the track, or the aux track for a Drum Machine Designer track stack.



- *Options button:* Tap to view and edit audio input and output options for the track, its Freeze and Solo Safe status, and its group membership.
- *Record Enable button:* Tap to enable the track for recording (on audio tracks only).
- *Solo button:* Tap to solo or unsolo the track.
- *Mute button:* Tap to mute or unmute the track.
- *Pan/Balance knob:* Swipe up or down to adjust the track pan position in the stereo field.
- *Peak level display:* Shows the highest level reached by the track during playback.
- *Volume fader:* Drag the handle up or down to adjust the track volume level.

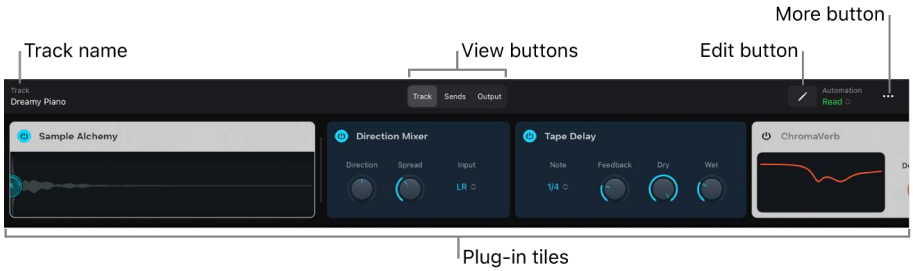
Show the Fader

- Tap the Fader button on the left side of the view control bar.

For information about working with the Fader, see Access mixing functions using the Fader.

Plug-ins area

The Plug-ins area provides a close-up view of the signal chain for the selected track. You can view and edit the plug-ins, sends, and output settings for the track.



The Plug-ins area includes these features:

- *Plug-in tiles:* You can view and edit effect and instrument plug-ins as *tiles* that give you access to key parameters. Plug-ins can also be opened in Details view for access to all parameters.
- *View buttons:* Work with different aspects of the selected track's signal flow:
  - *Track view:* View the MIDI and software instrument plug-ins on software instrument tracks, and audio plug-ins on both audio and software instrument tracks.
  - *Sends view:* Add and configure sends and control send levels.
  - *Output view:* View and edit audio plug-in tiles on the output channel for the selected track.
- *Edit button:* Sets the Plug-ins area to Edit mode, where you can reorder and remove plug-ins.
- *More button:* Includes commands to copy channel strip settings, turn off effect plug-ins, remove plug-ins or sends, and reset the channel strip.

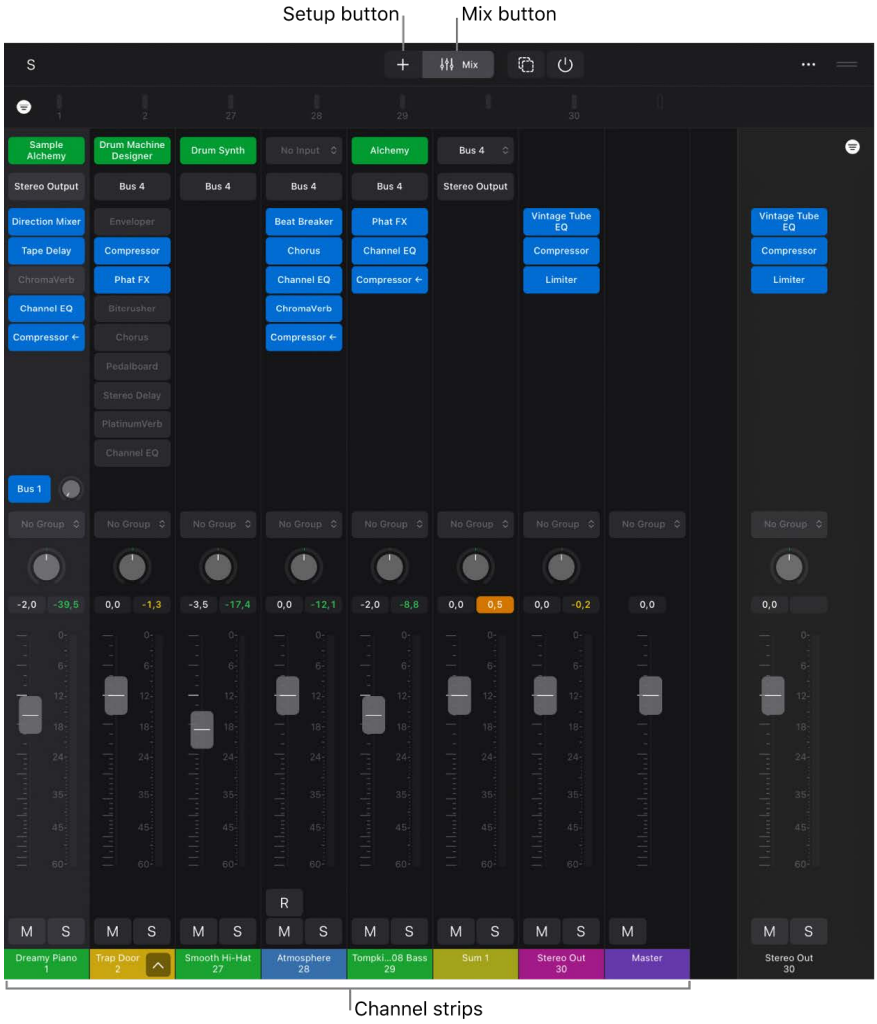
Open the Plug-ins area

- Tap the Plug-ins button in the middle of the view control bar.

For information about working in the Plug-ins area, see Intro to the Plug-ins area.

Mixer

The Mixer shows the channel strips for the tracks in your project, including auxiliary and output channel strips and the master channel strip. This makes it easy to view and adjust relative levels and pan positions and perform other mixing functions. You can mute and solo tracks, add and edit effects, use busses and sends to control the signal flow, and use groups to control multiple channel strips together.



You work in the Mixer using the following two modes:

- *Setup mode:* You can quickly add, replace, reorder, and remove plug-ins on the channel strips in the project.
- *Mix mode:* You can open plug-ins in Details view to view and adjust all plug-in parameters, and quickly turn plug-ins on or off to hear how they affect the mix.

Channel strips in the Mixer include the following controls:

- *Plug-in slots:* Add, replace, and remove effect plug-ins; on instrument channel strips, also replace the instrument plug-in.
- *Send slots:* Add sends and adjust the send level.
- *Pan/Balance knob:* Swipe up or down to adjust the pan position of the channel.
- *Volume fader:* Drag the handle up or down to adjust the volume level of the channel.
- *Mute button:* Tap to mute or unmute the channel strip.
- *Solo button:* Tap to solo or unsolo the channel strip.
- *Channel name and number:* Shows the name and number of the track corresponding to the channel strip.

Open the Mixer

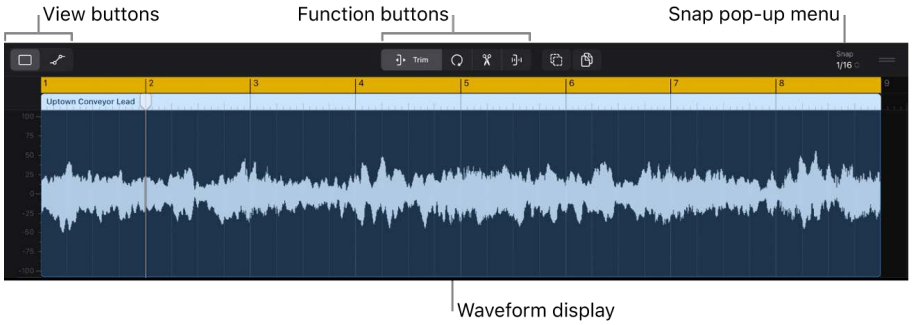
- Tap the Mixer button in the middle of the view control bar.

For information about working in the Mixer, see Intro to mixing.

Editors

Audio Editor

The Audio Editor displays the audio waveform of the regions on an audio track. In the Audio Editor, you can copy, paste, move, trim, split, and join audio regions and perform other edits. Using the ruler and the Snap grid, you can precisely align edits with specific points in time.



- *View buttons:* Show the normal editing view or Automation view.
- *Function buttons:* Tap to work in different edit modes in the Audio Editor; includes the Trim, Loop, Split, and Stretch buttons.
- *Snap pop-up menu:* Set the Snap value and Snap options for the Audio Editor.
- *Waveform display:* View the audio waveform for regions on the selected audio track.

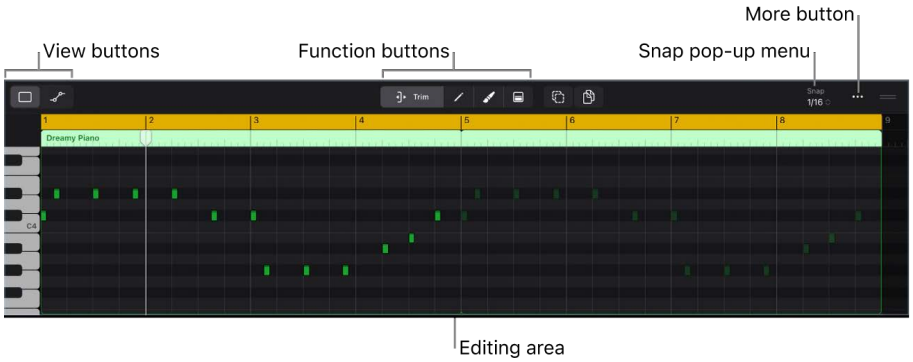
Open the Audio Editor

- With an audio track or audio region selected, tap the Editors button in the middle of the view control bar.

For information about the Audio Editor, see Intro to the Audio Editor.

Piano Roll Editor

The Piano Roll Editor shows note events in MIDI regions as editable rectangles on a time grid. The position of each note on the grid shows the time position where it starts playing, its duration (length), and pitch. Note velocity is indicated by color. You can edit notes by moving them, resizing them to change their duration, dragging them vertically to change their pitch, and in a variety of other ways.



- *View buttons:* Show the normal editing view or Automation view.
- *Function buttons:* Tap to work in different edit modes in the Piano Roll Editor; includes the Trim, Pencil, Brush, and Velocity buttons.
- *Snap pop-up menu:* Set the Snap value and Snap options for the Piano Roll Editor.
- *Editing area:* Edit the notes in the MIDI region or regions on a time grid.

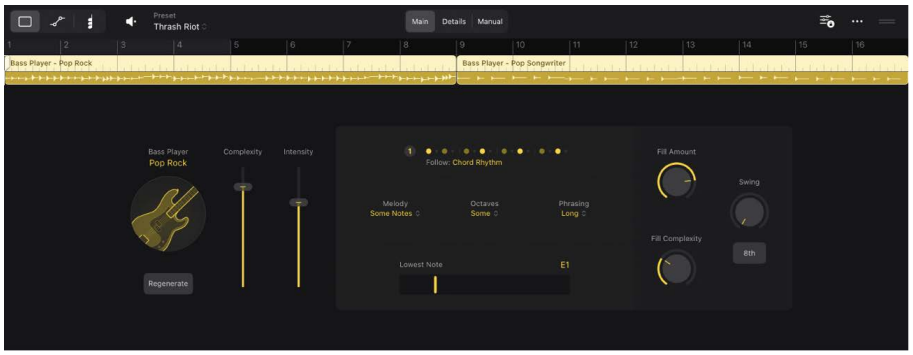
Open the Piano Roll Editor

- With a software instrument track or MIDI region selected, tap the Editors button in the middle of the view control bar.

For information about the Audio Editor, see Intro to the Piano Roll Editor.

Session Player Editor

You can view and edit Session Player region parameters in the Session Player Editor. The Session Player Editor shows settings for the selected Session Player region, including sliders for adjusting the complexity and intensity of the region performance, and controls for editing performance parameters, including pattern variations and fill settings.



- *View buttons:* Show the normal editing view or Automation view.
- *Preview button:* Tap to preview the region without the rest of the project.
- *Session Player button:* Tap, then choose a style.
- *Complexity and Intensity sliders:* Drag up or down to adjust the complexity and intensity of the pattern.
- *Pattern Variations sliders:* Drag left or right to change the pattern for individual instruments.
- *Fills slider:* Drag up or down to adjust the amount of fills in the pattern.

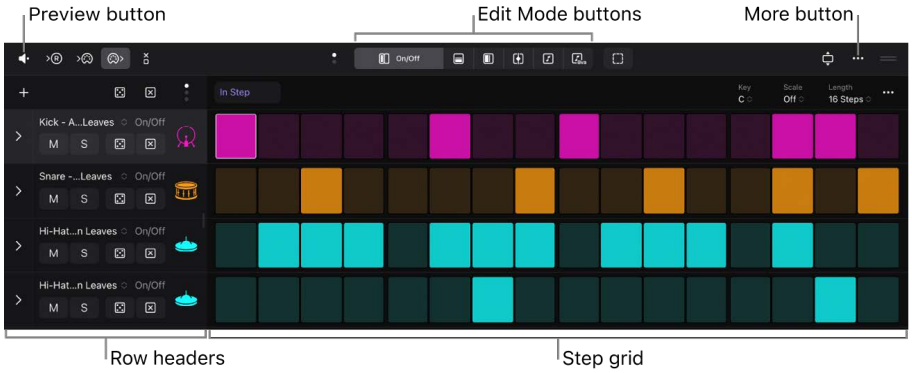
Open the Session Player Editor

- With a Session Player region selected, tap the Editors button in the middle of the view control bar.

For information about the Session Player Editor, see The Session Player Editor.

Step Sequencer

In Step Sequencer, you can create patterns by editing steps in the *step grid*. Each row in the grid controls either a sound or an automation parameter, and each step represents a definable length of musical time. You can adjust parameters for individual steps, such as velocity, pitch, gate time, and more; and edit pattern and row settings, including pattern length, loop start and end points, playback position, and more.



- *Step grid:* The main working area, where you turn steps on and off and graphically edit step settings using edit modes.
- *Row headers:* Each header contains a row icon, a disclosure arrow to show subrows, and a set of controls for the row, including Mute and Solo buttons, a Row Assignment pop-up menu, Rotate buttons, and Decrement/Increment buttons.
- *Preview button:* Preview the pattern in isolation without the rest of the project.
- *Edit Mode buttons:* Tap to choose an edit mode for the step grid.
- *More button:* Includes controls to show and save patterns, sort rows, display edit mode values, and more.

Open Step Sequencer

Do one of the following:

- Tap a pattern region in the Tracks area, then tap the Editors button in the view control bar to display that region in Step Sequencer in the Editors area.
- Select a track with Pattern as the default region type, then tap the Editors button in the view control bar.

For information about Step Sequencer, see Intro to Step Sequencer.

Play Surfaces

Logic Pro features a variety of Play Surfaces that you can use to play any of the included software instruments. There are Keyboard, Fretboard, and Drum Pad Play Surfaces as well as Chord Strips and Guitar Strips. You can resize Play Surfaces to make playing easier.



- *Surface Types button:* Choose the Play Surface to play.
- *Side Controls button:* Show performance controls, including pitch bend and modulation wheels.
- *Scale button:* Play the Keyboard and Fretboard Play Surfaces using a specific scale.
- *More button:* Access Surface settings and view options.
- *Resize handle:* Drag up or down to resize the Play Surface.

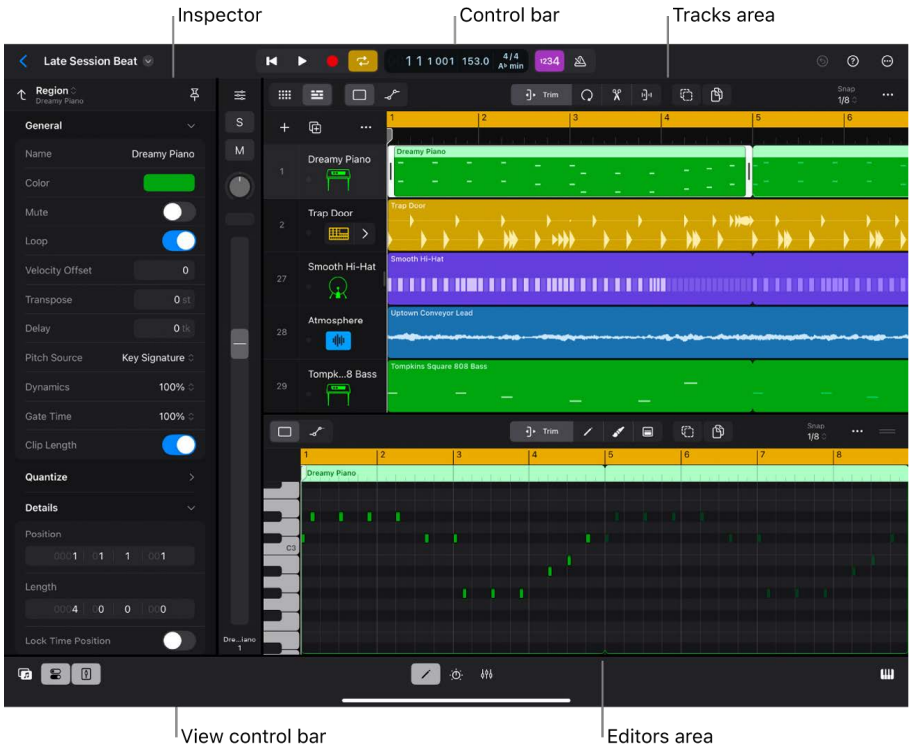
Open the Play Surfaces

- Tap the Play Surfaces button on the right side of the view control bar.

For information about Play Surfaces, see Intro to Play Surfaces.

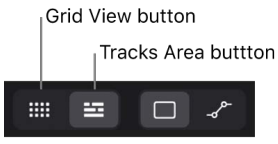
Working areas in Logic Pro for iPad

Logic Pro for iPad provides different working areas, each optimized for a particular way of working or a specific task. Only one working area can have key focus at a given time. Tapping in another working area makes it the focused area.

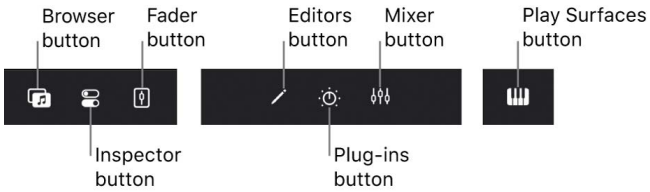


You can show or hide working areas in different combinations, depending on what you want to accomplish. Many working areas can be resized for either a larger, more detailed view or a minimized view, making it easier to view several of them together. You can also zoom in or out in the Tracks area, the Audio Editor, and the Piano Roll Editor for either a more detailed or a more comprehensive view.

You can switch between the Tracks area and Live Loops using the buttons in the control bar:



The buttons to show and hide the Browser, inspector, Fader, editors, Plug-ins area, Mixer, and Play Surfaces are on the view control bar, located along the bottom of the Logic Pro interface.



Certain combinations of working areas are not supported. For example, if the Browser is open and you tap the Inspector button, the Browser closes, and the inspector opens in the space previously occupied by the Browser.

If you find while working that the screen becomes cluttered by too many working areas open at once, you can quickly close all working areas except the Tracks area (or Live Loops grid) by double-tapping the view control bar.

You can use Logic Pro in both landscape and portrait orientation on your iPad. Certain tasks might be more suited to one orientation or another ; for example, you can see a larger part of a Tracks area arrangement in landscape orientation, whereas using the Mixer in portrait orientation lets you view the full height of the channel strips.

Control how working areas update using Catch Playhead

The Tracks area, Audio Editor, and Piano Roll Editor show the playhead, which moves from left to right as the project plays. For each of these working areas, you can control whether or not they scroll horizontally as the playhead moves using the Catch Playhead function. When Catch Playhead is turned on, the working area follows the playhead during playback or recording. When Catch Playhead is turned off, the working area does not update, even when the playhead moves out of the visible portion of the timeline. Additionally, when the playhead is not visible in the working area, you can have the area scroll to show the playhead position.

Split View, Slide Over, and Stage Manager

You can also multitask between Logic Pro and other iPad apps in Split View and Slide Over. In Split View you can use Logic Pro together with another app, each occupying half of the iPad screen. After you open both apps in Split View, you can adjust the amount of the screen each app occupies by dragging the divider between the two apps.

In Slide Over, the other app appears as a smaller window that slides in front of Logic Pro. You can move the app to see different areas of Logic Pro under it or move it offscreen until you want to use it again.

If your iPad supports Stage Manager, you can move and resize the Logic Pro window when Stage Manager is turned on and use Stage Manager to multitask with other iPad apps.

For information about using Split View, Slide Over, and Stage Manager, see the iPad User Guide.

Resize a working area

Many working areas, including the Editors area, Plug-ins area, Mixer, and Play Surfaces, can easily be resized to fill more of the Logic Pro interface.

- Drag the resize handle ═ on the right edge of the local menu bar, then drag vertically to resize the area.
- Tap the resize handle to expand the area to its maximum size. Tap the handle again to return to the previous size.

Zoom the Tracks area, Piano Roll Editor, or Audio Editor

Do any of the following:

- Pinch vertically to zoom in or out vertically.
- Pinch horizontally to zoom in or out horizontally.

Close all working areas except the Tracks area or Live Loops grid

- In Logic Pro, double-tap the view control bar.
- To reopen the previously open working areas, double-tap the view control bar again.

Control how working areas update using Catch Playhead

1. In Logic Pro, tap the More button ••• in the menu bar for the Tracks area, Audio Editor, or Piano Roll Editor to set the Catch Playhead mode for that working area.
2. Tap one of the Catch Playhead options:
   - *Off:* The working area does not scroll so the playhead remains visible.
   - *Automatic:* The working area scrolls so that the playhead remains visible as it moves.
   - *Catch Now:* The working area scrolls to show the playhead position. This option is available only when the playhead is not currently visible.

Use Logic Pro in Split View

1. Tap the Multitasking button ••• at the top of the iPad screen.
2. Tap Split View.
3. To adjust Split View, drag the handle between the two app windows left or right.

Use Logic Pro in Slide Over

1. Tap the Multitasking button ••• at the top of the iPad screen.
2. Tap Slide Over.
3. To move the Slide Over window, drag it by the handle on the bottom of the window.

To learn more about working in Split View and Slide Over, see the iPad User Guide.

Work with function buttons in Logic Pro for iPad

Logic Pro for iPad provides groups of *function buttons* for a variety of editing tasks. Function buttons are available in the Tracks area, the Live Loops grid, the Audio Editor, the Piano Roll Editor, and Step Sequencer. In those working areas, function buttons are located in the middle of the menu bar for that working area. For example, the Tracks area menu bar has function buttons for editing regions using Trim, Loop, Split, and Stretch edit modes.



In general, you tap a function button to turn on its edit mode, then tap or otherwise interact with regions, cells, MIDI notes, or other items in the working area to edit them. Tapping a function button to turn on an edit mode turns off the previously active edit mode for the working area.

Use function buttons as momentary buttons

Function buttons can also be used as *momentary buttons*. To use a function button as a momentary button, you touch and hold the button, then perform an editing operation without releasing your finger. After completing the operation, you release your finger, and the function button that was selected before the momentary one you just used remains selected. For example, with the Trim button selected, you can touch and hold the Split button, split one or more regions using the Scissors tool, then release your finger from the Split button, and the Trim button remains selected.

When you touch and hold a function button but release your finger without performing any editing operation, the button becomes selected, and its edit mode is turned on.

Use modifier buttons

In addition to the function buttons, Logic Pro provides modifier buttons that modify the functionality of the edit modes. The Multiple Select and Copy buttons are located to the right of the function buttons in the Tracks area, the Audio Editor, the Piano Roll Editor, and the Mixer (in the Mixer, both modifier buttons are available in Setup mode, but only the Multiple Select button is available in Mix mode).

- *Multiple Select button:* When the Multiple Select button is selected, you can select multiple items by tapping them. Tapping an item selects it (or deselects it, if it's already selected) without deselecting other selected items.

  Note: After selecting items using the Multiple Select button, be sure to deselect the button before using one of the edit modes.

- *Copy button:* When the Copy button is selected, dragging an item creates a copy rather than moving the item.

In addition, the Stepped Automation button is available when Automation view is turned on in the Tracks area. See Stepped automation curve.

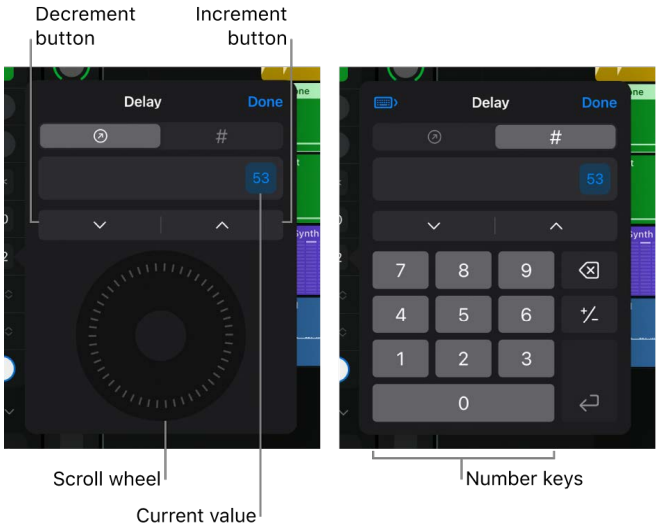
The Multiple Select and Copy buttons can also be used as momentary buttons. For example, you can touch and hold the Copy button, drag a region to create a copy, then release your finger from the Copy button and drag regions without creating copies of them.

Work with numeric values in Logic Pro for iPad

Many Logic Pro functions involve editing numeric values for parameters and other data. For example, many region parameters and track parameters in the inspector feature editable numeric values. Where numeric values for parameters appear, you can generally edit them in one of two ways:

- Drag the numeric value up or down to increase or decrease the value.
- Tap the numeric value to open a numeric input dialog, where you can edit values using Decrement/Increment buttons, a scroll wheel, or a numeric keypad. For some parameters, additional editing controls are available.

When you open a numeric input dialog, it contains the following:



- The parameter name
- The current parameter value, highlighted in blue
- A Scroll Wheel button and a Number Pad button #, which you use to switch between the scroll wheel and the numeric keypad.
- Decrement/Increment buttons to change the value in single increments

Open a numeric input dialog

- Tap an editable numeric parameter.

Switch between the scroll wheel and the numeric keypad

- Tap the Scroll Wheel button to show the scroll wheel.
- Tap the Number Pad button # to show the numeric keypad.

Edit the selected value using the Decrement/Increment buttons

- Tap the Decrement button to decrease the value in single units.
- Tap the Increment button to increase the value in single units.

Edit the selected value using the scroll wheel

- Drag the scroll wheel to edit the value.

Edit the selected value using the numeric keypad

Do any of the following:

- Tap the number keys to enter a value. Numbers are added to the right of the existing value. For example, if the value shown is 9, and you tap the 3 key, the number becomes 93.
- Tap the Delete key to remove the last digit of the value.
- Tap the Sign key to switch the current value between positive and negative.
- Tap the Return key to enter the new value, replacing the previous value.

  Note: After editing the value using the numeric keypad, be sure to either tap the Return key or tap the Done button before closing the numeric input dialog.

Exit the numeric input dialog

Do one of the following:

- Tap the Done button in the upper-right corner of the dialog.
- Tap anywhere outside the dialog.

If you have an external keyboard connected to your iPad, you can use Keyboard shortcuts for numeric input dialog.

Undo and redo edits in Logic Pro for iPad

In Logic Pro, you can undo one or more edit operations, and redo undone edits.

Undo your last edit operation

- In Logic Pro, tap the Undo button in the control bar. Each additional tap of the Undo button undoes the previous edit.

Redo the last undone edit

- In Logic Pro, touch and hold the Undo button in the control bar, then tap the Redo command that appears below the button.

Show separate Undo and Redo buttons

By default, you use the Undo button to both undo and redo edits. You can also show a separate Redo button in the control bar and use it to redo edits.

1. In Logic Pro, tap the More button in the control bar, then tap Customize Control Bar.
2. Tap Modes, then tap the Redo switch.

Work with projects

Intro to projects in Logic Pro for iPad

A *project* is a Logic Pro document that contains your recordings, the media files you add, and all the changes you make. You start working in Logic Pro by creating a project or opening an existing project.

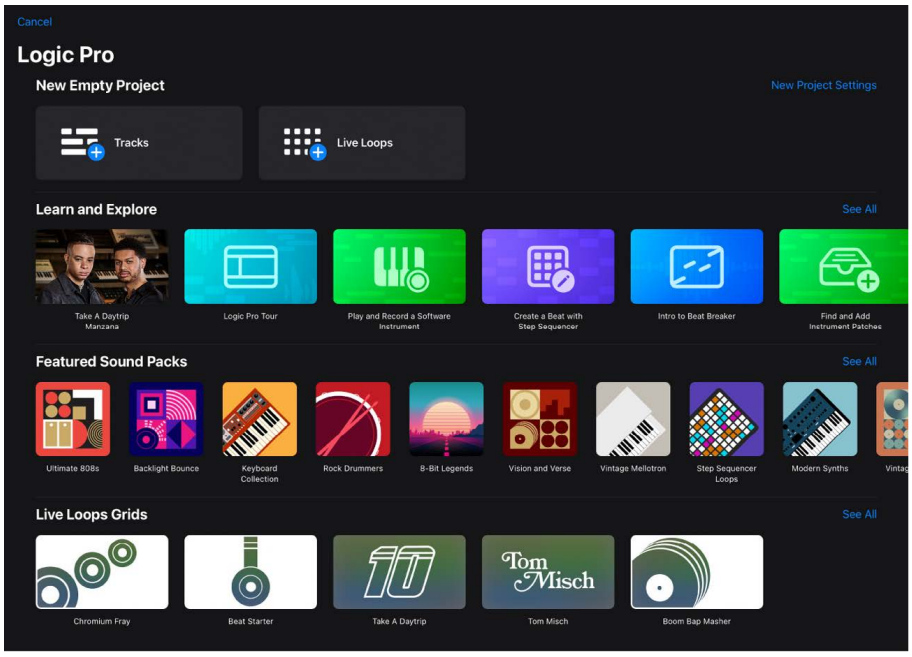
When you create a project, you can set new project settings, including the project tempo, time signature and key, and sample rate. You can edit these settings later while you're working.

You create new projects, open existing projects, manage projects, and delete projects in the New Project Chooser. You can also open Logic Pro for Mac projects in Logic Pro for iPad to continue working, then share them back to the app in which they were created.

Create projects in Logic Pro for iPad

You start working in Logic Pro by creating a new project. In the New Project Chooser, you can create an empty project using either the Tracks area or the Live Loops grid as the starting point for a new project.

You can edit new project settings, including the project tempo, time signature, key, and sample rate, in the New Project Settings window when you create a project, and change them later while you're working.



Create an empty project

1. In Logic Pro, tap the Projects Browser button ﹤ next to the project name in the control bar.
2. Do one of the following:
   - Tap the Create Project button in the Projects list.
   - Tap the New Project button ＋ in the menu bar.
3. In the New Project Chooser, tap the project type you want to create (Tracks or Live Loops).

Edit new project settings

1. In Logic Pro, tap the Projects Browser button ﹤ next to the project name in the control bar.
2. Tap the New Project button ＋ in the menu bar to open the New Project Chooser.
3. In the New Project Chooser, tap New Project Settings.
4. To change the project tempo, do one of the following:
   - Drag the Tempo value in the display up or down to change the tempo.
   - Tap the Tempo value in the display, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad. You can also tap the tempo on the Tap Tempo button at the bottom of the dialog.
5. To change the time signature, do any of the following:
   - Drag the Number of Beats value up or down to change the number of beats.
   - Tap the Time Signature value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
   - Tap the Note Value pop-up menu, then choose a new note value.
6. To change the key:
   - In the Key Signature area, tap the Key pop-up menu, then choose a new key.
7. To change the sample rate:
   - Tap the Sample Rate pop-up menu, then choose a sample rate.
8. Tap outside the New Project Settings window to close it.

Open and close projects in Logic Pro for iPad

You can open an existing project to continue working.

When you close a project and return to the New Project Chooser, all the changes you've made since the project was last opened are saved to the project. Logic Pro also saves your work automatically so that you don't lose important changes if the app quits unexpectedly.

You can also work with projects from Logic Pro for Mac in Logic Pro for iPad.

Open a Logic Pro project

1. In Logic Pro, tap the Projects Browser button ﹤ in the control bar.
2. In the Projects browser, tap the project to open it.

Open a demo song

Logic Pro includes several demo songs in the New Project Chooser.

1. In Logic Pro, tap the Projects Browser button ‹ in the control bar.
2. Do one of the following:
   - Tap the Create Project button in the Projects list.
   - Tap the New Project button + in the menu bar.
3. In the New Project Chooser, scroll down to the Demo Songs section.
4. Tap the demo song you want to open.

Open a Logic Pro for Mac project

1. Share the Logic Pro for Mac project to your iPad.
2. In Logic Pro, tap the Projects Browser button ‹ in the control bar.
3. In the Projects browser, locate the Logic Pro for Mac project and tap to open it.

Logic Pro for Mac projects using certain features can't be opened in Logic Pro for iPad. For more information about working with Logic Pro for Mac projects in Logic Pro for iPad, see Work with projects from Logic Pro for Mac.

Close an open project

- In Logic Pro, tap the Projects Browser button ‹ in the control bar.

  The current state of the project is saved.

Play projects in Logic Pro for iPad

You start and stop a Logic Pro for iPad project using the Play button, and you can control project playback using the transport buttons in the control bar. When you play a project, playback starts from the current playhead position. If Cycle mode is turned on, playback starts from the beginning of the cycle area.

Start project playback

- In Logic Pro, tap the Play button ▶ in the control bar (or press the Space bar).

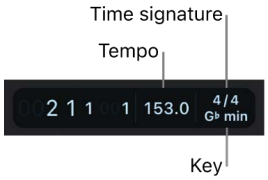
  Tap the Play button again to stop project playback.

Start project playback from the last start position

- In Logic Pro, do one of the following:
  - If the project is stopped, double-tap the Play button ▶ in the control bar.
  - If the project is playing, tap the Play button ▶ in the control bar again.

Edit project properties in Logic Pro for iPad

Each Logic Pro project has properties that include the project tempo, key and scale, time signature, and sample rate. You can set project properties when you create a project and change them later while you're working. Some project properties, such as tempo and sample rate, should usually be set when you create the project because they can affect recordings or media files you add to the project, creating extra work.



Set the project tempo

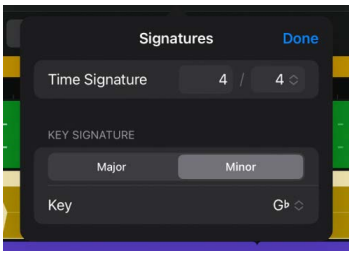
In Logic Pro, do one of the following:

- Drag the Tempo value in the display up or down to change the tempo.
- Tap the Tempo value in the display, then then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad. You can also tap the tempo on the Tap Tempo button at the bottom of the dialog.
- Tap Done to exit the dialog.

For information about the Tempo track and creating tempo changes, see Intro to the Tempo track.

Set the project time signature

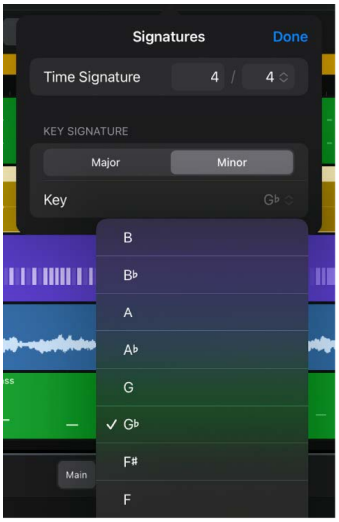
1. In Logic Pro, tap the time signature in the display.
2. In the Signatures window, do one of the following:



   - Drag the Number of Beats value up or down to change the number of beats.
   - Tap the Number of Beats value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
3. Tap the Note Value pop-up menu, then choose a new note value.
4. Tap Done to exit Settings.

Set the project key signature

1. In Logic Pro, with the playhead at the start of the project, tap the project key in the display.
2. In the Signatures window, tap the Key pop-up menu and choose a new key.



3. Tap either Major or Minor.
4. Tap Done to exit the Signatures window.

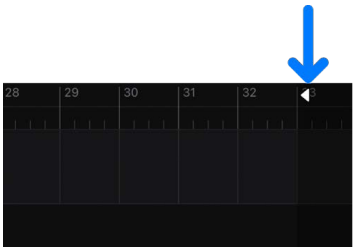
Set the project sample rate

1. In Logic Pro, tap the More button ⋯ in the control bar, then tap Settings.
2. Tap Project Settings, then tap Audio.
3. Tap the Sample Rate pop-up menu, then choose a new sample rate.
4. Tap Done to exit the Project Settings.

Set the project end point

Logic Pro projects start at position 1 1 1 1 (as shown in the display). When you create a project in Logic Pro, by default the project is 32 bars long. You can set the Project End marker to remove unused bars at the end of the project, or to make the project longer.

1. In Logic Pro, swipe right in the Tracks area until you see the Project End marker.



2. Drag the Project End marker horizontally to shorten or lengthen the project.

During playback, a project stops when it reaches the Project End marker. When recording, the Project End marker moves to accommodate the end of the recording, if recording extends past the current position of the marker.

Manage projects in Logic Pro for iPad

You can move, copy, duplicate, and rename Logic Pro projects in the Projects Browser, and manage them in other ways.

Move a project

1. In Logic Pro, tap the Projects Browser button ﹤ on the left side of the control bar.
2. In the Projects browser, touch and hold the project, then tap Move.
3. Browse to the location where you want to move the project.
4. Tap Move in the upper-right corner of the Move dialog.

Copy a project

1. In Logic Pro, tap the Projects Browser button ﹤ on the left side of the control bar.
2. In the Projects browser, touch and hold the project, then tap Copy.
3. Browse to the location where you want to copy the project.
4. Tap the background, then tap Paste.

Duplicate a project

1. In Logic Pro, tap the Projects Browser button ﹤ on the left side of the control bar.
2. In the Projects browser, touch and hold the project, then tap Duplicate.

   A duplicate project appears below the original, appended with a number to indicate it that it is a duplicate.

You can open the duplicate project and start working, or rename the duplicate to easily distinguish it from the original.

Rename a project

1. In Logic Pro, tap the Projects Browser button ﹤ on the left side of the control bar.
2. In the Projects browser, touch and hold the project, then tap Rename.
3. Enter a new name for the project.

Delete Logic Pro for iPad projects

You can delete Logic Pro projects in the Projects browser if you no longer want to keep them.

Delete a project

1. In Logic Pro, tap the Projects Browser button ﹤ on the left side of the control bar.
2. In the Projects browser, touch and hold the project, then tap Delete.

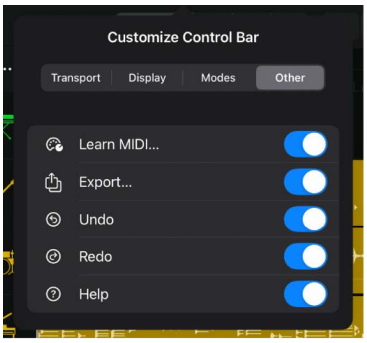
When you delete a project, it can no longer be edited or played.

Customize the control bar in Logic Pro for iPad

The control bar, located at the top of the Logic Pro interface, offers a default set of buttons and controls for many app functions. In the middle of the control bar is the display, which shows the playhead position along with the project tempo, key, and time signature.

Change the controls in the control bar

1. In Logic Pro, tap the More button on the right side of the control bar, then tap Customize Control Bar.
2. Do any of the following:
   - *To show or hide the transport buttons:* Tap Transport, then tap the switches for individual buttons.
   - *To choose the time format for the display:* Tap Display, tap the Position pop-up menu, then choose a time format (Beats, Time, or Beats & Time).
   - *To show or hide the tempo, time and key signature, MIDI, or CPU/Memory display:* Tap Display, then tap the switches for individual controls.
   - *To show or hide the metronome, count-in, tuner, or other controls:* Tap Modes, then tap the switches for individual controls.
   - *To show or hide the Export, Undo, Redo, Learn MIDI, or Help buttons:* Tap Other, then tap the switches for individual controls.



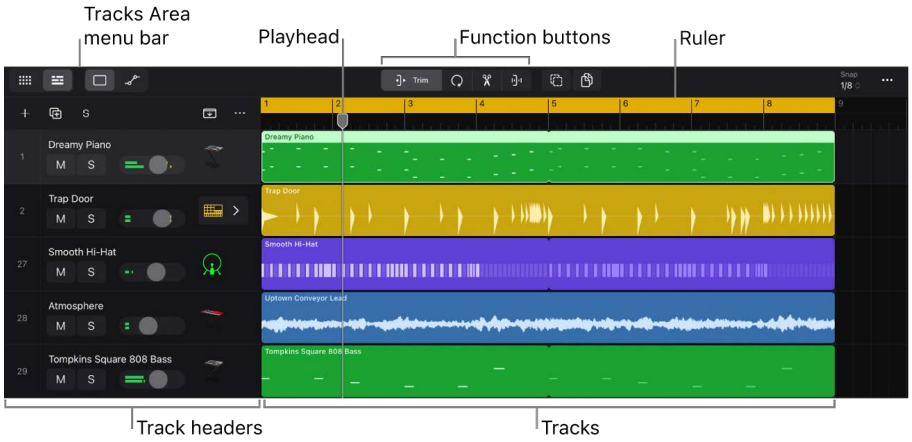
3. Tap outside the dialog to exit it.

Work with tracks

Intro to tracks in Logic Pro for iPad

Tracks help you organize and control the sound of the recordings and other material in a Logic Pro for iPad project. You record and arrange regions on tracks in the Tracks area and use the same tracks for the cells in the Live Loops grid. Each track is assigned to a channel strip in the Mixer.

When you create a track, you choose the track type and the default region type. You can also set new track options, including opening the Browser to browse for patches.



Logic Pro projects can include the following track types:

- *Audio tracks:* Contain audio regions from audio recordings, audio Apple Loops, and imported audio files.
- *Software instrument tracks:* Contain MIDI regions from software instrument recordings, software instrument Apple Loops, Session Player regions, and Step Sequencer pattern regions.

Each track has a track header located to the left of the track, which shows the track number and track icon. Track headers also contain controls that you can use to mute, solo, and adjust the volume level of the track, and control other track functions.

You can use track stacks to organize projects with high track counts and simplify the creation of audio subgroups for related tracks. There are two types of track stacks: *folder stacks* and *summing stacks*, which are useful in different situations.

You can view and edit track parameters for the selected track in the inspector.

A special set of tracks called global tracks appear below the ruler in the Tracks area. Global tracks provide a way to view and edit different aspects of the overall project, such as tempo and transposition, which affect all tracks in the project.

Create tracks in Logic Pro for iPad

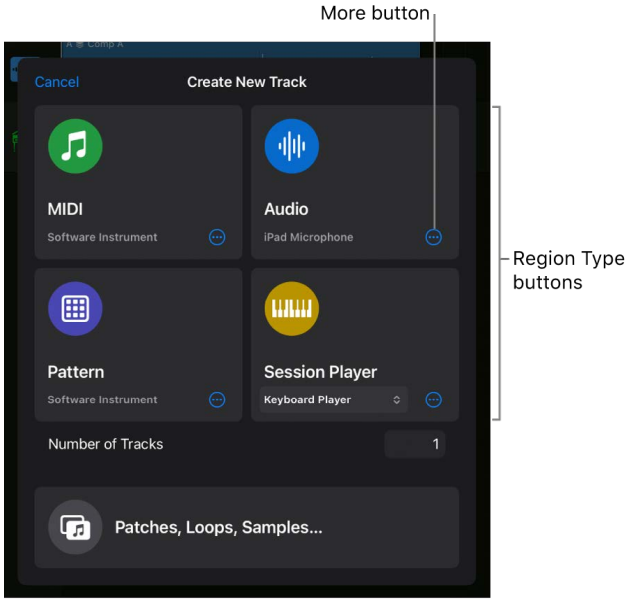
You add tracks to a Logic Pro for iPad project to organize your recordings, loops, and other material. You can create audio or software instrument tracks in the New Tracks dialog. When you create a software instrument track, you choose the default region type for the track and can set other new track options. The available options vary depending on the type of track you create.

You can also create multiple tracks of the chosen type.

When you create a new track, a corresponding new channel strip is also created in the Mixer.

Create new tracks

1. In Logic Pro, tap the Add Tracks button + above the track headers.



2. In the New Tracks dialog, do one of the following:
   - To create an audio track, tap the Audio button.
   - To create an instrument track, tap the MIDI or Pattern button, depending on the default region type you want the track to have. The default region type also determines which editor opens when the track is selected.

     For information about region types, see Intro to regions.
   - To create an instrument track using a Session Player, choose the Session Player you want to use (Keyboard Player, Bass Player, or Drummer) from the pop-up menu in the Session Player button, then tap the Session Player button.

     For information about Session Players, see Session Player overview.
   - To set new track options, tap the More button ⋯ for the track or region type.

Create multiple tracks

In the New Tracks dialog, do one of the following:

- Drag the Number of Tracks value up or down to edit the value.
- Tap the Number of Tracks value, then tap the Decrement/Increment buttons or drag the scroll wheel to edit the value.

Set new track options

1. In the New Tracks dialog, tap the More button ⋯ for the region type you want to work with.
2. Do any of the following:
    - *For instrument tracks:*
        - To use the default patch on the track, tap the Patch / Instrument pop-up menu and choose Default patch.
        - To use a default instrument plug-in on the track, tap the Patch / Instrument pop-up menu and choose Instrument, then choose an instrument from the submenu.
        - To set whether the Browser opens when a new track is created, tap the Open Browser switch. When Open Browser is active, a Type pop-up menu becomes available, from which you can choose whether the Browser opens showing patches or loops.
        - To choose the style for Session Player regions on instrument tracks, tap the Style pop-up menu, then tap a style.

          If you don’t want the Session Player region on the new track to use the default progression, deselect the “Use Default Chord Progression for New Regions” checkbox.
        - To set whether the Play Surface opens when a new track is created, tap the Open Play Surface switch.
        - To use the track for an external instrument, tap the Use External MIDI switch. When Use External MIDI is turned on, pop-up menus appear for MIDI Output and MIDI Out Channel.

          Use the MIDI Output pop-up menu to choose the MIDI output port or MIDI device to use as the MIDI destination.

          Use the MIDI Out Channel pop-up menu to choose the MIDI output channel to use. You can also choose All to send MIDI messages using their original channels.
        - For instrument tracks with Session Player or pattern as the default region type, an Open Editor switch appears. Tap the switch to open the Session Player Editor or Step Sequencer when a new track is created.
    - *For audio tracks:*
        - To set the audio input format, tap the Format pop-up menu and choose Mono or Stereo.
        - To set the audio input channel, tap the Channel pop-up menu and choose a mono or stereo input.
        - To change the order in which audio inputs are displayed, tap the Ascending switch.

- To use the default audio patch on the track, tap the Patch pop-up menu and choose Default Audio Patch.
- To set whether the Browser opens when a new track is created, tap the Open Browser switch.
- To set whether the Browser shows audio patches or loops, tap the Type pop-up menu and choose Patches or Loops.

3. Tap Create in the upper-right corner of the New Tracks dialog.

Create tracks using drag and drop in Logic Pro for iPad

You can quickly create new tracks in Logic Pro for iPad by dragging items such as patches, regions, audio files, loops, or samples to different destinations. You can:

- Drag an instrument or audio patch to the track header area to create a new track using the patch.
- Drag a region or cell to the track header area to create a new sample-based instrument track using an audio bounce of the region or cell.
- Drag a loop or sample to the track header area to create a new sample-based instrument track using the loop or sample.
- Drag an audio file, loop, or sample to the Tracks area to create a new track containing a region created from the file, loop, or sample.
- Drag multiple items to the track header area to create new empty tracks, and drag multiple items to the Tracks area to create new tracks containing the items as regions.

Dragging an audio or software instrument region or cell, an audio file, an Apple Loop, or a sample to the area below the track headers creates a new sample-based software instrument track. When you create a track by dragging one of these items, you can choose whether the track uses a Quick Sampler or Sample Alchemy instrument plug-in or a Drum Machine Designer track stack. When Quick Sampler is chosen, it uses the Optimized setting. When Sample Alchemy is chosen, it uses the Granular setting. When Drum Machine Designer is chosen, the material is analyzed to determine if it can be sliced. If so, a MIDI region is created that triggers the slices.

When you drag an audio or software instrument region or cell to the track header area to create a track, the region or cell is bounced to an audio file, which is then used by the chosen instrument plug-in on the new track (the bounce includes all effect plug-ins on the track containing the cell or region). When you drag an audio file, a loop, or a sample to the track header area to create a track, that item is used by the chosen instrument on the new track.

You can also create a new track by dragging an audio file, Apple Loop, or sample to the area below all existing tracks in the Tracks area. When you drag an audio file to the area below the existing tracks, an audio track is created. When you drag an Apple Loop, a track of the corresponding type (audio, software instrument, or Session Player) is created.

Create a track by dragging an audio or instrument patch to the track header area

- In Logic Pro, drag an audio or instrument patch from the Browser to the area below all existing track headers in the track list.

  A track of the corresponding type (audio or instrument) using the chosen patch is added below the existing tracks.

Create a track by dragging a region or cell to the track header area

1. In Logic Pro, touch and hold a region or cell, then drag it to the area below all existing track headers in the track list.
2. When the “Create new track with” dialog appears, tap the type of instrument you want to use for the new track.

   An instrument track with the chosen instrument is added below the existing tracks.

Create a track by dragging a loop or sample to the track header area

1. In Logic Pro, touch and hold a loop or sample, then drag it to the area below all existing track headers in the track list.
2. When the “Create new track with” dialog appears, tap the type of instrument you want to use for the new track.

   An instrument track with the chosen instrument is added below the existing tracks.

Create a track by dragging an audio file, loop, or sample to the Tracks area

- Drag an audio file, loop, or sample from the Browser to the area below all existing tracks in the Tracks area.

  A track of the corresponding type is added below the existing tracks, containing a region created from the audio file, loop, or sample.

Choose the default region type for a software instrument track in Logic Pro for iPad

In Logic Pro for iPad, software instrument tracks can have a default region type. The default region type can be MIDI, Session Player, or pattern. When you create a software instrument track, you can choose the default region type in the New Tracks dialog, and you can change it later in the Track inspector.

The default region type determines which editor opens when you tap the Editors button with the track selected, or which editor appears when the Editors area is open with an instrument track selected, but no region is selected.

Regardless of the default region type, an instrument track can contain any combination of MIDI, Session Player, and pattern regions.

Change the default region type for a software instrument track

1. In Logic Pro, select the track.
2. Tap the Inspector button to open the inspector.
3. Tap the Level menu at the top of the inspector and make sure that Track is selected.
4. Tap the disclosure arrow to show General track parameters if needed.
5. Choose a region type from the Default Region Type pop-up menu.
6. Tap the Inspector button to close the inspector.

Select tracks in Logic Pro for iPad

You select a track to perform different operations on it, such as duplicating or renaming the track or editing track parameters. When you select a track, by default the regions on the track are also selected.

You can also search for a track by name or number and select it. The Tracks area scrolls so that the selected track is visible. This is particularly useful for projects with a large number of tracks.

You can select multiple tracks, in order to reorder them as a group or to create a track stack with the selected tracks. When multiple tracks are selected, the first selected track is the focused track. Some operations only affect the focused track when multiple tracks are selected. For example, you can only edit track parameters for the focused track in the inspector.

When working areas in Logic Pro are configured so that only a single track is visible below the control bar, tapping the track icon of the visible track shows a Select Track menu rather than a list of track options, allowing you to choose which track is displayed. For example, if the Mixer is resized to fill most of the screen so that only one track is visible above the Mixer, tapping the visible track icon opens the Select Track menu, so that you can choose which track is displayed.

Select a track

- In Logic Pro, tap either the track icon or track number.

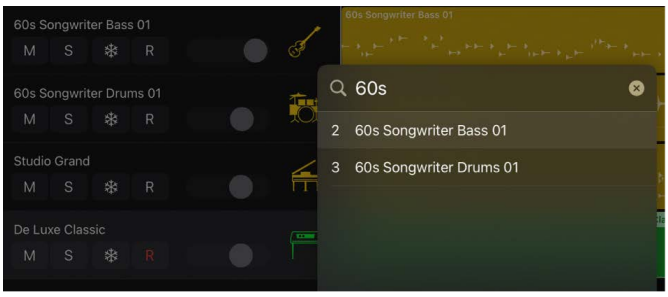
Select multiple tracks

1. In Logic Pro, tap the Multiple Select button in the Tracks area menu bar.
2. Select tracks by tapping either the track icon or track number. Tapping the track number also sets the focus.

   Note: After performing a multiple selection, tap the Multiple Select button again to revert to single selection.

Search for and select a track

1. In Logic Pro, tap the More button ••• above the track headers, then tap Search and Select Track (or press ^⌘T).
2. Enter a track name or track number. As you enter text, the results list shows matching tracks by name and number.



3. To select a track, tap its track name in the results list.

   The Tracks area scrolls to show the selected track.

Select a track using the Select Track menu

- Tap the track icon of the visible track, then choose the track to display from the Select Track menu.

Duplicate tracks in Logic Pro for iPad

You can duplicate a track, creating a new track below the original track with the same instrument and effects settings. The duplicate track can be empty, or it can contain the same content as the original track.

The Duplicate Track button has two states, Duplicate Track and Duplicate Track with Content. You can choose which function it performs, and then use it to duplicate tracks with or without content.

Choose the function for the Duplicate Track button

1. In Logic Pro, touch and hold the Duplicate Track button above the track headers.
2. Under Configure Button, do one of the following:
   - Choose Duplicate Track to duplicate a selected track without its content.
   - Choose Duplicate Track with Content to duplicate a selected track along with its content.

The Duplicate Track button keeps the assigned function until you change it.

Duplicate a track without its content

1. In Logic Pro, tap a track icon to select the track.
2. Do one of the following:
   - Tap the Duplicate Track button above the track headers.
   - Tap the track icon again, then tap Duplicate.

Note: You can choose the function for the Duplicate Track button.

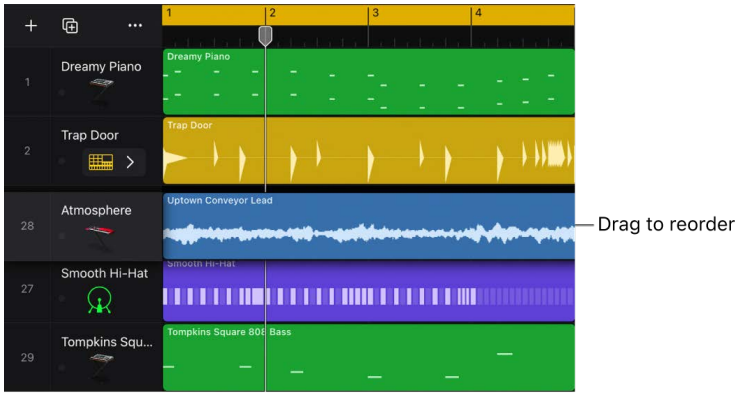
Duplicate a track along with its content

1. In Logic Pro, tap a track icon to select the track.
2. Do one of the following:
   - Tap the Duplicate Track button above the track headers.
   - Tap the track icon again, then tap Duplicate with Content.

Note: You can choose the function for the Duplicate Track button.

Reorder tracks in Logic Pro for iPad

You can reorder tracks in the Tracks area. Changing the order of tracks doesn't affect the sound of a project, but it lets you organize tracks visually to keep instruments in a particular order, or keep related tracks together. For example, you can keep all drum tracks together, or keep all tracks that double the same melody together.



Reorder tracks in the Tracks area

- In Logic Pro, touch and hold a track icon, then drag vertically to move the track up or down.

Rename tracks in Logic Pro for iPad

By default, tracks take the name of the patch used on the track. You can rename tracks to help organize your project and identify different instruments or parts. While renaming, you can move to the previous or next track.

Note: When you rename a track having a default track name and that has not previously been renamed (for example Audio 1 or Inst 1), any regions on the track with the track name as their region name and that have not previously been renamed, as well as the source audio files, are renamed using the new name.

Rename a track

1. In Logic Pro, select a track.
2. Tap the track icon, then tap Rename.

   The track name is highlighted and ready to edit.
3. Enter a new name for the track.
4. To rename the previous track, tap the Up button ^ above the onscreen keyboard (if you are using a hardware keyboard, they appear in the center of the view control bar).
5. To rename the next track, tap the Down button v above the onscreen keyboard (if you are using a hardware keyboard, they appear in the center of the view control bar).
6. Tap anywhere outside the track to exit the Rename field.

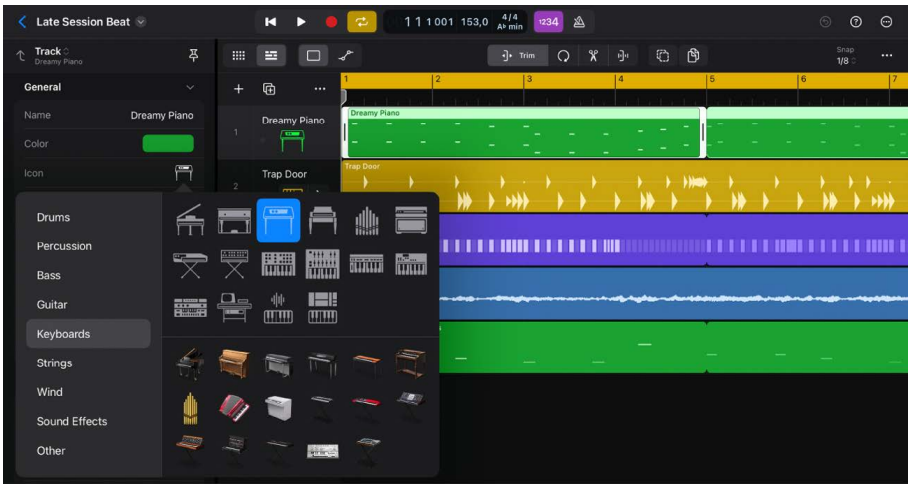
Tip: When renaming tracks using the onscreen keyboard, you can also tap the Tab key to move to the next track.

Change track icons in Logic Pro for iPad

By default, tracks use the same icon as the patch chosen for the track. You can change a track icon at any time while working on a project.

Change the icon for a track

1. In Logic Pro, select a track.
2. Tap the Inspector button in the view control bar.
3. In the inspector, make sure Track is selected in the Level menu.
4. Tap the Icon image, then tap a new icon from the Icon menu.



5. Tap the Inspector button again to close the Track inspector.

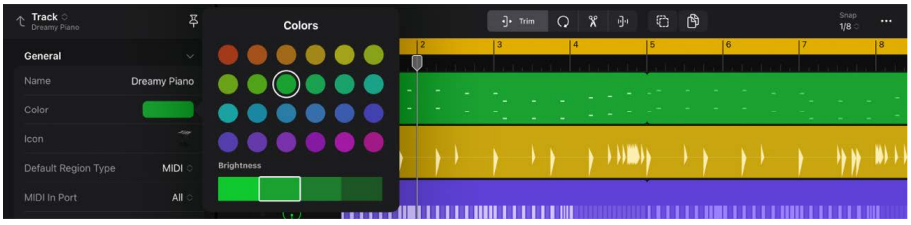
Change track colors in Logic Pro for iPad

By default, track colors reflect the track type. You can change the color of specific tracks to help visually organize the Tracks area and identify tracks in a large arrangement. Track colors are visible when you customize the track headers to show track color bars. Also, any new MIDI regions created on a software instrument track reflect the track color.

Changing the color of a track also changes the color of the corresponding channel strip in the Mixer.

Change the color of a track

1. In Logic Pro, tap a track icon to select the track.
2. Tap the Inspector button in the view control bar.
3. In the inspector, make sure Track is selected in the Level menu.
4. Tap the Color well, then tap a new color in the Colors palette.



5. Tap the Inspector button again to close the Track inspector.

Use the Tuner on an audio track in Logic Pro for iPad

You can tune instruments connected to your iPad with the Tuner to ensure that audio recordings are in tune with any software instruments, samples, or existing recordings in your projects. You can use the Tuner to tune an instrument connected to the audio input for an audio track in your project.

Show the Tuner button

1. In Logic Pro, tap the More button in the control bar, then tap Customize Control Bar.
2. Tap Modes, then tap the Tuner switch.

Use the Tuner

1. In Logic Pro, tap the track header of an audio track to select the track.
2. Tap the Tuner button in the control bar to show the Tuner.
3. Play a single note on the instrument and watch the Tuner. If the note is flat or sharp of the keynote, the note name and horizontal line in the Tuner appear red. The horizontal line points to the left if the note is flat, and to the right if it's sharp.
4. Adjust the tuning of your instrument until the note name and horizontal line appear blue and the horizontal line is centered.

Show the output track in the Tracks area in Logic Pro for iPad

A project can have one output track, which corresponds to the output channel in the Mixer. When shown, it appears below all other tracks in the Tracks area.

Show the output track

- Tap the More button ••• above the track headers, then tap Show Output Track.

Delete tracks in Logic Pro for iPad

You can delete a track if you no longer want to use it in your project.

Delete a track

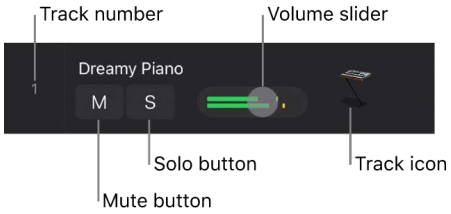
- In Logic Pro, tap a track icon to select the track.
- Tap the track icon again, then tap Delete.

Use track header controls

Intro to track headers in Logic Pro for iPad

Each track includes a track header that displays the track number and icon. Each track header also features a set of track controls, including Mute and Solo buttons and a Volume slider on all tracks and an Input Monitoring button on audio tracks.

You can resize the track headers to show or hide track controls and customize the track headers to show different track controls, including Record Enable, Freeze, and Track On/Off.



Show the track controls

- In Logic Pro, swipe right on the track list to show the track controls.

  To hide the track controls, swipe left on the track list.

Mute and solo tracks in Logic Pro for iPad

You can silence, or mute, a track so that you don't hear it when you play the project. Muting tracks is useful when you want to hear how the project sounds without the track or compare alternate versions of a track.

When you mute a track using the Mute button, the channel strip to which the track is assigned is muted; all tracks in the project that use the same channel strip are also silenced. Plug-ins on the muted channel strip are still processed, however, so the system responds very quickly when tracks are muted or unmuted.

You can solo a track, silencing all tracks that are not soloed. Soloing tracks is useful when you want to work on a track without hearing the other tracks in the project.

The first time any track in a project is soloed, the Clear/Recall Solo button S appears in the area above the track headers. You can quickly unsolo or resolo all soloed tracks using this button.

Mute a track

1. In Logic Pro, show the track controls.
2. Tap the Mute button M in the track header.

   Tap the Mute button again to unmute the track.

Solo a track

1. In Logic Pro, show the track controls.
2. Tap the Solo button S in the track header.

   Tap the Solo button again to unsolo the track.

Quickly mute or solo multiple tracks

- In Logic Pro, touch and hold a Mute button M or Solo button S, then drag vertically over other tracks you want to mute or solo.

Unsolo or resolo all soloed tracks

When a project contains one or more soloed tracks, tapping the Clear/Recall button S unsolos all soloed tracks.

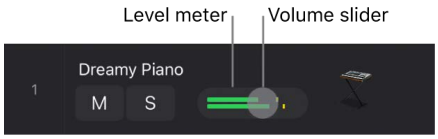
- In Logic Pro, tap the Clear/Recall Solo button S in the area above the track headers.

  To resolo all previously soloed tracks, click the Clear/Recall Solo button again.

If no tracks in the project are currently soloed, tapping the Clear/Recall Solo button solos all tracks, and tapping it again unsolos all tracks.

Set track volume in Logic Pro for iPad

You can set the volume level of each track, to balance the relative volume of the tracks in the project.



Set track volume

1. In Logic Pro, show the track controls.
2. Drag the Volume slider left or right to change the volume level.

The level meter in a track's Volume slider shows the output volume for the track as the project plays. You can watch the level meter as you record to the track to see if clipping occurs on the track.

You can also adjust the volume level of the selected track, adjust track pan/balance position, and perform other mixing functions using the Fader.

Make tracks ready for recording in Logic Pro for iPad

You make a track ready for recording by tapping the track's Record Enable button R in the track header, or by selecting a single track, making it the focused track. When you make a track ready to record by tapping its Record Enable button, the button blinks red. When you give a track focus, the letter *R* in its Record Enable button turns red.

When you start recording (by tapping the Record button ● in the control bar), Record Enable buttons of record-ready tracks turn solid red; they return to their previous state when recording ends.

Multiple tracks can be ready to record as long as each track has a unique input (chosen in the Input slot in the Mixer). Multiple tracks that use the same input cannot be simultaneously record-ready.

For information about recording to multiple audio tracks, see Record to multiple audio tracks. For information about recording to multiple software instrument tracks, see Record to multiple software instrument tracks.

Make a track ready for recording

1. In Logic Pro, show the track controls (if they are not already visible).
2. Do one of the following:
   - Tap the Record Enable button R in the track header.
   - When no track is record-ready, select a single track.

If the Record Enable button does not appear in the track headers, customize the track headers so that it is visible.

Use input monitoring on tracks in Logic Pro for iPad

You can turn on input monitoring to hear the output of audio and software instrument tracks that are not enabled for recording. This is useful when you want to set levels or practice a part before you commit to recording it. You can leave input monitoring turned on before, after, and during recording.

On software instrument tracks, you can simply select (focus) the track to hear yourself play. Input monitoring is useful when you want to play multiple tracks simultaneously, or when used in conjunction with MIDI Input and MIDI In Channel settings to play a software instrument with an external MIDI keyboard, sequencer, or other external source independent of which track is focused.

On audio tracks, the Input Monitoring button is hidden when both the iPad microphone and the iPad speakers are selected in General Audio settings.

When the track input is set to No Input, the Input Monitoring button is dimmed and inactive.

Note: Input monitoring is available only when Software Monitoring is turned on in App Settings > Audio > General. Software monitoring is typically turned on when either the audio input or the audio output is set to an external rather than an internal source, and it is inactive when both audio input and audio output are set to the internal iPad microphone and speakers. See General Audio settings.

Turn on input monitoring for a track

1. In Logic Pro, show the track controls.
2. Tap the Input Monitoring button | in the track header.

   To turn off input monitoring on the track, tap the Input Monitoring button again.

If the Input Monitoring button does not appear in the track headers, customize the track headers so that it is visible.

Input monitoring always involves latency. The amount of latency depends on the hardware you are using to record. In certain cases, input monitoring might make it difficult to obtain the best possible timing. Route the signal you want to record directly to headphones or a monitoring amplifier—and to the audio interface inputs, for recording. You won't accidentally overdrive your A/D converters because the input level meters display a clipping warning if an overload occurs.

Turn off tracks in Logic Pro for iPad

You can turn tracks on or off in the Tracks area. Turning a track off lets you silence the track while still hearing other tracks in the project assigned to the same channel strip. When no other track is assigned to the same channel strip, turning off a track also saves processing power because plug-ins on the channel strip are no longer processed. Turning a track off (or turning it back on) takes slightly longer than muting or unmuting the track because of internal pre-processing. Unlike muting a track, turning off a track can't be automated.

When a software instrument track is turned off, all MIDI regions on the track are silenced, but live input (playing) is still audible.

You can also control dynamic loading of plug-ins on a track using the On/Off button. When you open a project, plug-ins on tracks that are turned off aren't loaded, even if the tracks contain regions. While working on the project, plug-ins aren't loaded on a track that is turned off when the track is focused, or when regions are added to the track. When the track is turned on, plug-ins are loaded if the track becomes focused. You can also make the plug-ins on a track inactive using the On/Off button.

Turn tracks on or off

- In Logic Pro, show the track controls.
- Tap the On/Off button in the track header.

If the On/Off button does not appear in the track headers, customize the track headers so that it is visible.

Freeze tracks in Logic Pro for iPad

You can freeze a track, reducing its processor usage to that of a high-resolution audio track without effect plug-ins, regardless of the number or complexity of the plug-ins actually used on the track. Freezing is particularly useful for software instrument tracks and for audio tracks that use complex effects. It is not available for multi-output software instruments.

When you freeze a track, the track is bounced to an audio *freeze file*, which includes the output of any plug-ins on the track and any track automation. While the track is frozen, the freeze file plays back in place of the original track, which is temporarily deactivated (including its plug-ins). You can still use track controls (such as mute and solo), but you can't edit track content (including region mute or solo, for example).

If you want to edit the track, you can unfreeze it, make the changes, and then freeze the track again.

Freeze is designed to circumvent CPU-intensive processes, such as complex software instruments and complex plug-ins (such as reverbs, filter banks, or Fourier transform–based effects). If your iPad can calculate all active processes in real time, freezing tracks is unnecessary. Freezing tracks is recommended when tracks with CPU-intensive software instrument or effect plug-ins are in a finalized state, requiring no further changes. Freezing also helps to free memory in low-memory situations, such as when using memory-intensive software instruments.

You can also have Logic Pro automatically freeze tracks if the iPad can't process the audio in time. See General.

Freeze a track

1. In Logic Pro, select the track, then show the track controls.
2. Tap the Freeze button ❄ in the track header.
3. Tap the Inspector button.
4. In the inspector, tap the disclosure arrow for the More section.
5. Tap the Freeze Mode menu, then choose the Freeze mode:
   - *Source Only:* Freezes the track signal without any effect plug-ins. When selected, the Freeze button appears green. This Freeze mode is useful when using processor-intensive software instruments.
   - *Pre Fader:* Freezes the track signal including all effect plug-ins. When selected, the Freeze button appears blue.
   - Tap the Play button ▶ in the control bar to trigger freezing. Tap it again to start playback.

     To unfreeze the track, tap the Freeze button again.

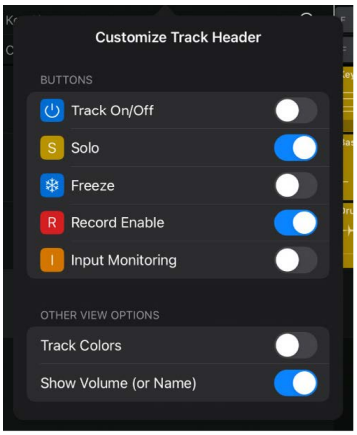
If the Freeze button does not appear in the track headers, customize the track headers so that it is visible.

Customize the track headers in Logic Pro for iPad

You can customize the track headers to show more or fewer controls, including the Solo, Record Enable, Input Monitoring, Track On/Off, and Freeze buttons and the Volume slider, as well as the track color bars.

Customize the track headers

1. In Logic Pro, tap the More button ••• above the track headers, then tap Customize Track Header.



2. In the Customize Track Header window, tap the switches to show or hide track control buttons and other view options.

Work with track stacks

Intro to track stacks in Logic Pro for iPad

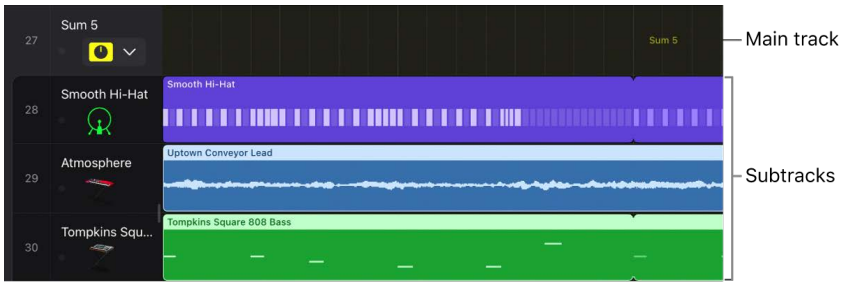
Track stacks provide a convenient way to organize and control tracks, to manage projects with high track counts, and to create and manage audio subgroups. You can create a track stack from a group of existing tracks and use the controls on the master track to control all the subtracks in the track stack.

Logic Pro has two types of track stacks: *folder stacks* and *summing stacks*. Both types have a main track and one or more subtracks. The track icon for the main track features a disclosure arrow that lets you show or hide the subtracks. When you close the stack, only the main track appears in the Tracks area.

Subtracks can include audio, software instrument, and aux tracks and can also include track stacks as subtracks.

Folder stacks

Folder stacks let you combine multiple tracks and control them as one unit, without changing the audio routing of the individual subtracks. When you create a folder stack, the channel strip assigned to the main track is called the *stack master*. Using the main track or the stack master channel strip, you can mute, solo, and adjust the volume level for the folder stack. This is similar to the way a Voltage Controlled Amplifier (VCA) master fader functions on a hardware mixing console.

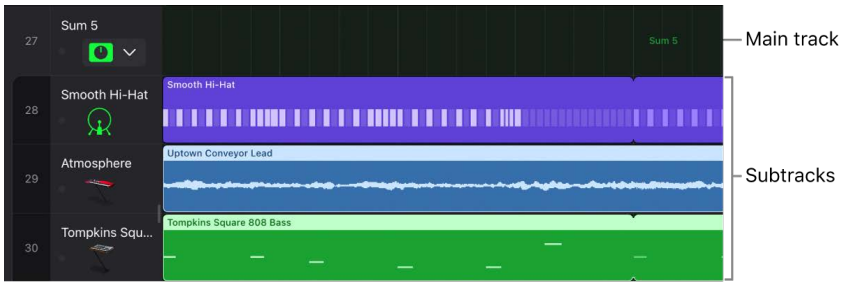


There is no patch for the main track of a folder stack, and no patch can be saved when the main track is selected. There are no regions on the main track of a folder stack, only on its subtracks. When the folder stack is closed, the main track displays an overview of the combined contents of all subtracks.

When you mute a folder stack using the Mute button on the main track (or stack master channel strip), the mute or solo state of individual subtracks is preserved, and it becomes active again when the main track is unmuted.

Summing stacks

Summing stacks let you combine multiple tracks and route their output to an audio subgroup. When you create a summing stack, the outputs from the subtracks are routed to a bus. The destination aux of the bus is assigned to the main track. When the main track is selected, you can mute, solo, and adjust volume and send levels for the summing stack and add and edit plug-ins, affecting the sound of all the subtracks in the summing stack. This is similar to the way an audio group works.



If a summing stack contains software instrument tracks as subtracks, you can record and play MIDI regions on the main track. MIDI events on the main track are played by all the software instrument subtracks in the summing stack. You can also record and play MIDI regions on individual (software instrument) subtracks. When the summing stack is closed, the main track displays an overview of the combined contents of all subtracks.

When the main track of a summing stack is selected, you can choose a different patch for the summing stack and create your own patches. Patches for a summing stack can include the main track and all subtracks, along with their channel strip and plug-in settings. Logic Pro includes a set of patches designed for use with summing stacks.

After you create a summing stack, you can route individual subtracks to different destinations. In the Bus submenu of the Send pop-up menu on subtracks, local busses are sorted into stack submenus. Note that if you route subtracks to a destination “outside” of the stack, those subtracks are no longer affected by the controls on the main track. Audio subgroups you create are saved as part of the summing stack, and their auxes appear as the last (bottom) subtracks in the summing stack.

Create and edit track stacks in Logic Pro for iPad

You create a track stack by selecting tracks in the Tracks area. Any nonadjacent tracks move so that they are grouped together in the track stack. Both folder stacks and summing stacks can contain any combination of track types as subtracks. A folder stack can also include summing stacks as subtracks.

You can hide the subtracks of a track stack to save space and then show them in order to record or edit. You can add tracks to a track stack, remove tracks from a track stack, and reorder tracks in a track stack (reordering tracks doesn’t affect the sound).

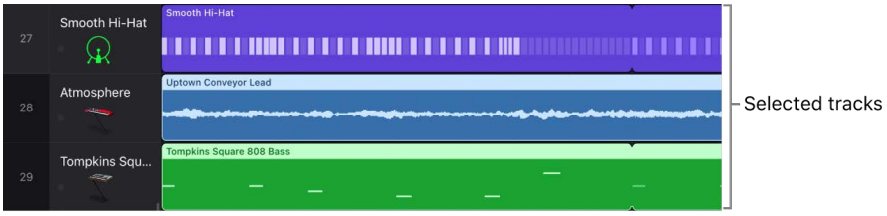
After creating the summing stack, you can route individual subtracks to a different destination. If you do so, however, the rerouted subtracks are no longer controlled by the main track’s channel strip.

You can add, remove, and reorder subtracks, nest a track stack inside another track stack, and flatten a track stack, in which case the subtracks again become normal tracks.

- When you flatten a folder stack, the main track is deleted if its Volume fader is set at 0 dB (unity gain) and it contains no automation data.
- When you flatten a summing stack, the audio subgrouping is retained, unless there is no audio processing on the main track aux (no plug-ins, Volume fader set to 0 dB, Pan/Balance set to neutral, and no automation data). In this case, all subtracks (or their audio subgroups) are routed to the stereo main output, and the main track aux is deleted.

Create a track stack

1. In Logic Pro, tap the Multiple Select button in the Tracks area menu bar.
2. Select tracks you want to use as subtracks in the track stack.

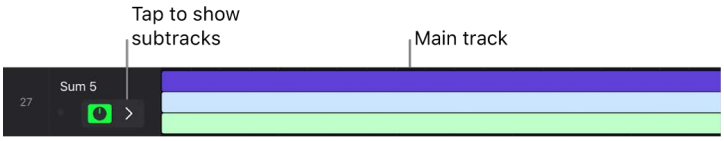


3. Tap the Multiple Select button again to deselect it.
4. Tap the icon of one of the selected tracks, then do one of the following:
   - To create a folder stack, tap Create Folder Stack.
   - To create a summing stack, tap Create Summing Stack.

   The track stack appears in the Tracks area, with the selected tracks as subtracks.
5. You can drag additional tracks into the track stack to add them as subtracks.

Show or hide subtracks

- In Logic Pro, tap the disclosure triangle in the track icon of the main stack.



Reorder subtracks

- In Logic Pro, touch and hold the track icon for a subtrack, then drag vertically to move the subtrack up or down.

Add a track to a track stack

- In Logic Pro, touch and hold a track icon, then drag the track between two subtracks in the track stack.

Remove a subtrack from a track stack

- In Logic Pro, drag the subtrack outside of the track stack (below the last subtrack, or above the main track).

  When you remove a subtrack from a summing stack, the track's output routing changes from the aux used by the main track to the main outputs.

Nest a track stack inside another track stack

- In Logic Pro, touch and hold the track icon of the track stack you want to nest, then drag it between two subtracks in the track stack you want to nest it inside.

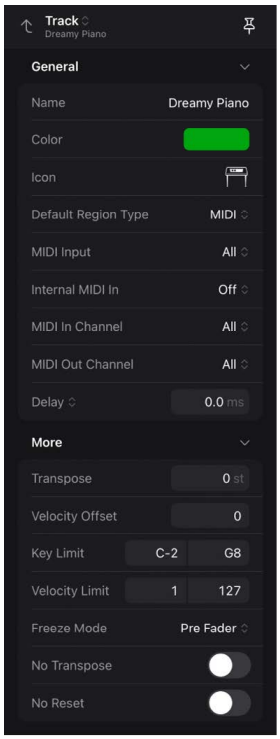
Flatten a track stack

- In Logic Pro, double-tap the track icon of the track stack, then tap Flatten Stack.

Edit track parameters in Logic Pro for iPad

Each track has a set of parameters. The parameters available depend on the track type (some parameters are common to all track types, while some are specific to audio tracks or software instrument tracks only). You can view and edit parameters for the selected track in the Track inspector.

All track types have a track name, track color, and track icon, which appear in the General category in the Track inspector. Other track parameters include the following:



All track types have a track name, which is shown at the top of the Track inspector when the track is selected, and a track icon, which appears in the track header. Track parameters for each track type are listed below:

Common track parameters

- *Name field:* Tap to select the current name, then enter a new name for the track.
- *Color:* Tap to open the Colors palette, then tap to choose a new track color.
- *Icon:* Tap to open the Icon menu, then tap to choose a new track icon.

Audio track parameters

- *Freeze Mode pop-up menu:* Choose Source Only to freeze the track signal without effect plug-ins, or choose Pre Fader to freeze the track with all effect plug-ins. See Freeze tracks.
- *Q-Reference switch:* (available only for projects shared from Logic Pro for Mac on audio tracks belonging to a Mixer group with "Editing (Selection)" and "Quantize-Locked (Audio)" turned on). When turned on, all regions on the track contribute their transients as reference points during the quantization process.
- *Flex switch:* Turn Flex on or off for the track.
- *Flex Mode pop-up menu:* Choose the flex mode for the track. See Flex Time algorithms and parameters.

  Depending on which flex mode you choose, other parameters become available below the Flex Mode pop-up menu.
- *Fill Gaps switch:* Turns the decay function on or off, allowing you to fill any gaps that occur between sounds as a result of shifting the audio.
- *Decay value field:* Sets the decay time between sounds because no time stretching takes place to compensate for the gaps.
- *Slice Length value field:* Shortens each slice by a percentage value. Shortening slices can be helpful for removing unwanted pre-attack sounds from the following slice, or to create a gated effect.

Software instrument tracks

- *Default Region Type pop-up menu:* Tap, then choose a new default region type.
- *MIDI Input pop-up menu:* Tap, then choose one of the following options:
  - *Off:* The track uses no MIDI input source.
  - *All:* The track uses any available MIDI source as input.
  - *Play Surface:* The track uses the selected Play Surface as a MIDI source.
  - *A listed MIDI port or device:* The track uses only the selected MIDI port or device as input. (default)
  - *Logic Pro Virtual In:* The track receives MIDI messages from another music app on your iPad.
  - *Bluetooth MIDI Devices:* Opens the Bluetooth MIDI Devices window so that you can connect or pair a Bluetooth device to choose as the MIDI source.
- *Internal MIDI In pop-up menu:* Choose a track with an instrument plug-in to provide internal MIDI input, or choose Off. You can also choose the output of a MIDI effect plug-in, or the output of an instrument plug-in capable of sending MIDI events, when these have been configured to be used as internal MIDI input sources. See Route MIDI internally to software instrument tracks.
- *Record pop-up menu:* Choose whether to record only the Internal MIDI In signal or both MIDI input and Internal MIDI In. (The menu is available when Internal MIDI In is set to anything other than Off.)
- *MIDI In Channel pop-up menu:* Choose a MIDI channel to receive input from only that channel, or choose All to receive input from all MIDI channels.

- *MIDI Output pop-up menu:* Tap, then choose one of the following options (this menu is available when a MIDI track using the External Instrument plug-in is selected):
  - *None:* No MIDI output is used.
  - *A listed MIDI port or device:* The track uses only the selected MIDI port or device as output.
  - *Logic Pro Virtual Out:* The track sends MIDI messages to another music app on your iPad.
  - *Bluetooth MIDI Devices:* Opens the Bluetooth MIDI Devices window so that you can connect or pair a Bluetooth device to choose as the MIDI output.
- *MIDI Out Channel pop-up menu:* Choose the MIDI channel for the track output, or choose All to send to all MIDI channels, with each MIDI signal keeping its original channel.
- *Delay in pop-up menu:* Tap, then choose whether the delay value is displayed in ticks or milliseconds. The value changes accordingly. When set to milliseconds, the delay value is independent of the tempo.
- *Delay value field:* Drag the Delay value up or down to edit the value, or tap the value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Transpose value field:* Drag the Transpose value up or down to edit the value in semitones, or tap the value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Velocity Offset value field:* Drag the Velocity Offset value up or down to edit the velocity for all regions on the track, or tap the value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Key Limit value fields:* The left field shows the lower key limit, and the right field shows the upper key limit. Drag the value each field up or down to edit the value, or tap each value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

  The two values together define the key range; any notes outside this range are not played.
- *Freeze Mode pop-up menu:* Choose Source Only to freeze the track signal without effect plug-ins, or choose Pre Fader to freeze the track with all effect plug-ins. See Freeze tracks.
- *No Transpose switch:* When turned on, regions on the track are not transposed (the Transpose Region parameter is ignored). This can be useful for instruments assigned to drum or other samples mapped across the keyboard on a single MIDI channel.
- *No Reset switch:* When turned on, no reset messages are sent to the track's instrument. This can be useful when using controllers for nonmusical purposes, such as Mixer automation.

Edit track parameters in the inspector

1. In Logic Pro, tap a track's icon to select the track.
2. Tap the Inspector button in the view control bar to open the inspector.
3. In the inspector, make sure Track is selected in the Level menu.
4. In the Track inspector, edit parameter values by tapping or dragging. Some parameters have specific controls for editing their values.
5. When you're done, tap the Inspector button again to close the Track inspector.

Start a Logic Pro subscription

You can have full access to all of the powerful features and sounds in Logic Pro for iPad by subscribing.

You can try free for one month. To begin your free trial, simply sign up for a monthly or yearly subscription using your Apple Account. If you choose the free trial, you can cancel your subscription at any time by following the instructions below.

Start a free trial subscription

When you open Logic Pro for iPad for the first time, you can sign up for a free one-month trial.

1. Open Logic Pro, then tap Continue.
2. Tap Try Monthly or Try Yearly, then follow the onscreen instructions to subscribe using your Apple Account.

You can cancel your subscription at any time during the trial or after it ends.

Manage your subscription

1. In the Settings app, tap your Apple Account, then tap Subscriptions.
2. Tap Logic Pro.
3. Tap available options to change your subscription plan or cancel your subscription.

If you cancel your subscription, you'll continue to have full access to all Logic Pro features until the end of your billing period. After your billing period ends, you'll still be able to share projects from the Projects browser, but all other functionality will be limited until you resubscribe.

See Manage App Store purchases, subscriptions, settings, and restrictions on iPad in the iPad User Guide.

How to get help in Logic Pro for iPad

Logic Pro provides Help in both online (HTML) and PDF formats for you to get answers to questions, learn about controls and functions while you're working, and view detailed information about the app. Logic Pro for iPad also includes a set of Lessons to help familiarize you with the app and guide you through a series of common tasks.

Open Logic Pro Help

- In Logic Pro, tap the Help button ⓘ in the control bar, then tap Logic Pro Help.

  You can also search for the Logic Pro for iPad User Guide on the internet using Safari or any web browser.

Download the Logic Pro for iPad User Guide PDF

- In Logic Pro for iPad Help, tap the PDF link at the bottom of each page.

Use Lessons

1. In Logic Pro, tap the Help button ⓘ in the control bar, then tap Lessons.
2. To search for a lesson by name or description text, tap the "Search lessons" field at the top of the Lesson Browser, then enter text.
3. In the Lesson Browser, tap a Lesson to open it.

   Some Lessons require one or more sound packs to be installed on your iPad. The Lesson description indicates whether a specific sound pack is required, and includes a Get button to download and and install the sound pack.
4. Use the Forward/Back buttons in the Lesson navigator to move through a Lesson. Sometimes you have to complete a task before you can move forward. Gestures in the app show you how to complete these tasks.
5. When you end a Lesson before completing it, your progress is saved. When you reopen the Lesson, you can choose whether to resume the Lesson at the point where you ended it or restart the Lesson from the beginning.
6. To reset the progress of a Lesson, touch and hold the Lesson, then tap Clear Progress.

Connect external devices

Connect external devices with Logic Pro for iPad

You can use Logic Pro for iPad with a variety of audio and MIDI devices, including microphones, keyboards and other instruments, and audio interfaces.

Many USB devices, such as microphones and MIDI controllers, can be connected directly to your iPad for recording in Logic Pro using the USB-C port. You can also connect wirelessly with Logic Pro using Bluetooth MIDI devices.

To connect other audio equipment that doesn't use USB, such as microphones, guitars, and many MIDI keyboards, you first need to connect an audio interface to your iPad. You can then connect the audio equipment to the audio interface. Logic Pro supports Core Audio and Core MIDI devices. When using an audio interface, check the manufacturer's specifications to make sure the interface is compatible with your iPadOS version and Logic Pro.

Using the USB-C port or an audio interface, you can also connect speakers or monitors, headphones, and other equipment to hear the audio from Logic Pro. The audio output can be configured in Audio Devices.

Note: Your iPad provides power to connected devices. To connect multiple external devices or to use your iPad for longer recording sessions, use a powered USB-C hub or an audio interface that has its own power supply.

Connect an audio interface

If you're using an audio interface, check the manufacturer's specifications to make sure the interface is compatible with iPad and Core Audio compliant.

- Connect a USB-C cable from an audio interface to the USB-C port on your iPad.

The audio interface appears as your audio input in Audio Devices. You can then use the Fader to set each input on the audio interface as a separate input source for the audio tracks you want to record to. If your audio interface also has MIDI ports, you can connect MIDI devices with MIDI cables to record to software instrument tracks.

Connect a microphone

You can connect a microphone to record vocals, an acoustic instrument, or any other sound to an audio track.

Do one of the following:

- Connect a USB microphone to the USB-C port on your iPad.
- Connect an audio interface to your iPad, then connect a microphone to the audio interface using a standard XLR cable.

Use the Fader to choose the microphone as the input source for the audio track you want to record to.

Connect an electric instrument

You can connect an electric instrument, such as an electric guitar or bass, to play and record on an audio track.

- Connect an audio interface to your iPad, then connect the electric instrument to the audio interface using a standard 1/4-inch tip-sleeve instrument cable.

Use the Fader to choose the instrument as the input source for the audio track you want to record to.

Connect a MIDI keyboard or controller

Do one of the following:

- Connect a USB MIDI keyboard or controller to the USB-C port on your iPad.
- Connect a MIDI interface or audio interface with MIDI ports to your iPad, then connect the MIDI Out port of the keyboard or controller to a MIDI In port on your interface using a MIDI cable.

The MIDI In/Out settings list the connected keyboard or controller. You can then assign the device's physical controls to functions and Logic Pro parameters using Learn MIDI.

Connect a Bluetooth device

1. In Logic Pro for iPad, tap the More button on the right side of the control bar, then tap Settings.
2. Tap App Settings, tap MIDI on the left, tap In/Out, and then tap Bluetooth MIDI Devices to open the Bluetooth MIDI Devices dialog.

   Tip: You can also open the dialog by tapping the MIDI Input pop-up menu in the Track inspector of a MIDI track and choosing Bluetooth MIDI Devices.
3. Tap Connect at the top (if it's not already selected), then tap a row with the status Not Connected, indicating a device ready to be connected.

   The status next to the device name changes to Connected; tap Connected when you want to disconnect the device.
4. Tap Done or swipe down to return to the MIDI In/Out settings.

   The MIDI In/Out settings now list the connected devices.

For more information about Bluetooth device settings, see MIDI In/Out settings.

Use virtual MIDI devices with Logic Pro for iPad

Logic Pro for iPad includes two virtual MIDI devices, called Logic Pro Virtual In and Logic Pro Virtual Out. You can use Logic Pro Virtual In to receive MIDI messages from another music app on your iPad, and use Logic Pro Virtual Out to send MIDI messages from Logic Pro to another music app on your iPad.

Receive MIDI messages from another music app

1. Logic Pro for iPad, tap the More button on the right side of the control bar, then tap Settings.
2. Tap App Settings, tap MIDI, then turn on Logic Pro Virtual In.
3. In the other music app, set the MIDI output to Logic Pro Virtual In. Check the app's documentation for information on how to do this.

Send MIDI messages to another music app

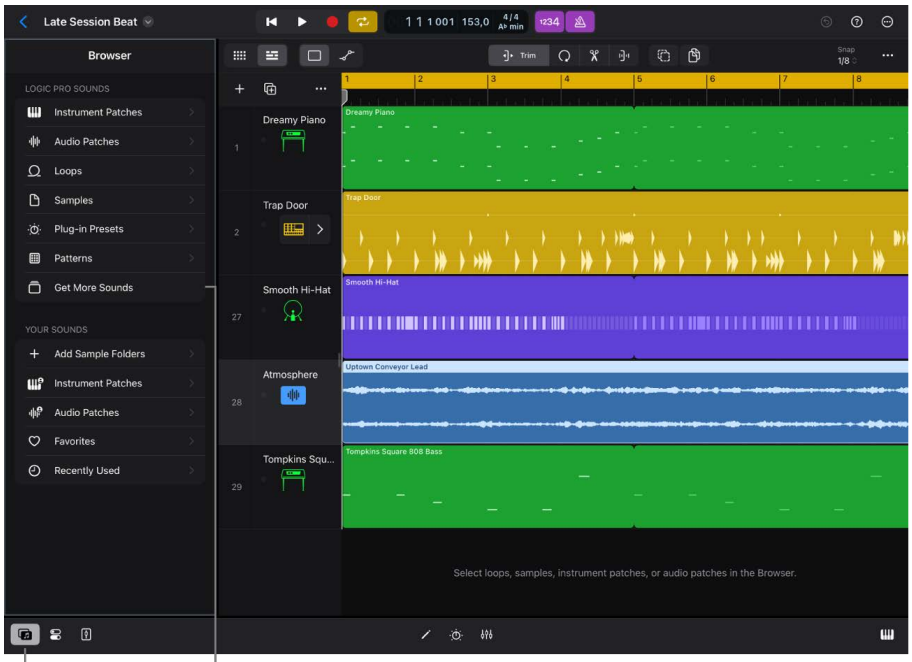
In Logic Pro for iPad, Logic Pro Virtual Out is available in the following locations:

- MIDI Synchronization project settings
- The MIDI Output pop-up menu in the Track inspector when an external MIDI track is selected (see Edit track parameters)
- The MIDI Destination pop-up menu in the External Instrument plug-in (see External Instrument)
- The New Tracks dialog when you set new track options

Find and use sounds in the Browser

Intro to the Browser in Logic Pro for iPad

Logic Pro for iPad features an extensive collection of patches, drum kits, Apple Loops, presets, and other material that you can use in your projects. You can access this material in the Browser and from there add it to your projects. When you install Logic Pro for iPad, you're asked to download essential sounds and instruments to help you get started. Several additional sound packs are available that you can download and manage in the Sound Library. After you download the sound packs, you can access them all in the Browser.



The advanced search function in the Browser lets you use keywords, filters, and other criteria to quickly find patches, loops, and other material for your projects. You can preview patches, loops, and samples before adding them.

You can simply drag and drop to add patches, Apple Loops, and samples from the Browser to the desired destination in your project. To speed up your workflow, you can also set Logic Pro to automatically replace patches on tracks each time you select a new one in the Browser. Plug-in presets and Step Sequencer patterns are visible in the Browser when their respective plug-in or instrument is active or selected.

You can save your own custom patches, presets, and patterns, and you can designate patches, loops, and samples as favorites and quickly access them in the Browser. You can also add your own collections of samples to the Browser so that you can use them in your projects.

See the following topics about accessing sounds and other material in the Browser:

- Find sounds in the Browser
- Browser patches overview
- Apple Loops
- Work with samples in the Browser
- Manage plug-in presets
- Save and edit patterns
- Add your own sample folders to the Browser
- Download additional sound packs

Open the Browser

- Tap the Browser button on the left side of the view control bar.

Find sounds in the Browser in Logic Pro for iPad

In the Browser, you can use keywords, filters, and other search criteria to quickly find instrument and audio patches, Apple Loops, and samples contained in sound packs downloaded from the Sound Library.

An extensive set of filters lets you refine your search based on criteria such as genre, instrument, musical properties, sound packs, and more. When no filters are applied, two rows of suggested filters are displayed above the results list. When you tap a filter, it is applied to the results and moves to the top row. The bottom row continues to show suggested filters based on the current applied filter combination.

When you add and remove keywords and filters, the results are automatically updated based on your filter criteria. Exact matches appear at the top of the list, followed by any partial matches.

In the All Filters window, you can access all available filters grouped into various categories.

Advanced filters

Some filters have additional functions to help you find what you're looking for.

Some filters have a More button ••• that you can tap to view a list of related subfilters you can use to narrow your search even further. For example, you can use the Drums filter by itself and see all drum-related sounds. However, you can also choose specific drum kit pieces (like Kick or Hi-Hat) from the subfilter menu to see just those pieces.

Group filters in the All Filters window have a pop-up menu containing a list of filters that describe an amount, value, or other attribute pertaining to the name of the enclosing button. For example, in the Loops view of the Browser, you can tap the Key group filter in the Musical Properties category and choose one or more keys from the menu to limit your search to loops in those keys. You can't use a group filter on its own; you need to choose one of the options in the group filter menu.

Paired filters contain two mutually exclusive descriptors (for example, Analog/Digital, Cold/Warm, or Bright/Dark). When you choose one of the descriptors, you exclude the other.



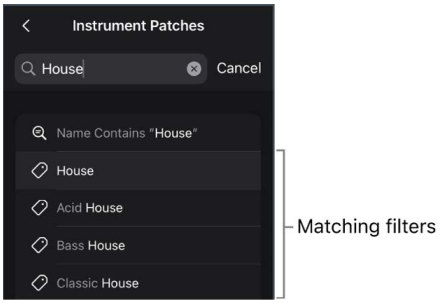
If you add patches, loops, or samples from the Browser to your project and want to find something that fits well with what you're working on, you can find similar items in the Browser. You can also negate a filter to exclude certain criteria from the results.

Search by keyword

In the Browser in Logic Pro, you can use keywords to search for sounds. In the Browser views for instrument patches, audio patches, loops, and samples, the suggested search results include filters and various items whose name contains your keyword.

1. Tap the Search button, then enter a search term in the search field.

   As you type, matches for filters containing your search term are updated in the list below the search field.



2. Do any of the following:

   - Tap Search on the onscreen keyboard, or tap "Name Contains" at the top of the list.

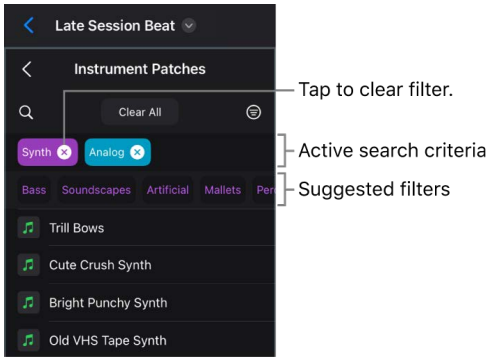
     If your search term exactly matches the name of a filter, the filter is applied to the search results.

   - Tap one of matching results.

Use filters

You can filter the results in the Browser views for instrument patches, audio patches, loops, and samples. When no filters are active, two rows of suggested filters are displayed above the results list. Once you apply a filter, the top row shows any active filters. The bottom row continues to show suggested filters based on the active filters.

- In the Browser, do any of the following:
  - *Apply a filter:* Tap one or more filters above the results list.
  - *Clear a filter:* Tap the Clear button ⊗ next to the filter name.

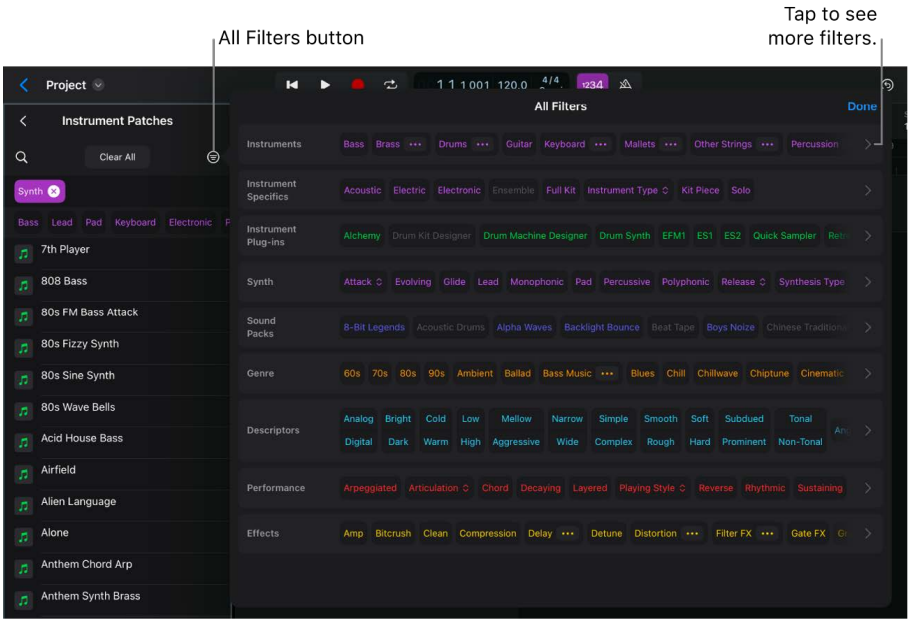


  - *Clear all search criteria:* Tap the Clear All button.

Show all filters

1. Tap the All Filters button ☰.

   The All Filters window opens.



2. Tap different filters in the All Filters window to refine your search.
3. Tap active filters to remove them from the search criteria.
4. Tap Done or tap anywhere outside of the All Filters window when you're finished.

View material from a particular sound pack

After you download sound packs in the Sound Library, you can set your filters in the Browser to view material from one or more sound packs.

1. In the Browser, tap the All Filters button.
2. In the Sound Packs category of the All Filters window, tap the filter for the sound pack you want to see in the results.

   To view filters for all sound packs, tap the disclosure arrow on the right.

Find similar matches in the Browser

You can find similar matches in the Browser for instrument and audio patches, Apple Loops, and samples.

1. In the Browser, tap an item in the results list to select it.
2. Tap the More button at the bottom of the Browser, then tap Find Similar.

Find similar matches in your project

You can find similar matches for instrument and audio patches, Apple Loops, and samples used in your project.

- In Logic Pro, do one of the following:
  - *Find similar instrument or audio patches:* Tap the track header of a selected track, then tap Find Similar in the menu.
  - *Find similar Apple Loops or samples:* Tap a selected region or cell containing an Apple Loop or sample. In the menu, tap Browser, then tap Find Similar.

  The Browser opens to the corresponding view, and the results are filtered to show similar material.

Recall original search criteria in the Browser

If you use any combination of filters to find an item in the Browser and then add it to your project, you can recall the original search criteria you used to find it.

- In Logic Pro, do one of the following:
  - *For instrument or audio patches added from the Browser:* Tap the track header of the track, tap it again, then tap Show Original Search.
  - *For Apple Loops or samples added from the Browser:* Tap a selected region or cell containing an Apple Loop or sample, tap Browser, then tap Show Original Search.

Save and access your favorite patches, Apple Loops, or samples

You can save patches, Apple Loops, and samples you use frequently as “favorites” so that you can quickly access them in the Browser. This feature is ideal for compiling a collection that you use regularly. You can easily replace or add to your favorites as your project advances.

1. To add a patch, Apple Loop, or sample to your favorites in the Browser, drag it slowly to the left, then tap the Favorite button.

   To add a favorite in a single gesture, swipe all the way to the left.

   When you save a favorite, a Favorite icon appears to right of the item in the Browser.
2. To access your favorites, tap Favorites in the top-level view of the Browser.

Negate search criteria

You can negate filters and matches so that any similar matches are excluded from the results. For example, imagine your search criteria is filtered to include results for the genre Hip Hop, the descriptor Aggressive, and the instrument Drums. If you negate the filter for Drums, the results match Hip Hop and Aggressive but exclude all matches for Drums. Likewise, you can exclude matches that are similar to a particular match from the results list.

In the Browser, do one of the following:

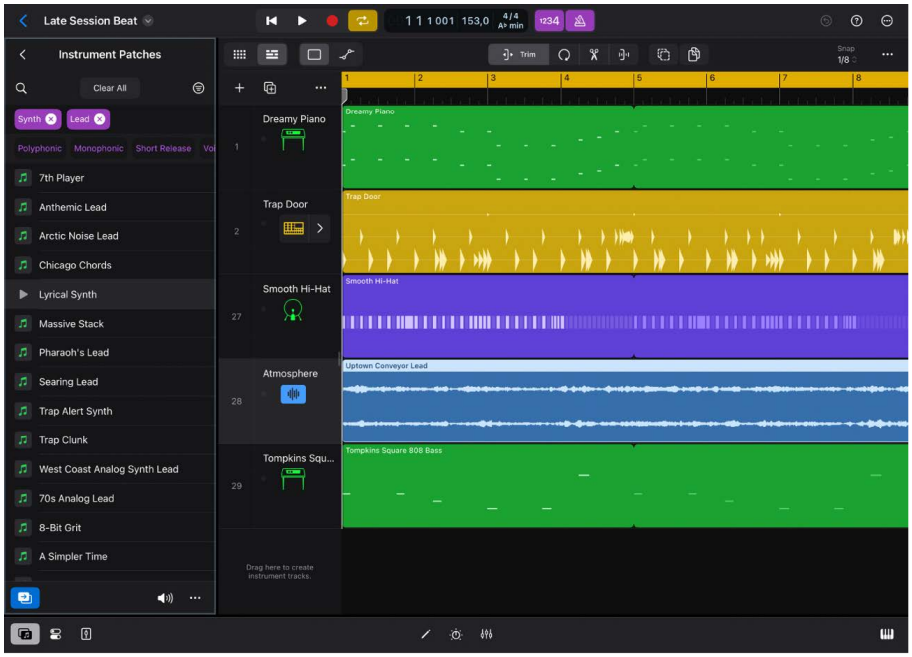
- *Negate a filter:* Tap the name of an active filter, then tap the NOT operator.
- *Negate a match in the results list:* Tap a match in the results list to select it, tap the More button ••• at the bottom of the Browser, then tap Find Dissimilar.

The negation is indicated by a strikethrough added to the filter name. To remove the negation from the filter set, tap the filter, then tap the name in the menu.

Work with patches in the Browser

Overview of patches in Logic Pro for iPad

Audio and instrument patches contain effects and routing settings that control the sound of a track. Instrument patches also include an instrument plug-in that you can play with a Play Surface or external MIDI device. You can either create a new track with a patch or apply the patch settings to an existing track. Audio patches also include patches intended specifically for use on aux and output channel strips. With Replace mode turned on, you can load a new patch on the selected track each time you tap a new patch in the Browser, as long as the patch is compatible with the track type.



You can edit patches by changing channel strip settings, adding plug-ins, or editing plug-in parameters, and you can save your own custom patches. See Save custom patches.

You can designate patches you use frequently as “favorites” so that you can quickly access them in the Browser.

Show patches in the Browser

In Logic Pro, do one of the following:

- Tap the Browser button, then tap Instrument Patches or Audio Patches, depending on which kind of patch you want to see.
- Select a track, tap it again, then tap Show Patches.

  The Browser opens in Instrument Patches view or Audio Patches view, depending on which kind of track you selected.

Preview a patch

1. In the Browser, tap the Preview button to the left of the audio or instrument patch name.
2. Tap the Preview Volume button at the bottom of the Browser, then drag the Volume slider to adjust the volume of the patch you're listening to.
3. Tap the Preview button again to stop the preview.

Tip: To quickly preview one patch after another, touch and hold a Preview button, then drag up or down.

Create a new track with a patch

In the Browser, select an audio or instrument patch, then do one of the following:

- Touch and hold the patch, then drag it to the area below the last track header.
- Tap the More button ···, then tap New Track with Patch.
- Drag the patch to the left, then tap the Add button.

Replace a patch on the selected track

1. In Logic Pro, select the track on which you want to replace the patch, then navigate to Instrument Patches or Audio Patches in the Browser, depending on what kind of track you selected.
2. Select an audio or instrument patch, then do one of the following:
   - Touch and hold the patch, then drag it to the track header of the track containing the patch you want to add or replace.
   - Tap the More button ···, then tap Replace Patch.
   - Drag the patch to the left, then tap the Replace button.

Automatically replace the patch on the selected track

When Replace mode is turned on, you can automatically replace the patch on the selected track by tapping a new patch in the Browser. This can be useful when you want to quickly try out different patches on tracks.

1. In Logic Pro, select an audio or software instrument track.
2. Open the Browser, then navigate to Instrument Patches or Audio Patches, depending on what kind of track is selected.
3. Tap the patch you want to load.
4. Tap the Replace Mode button in the bottom-left corner of the Browser.

   The currently loaded patch on the selected track is replaced by the selected patch. Each time you tap a different patch in the Browser, it replaces the patch on the selected track.

Choose a patch for an aux or output channel strip

In order to choose a patch for an aux or output channel, you first need to create an aux or output track. Then you can add aux or output patches from the Browser.

1. In Logic Pro, do either of the following:
   - *Show the output channel in the Tracks area:* Tap the More button ••• above the track headers, then tap Show Output Track.
   - *Show an aux channel in the Tracks area:* In the Mixer, tap the aux channel strip name to select it, tap it again, then tap Create Track.
2. In the Browser, navigate to Audio Patches, then open the All Filters window.
3. In the Type category, tap the Aux Patch or Output Patch filter, then tap Done or tap anywhere outside of the All Filters window.

   The results list shows aux or output patches, depending on what filter you tapped.
4. Do any of the following:
   - Touch and hold a patch, then drag it to the track header of the aux or output track containing the patch you want to replace.
   - Select the aux or output track containing the patch you want to replace, tap the More button •••, then tap Replace Patch.
   - Select the aux or output track containing the patch you want to replace, drag the patch to the left, then tap the Replace button .

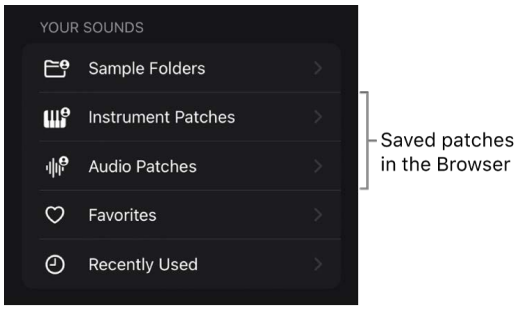
Set the default patch for tracks

The default patch determines which patch is loaded when you create a new audio or software instrument track.

1. In the Browser, navigate to Instrument Patches or Audio Patches.
2. Select a patch, tap the More button •••, then tap Set as Default for New.
3. Choose one of the following options:
   - *For instrument patches:*
     - MIDI Track
     - Pattern Track
     - Session Player Track
   - *For audio patches:*
     - Audio Track
     - Amp Track

Save custom patches in Logic Pro for iPad

You can save the settings for audio and instrument patches in the Browser and use them on other tracks, or use them in another project. Patches you save are stored in the Your Sounds section of the Browser.



You can rename patches you save and delete them from the Browser if you no longer want to use them.

Save a custom patch

1. In Logic Pro, select the track you want to use as a starting point for the custom patch.
2. Customize the patch settings by changing channel strip or plug-in parameters or adding or changing plug-ins.
3. Tap the track header of the selected track, then tap Save Patch.
4. In the dialog that appears, enter a name for the saved patch, then tap OK.

After you save a patch for the first time, a new view—either Instrument Patches or Audio Patches, depending on the kind of patch you save—appears in the Your Sounds section of the Browser. You can find your saved patches here, and you can use them in any Logic Pro project.

Rename a saved patch

1. In the Browser, navigate to the saved patch you want to rename.
2. Select the patch, tap the More button •••, then tap Rename.
3. In the dialog that appears, enter a new name for the patch, then tap Rename.

Delete a saved patch

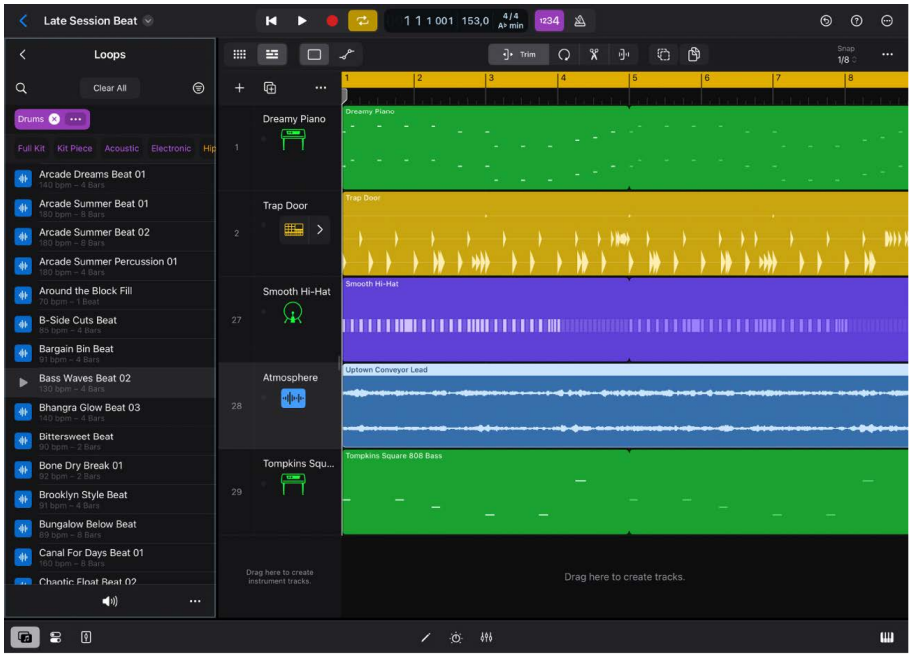
1. In the Browser, navigate to the saved patch you want to delete.
2. Do either of the following:
   - Select the patch, tap the More button •••, then tap Delete.
   - Swipe the patch to the left, then choose Trash.
3. In the dialog that appears, tap Delete.

Use Apple Loops in your projects

Apple Loops in Logic Pro for iPad

Apple Loops are prerecorded musical phrases or riffs that you can use to easily add drum beats, rhythm parts, and other sounds to a project. These loops contain musical patterns that can be repeated over and over and can be extended to fill any amount of time.

When you add an Apple Loop to a project, a region is created for the loop. When the project plays, the region plays at the project tempo and key signature. This lets you use several loops together, even if the loops were recorded at different speeds and in different keys.



Logic Pro has four types of Apple Loops:

- *Audio loops* (blue) are audio recordings. You can add them to audio tracks and edit them just like other audio regions in the Tracks area and Audio Editor.
- *MIDI loops* (green) can be viewed and edited, including individual notes, in the Piano Roll Editor. You can change the sound of the instrument plug-in used to play the loop. You can convert MIDI loops to audio loops by adding them to audio tracks.
- *Session Player loops* (yellow) contain genre and parameter settings that you can change in the Session Player Editor. You can convert Session Player loops to audio loops by adding them to audio tracks.
- *Pattern loops* (violet) contain all the notes and pattern information from a pattern created using Step Sequencer. Pattern loops can be edited just like other regions in the Tracks area, but the notes themselves can be edited only in Step Sequencer. You can convert pattern loops to audio loops by adding them to audio tracks.

In the Loops view of the Browser, you can find loops with the instrument, genre, and feel that are right for your project; preview loops; add loops to your project; and create a selection of your favorite loops.

Add Apple Loops to your Logic Pro for iPad project

After searching for loops in the Browser, you can preview them to find the one that sounds best in your project. When you preview a loop, you can hear it by itself (solo) or play it together with the project. You can add a loop by dragging it to the appropriate track in the Tracks area. You can also add it directly to a new track, or use the loop to create a new track for Quick Sampler, Sample Alchemy, or Drum Machine Designer.

Unless changed in the New Project Settings window, new projects default to a project tempo of 120 bpm and a key of C major. If the first region added to a project is an Apple Loop (that is, before any audio or MIDI has been added or recorded to the project), the project tempo and key are adjusted to match the Apple Loop. If you already established a project tempo and key signature (either by recording directly into the project or adding material), Apple Loops automatically conform to the current project tempo and key signature. If you subsequently change the project tempo, Apple Loops automatically conform to the new tempo. If you create key changes on the Signature track, the regions created from the loops follow the key changes and are transposed to the new key. See Transposition and the Pitch Source parameter.

View Apple Loops in the Browser

- In Logic Pro, tap the Browser button, then tap Loops.

Preview a loop

1. In Loops view in the Browser in Logic Pro, tap the Preview button to the left of the loop name.

   A waveform for the preview appears near the bottom of the Browser.

2. Tap anywhere inside the waveform to start the preview from that point.
3. Tap the Preview Volume button at the bottom of the Browser, then drag the Volume slider to adjust the volume of the loop you're listening to.
4. Tap the Preview button again to stop the preview.

Tip: To quickly preview one loop after another, touch and hold a Preview button, then drag up or down.

Filter loops by type

In Logic Pro, you can filter loops in the Browser list to show loops of only a particular type: audio, MIDI, pattern, or Session Player.

1. In Loops view in the Browser, tap the All Filters button.
2. In the Type category, choose one or more loop types.

Filter loops by musical properties

In Logic Pro, you can filter loops in the Browser list by various musical properties, including feel, key signature, part, swing, time signature, and tonality.

1. In Loops view in the Browser, tap the All Filters button.
2. In the Musical Properties category, choose one or more musical properties.

Add a loop to your project

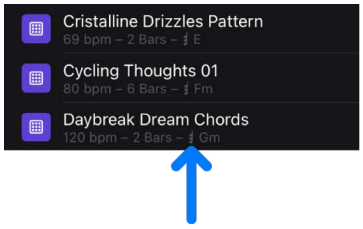
- In Loops view in the Browser in Logic Pro, touch and hold a loop, then do one of the following:
  - Drag a loop to an empty area of the Tracks area, below the existing tracks.

    A new track of the appropriate type (audio or software instrument) is created, and the loop is added to the new track.
  - Drag an audio loop (blue) to an audio track.
  - Drag a MIDI loop (green), a pattern loop (violet), or a Session Player loop (yellow) to a software instrument track.
  - Drag a MIDI loop (green), a pattern loop (violet), or a Session Player loop (yellow) to an audio track to convert it to an audio loop.

Add chords from Apple Loops to your project

In Logic Pro, many Apple Loops contain chords that you can use in your project. If you add loops with chords to the tracks area, you can keep the chords in the resulting region or add them to the Chord track to quickly create a harmonic structure for Session Players.

Apple Loops with chords have the Chord symbol 𝄞 under the loop name in the Browser. See Intro to chords.



- In Loops view in the Browser in Logic Pro, tap the More button ···, tap Loop Chords, then choose one of the following options:
  - *Keep Region Chords:* When you drag an Apple Loop with chords to the Tracks area, it follows the region chords it contains.
  - *Replace Global Chords with Region Chords:* When you drag an Apple Loop with chords to the Tracks area, the region chords contained in the loop are pasted to the Chord track at the position where you drag the loop.
  - *Automatic:* When you drag an Apple Loop with chords to the Tracks area and there are no chords on the global Chord track at the position where you drag the loop, the region chords are added to the global Chord track at that position. If chords already exist on the Chord track at the position where you drag the loop, the loop follows its region chords. Session Player loops are an exception; If chords exist on the Chord track at the position where you drag a Session Player loop, they follow the chords on the Chord track.

Create a new track with a loop

- In the Browser in Logic Pro, tap a loop to select it, tap the More button ···, then tap New Track with Loop.

  A new track is created, and the loop is placed on the track at the beginning of the project.

Place a loop at the playhead position

1. In Logic Pro, select the track where you want to place the loop.
2. Place the playhead where you want the loop to start.
3. In the Browser, tap a loop to select it, tap the More button •••, then tap Place Loop at Playhead.

Create a new instrument track with Sample Alchemy, Quick Sampler, or Drum Machine Designer

1. In the Browser in Logic Pro, touch and hold a loop, then drag it to the empty area below the last track header.
2. Tap Sample Alchemy, Quick Sampler, or Drum Machine Designer in the “Create new track with” dialog that appears.

Work with samples in the Logic Pro for iPad Browser

The Samples view in the Browser contains samples from downloaded sound packs. These are mainly intended to be used with sample-based software instrument plug-ins, such as Drum Machine Designer, Quick Sampler, and Sample Alchemy. However, you can use them any way you want.



Samples are tagged by genre, instrument, and other criteria, making it easy to quickly find matching items that you can audition and add to your project. See Find sounds in the Browser.

If you want to use your own audio loops and samples in your project, see Import media or Add your own sample folders to the Browser.

View samples in the Browser

- In Logic Pro, tap the Browser button, then tap Samples.

Preview a sample

1. In Samples view in the Browser, tap the Preview button to the left of the sample name.

   A waveform for the preview appears near the bottom of the Browser.

2. Tap anywhere inside the waveform to start the preview from that point.
3. Tap the Preview Volume button at the bottom of the Browser, then drag the Volume slider to adjust the volume of the sample you're listening to.
4. Tap the Preview button again to stop the preview.

Tip: To quickly preview one sample after another, touch and hold a Preview button, then drag up or down.

Create a new Quick Sampler or Sample Alchemy track with a sample

- In Samples view in the Browser, do one of the following:
  - Tap a sample to select it, tap the More button ···, then tap Quick Sampler Track or Sample Alchemy Track.
  - Drag a sample from the Browser to the area below the last track header, then tap Quick Sampler or Sample Alchemy in the "Create new track with" dialog that appears.

You can also use similar methods for Drum Machine Designer. See Edit surface settings.

Add a sample to a track

- In Samples view in the Browser, touch and hold a sample, then do one of the following:
  - *Add sample to an existing audio track:* Drag the sample to the track. Place the left edge of the sample where you want it to start playing, then let go.

    A new region containing the sample is created. If the track already contains a region at the position where you place the sample, it is replaced or overlapped with the resulting new region.
  - *Add sample to a new audio track:* Drag the sample to the empty area below the last track. Place the left edge of the sample where you want it to start playing, then let go.

    A new audio track containing the sample is created.

Create a new track with a sample

- In Samples view in the Browser, tap a sample to select it, tap the More button ···, then tap New Track with Sample.

  A new audio track is created, and the sample is placed on the track at the beginning of the project.

Place a sample at the playhead position

1. In Logic Pro, select the track where you want to place the sample.
2. Place the playhead where you want the sample to start.
3. In the Browser, tap a sample to select it, tap the More button ···, then tap Place Sample at Playhead.

Replace a sample in a software instrument

If you have an instance of Quick Sampler or Sample Alchemy on a software instrument track, you can easily replace the sample used.

- In Samples view in the Browser, touch and hold the sample, then drag it to the track header of the track where the software instrument is using the sample you want to replace.

You can also use a similar method for Drum Machine Designer to add or replace samples on a pad. See Edit Drum Machine Designer surface settings.

Manage plug-in presets in Logic Pro for iPad

You can access presets for plug-ins in the Presets view of the Browser. When you use a plug-in in Logic Pro for iPad, you can view and load presets from the Browser. You can also save custom presets and access them in the Browser.



See Intro to plug-ins and Work with plug-in presets.

View plug-in presets in the Browser

Do any of the following:

- In the Plug-ins area, touch and hold the plug-in name, then choose Show Presets.
- In the Mixer, tap the plug-in to open it in Details view.
- In the Details view of a plug-in, tap the More button ••• in the plug-in menu bar, then tap Show Presets.

  The Browser opens, showing available presets for the plug-in.

The Plug-in Presets view in the Browser shows the presets for the active or selected plug-in and updates the list of presets when you select or open a different plug-in.

Load a preset

- Tap a preset in the Browser.

Save a custom preset

1. In the Details view of a plug-in, tap the More button ••• in the plug-in menu bar, then tap Save As.
2. In the dialog that appears, enter a name for the saved preset, then tap OK.

You can access saved presets in the top level of the Plug-in Presets view when the plug-in is selected in the Plug-ins area or open in Details view.

Save changes to a custom preset

You can save the changes you make to a custom preset after you have loaded it.

- In the Details view of a plug-in, tap the More button ••• in the plug-in menu bar, then tap Save.

Delete a custom preset

- Tap a custom preset in the Browser, tap the More button ••• at the bottom of the Browser, tap Delete, tap Delete again, then tap Delete to confirm.

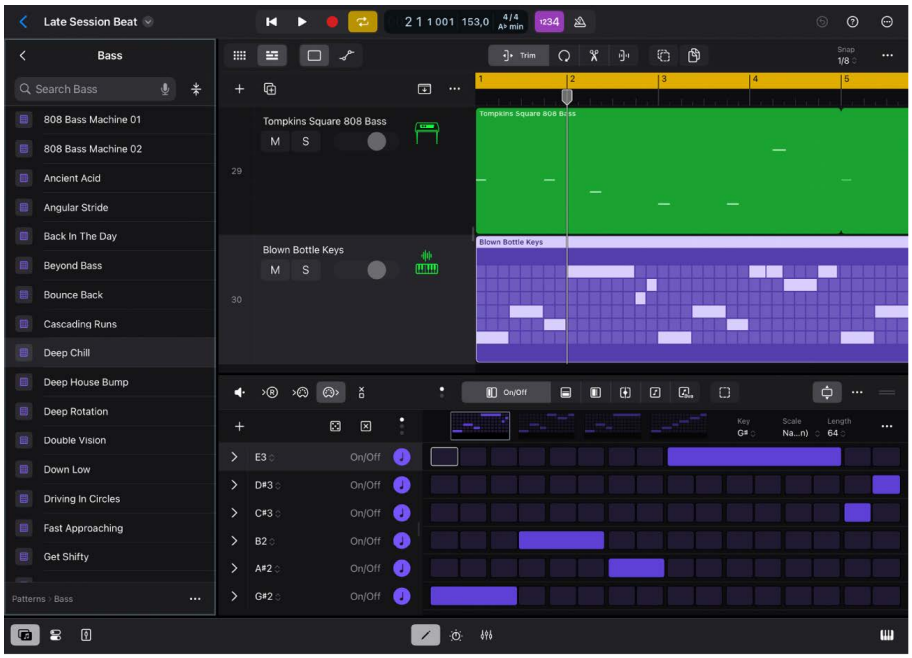
Save a default preset

- Open the plug-in in Details view, tap the More button ••• in the plug-in menu bar, then tap Save As Default.

This preset loads whenever that plug-in is initially added to a channel strip. You can also revert to this user default setting at any point by choosing Recall Default from the More menu.

Save and edit patterns in Logic Pro for iPad

You can access patterns and templates for Step Sequencer in the Patterns view of the Browser. You can easily add them from the Browser to a software instrument track or Step Sequencer. Patterns and templates that you save in Step Sequencer are stored in the User folder. See Load and save patterns.

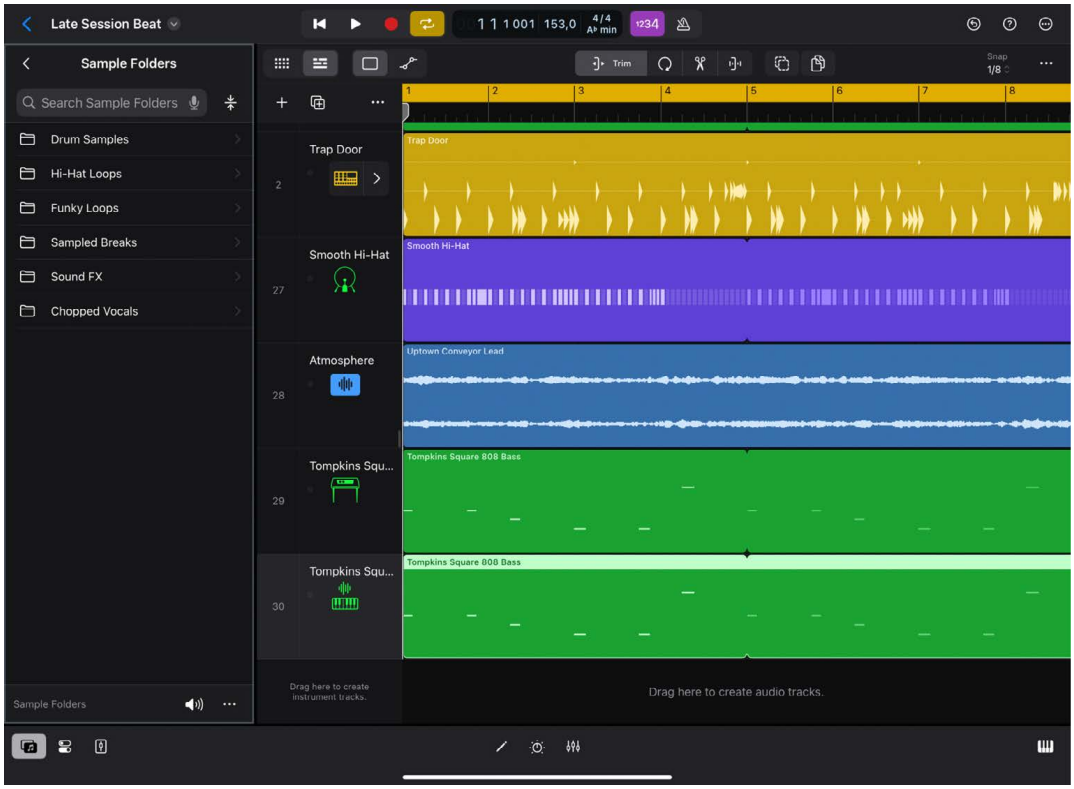


View Step Sequencer patterns in the Browser

1. Select a pattern region or cell, then do one of the following:
   - Tap the Editors button in the view control bar.
   - Tap the region or cell again, tap Edit, then tap Show in Editor.
2. Tap the Browser button, then tap Patterns.

Add your own sample folders to the Browser in Logic Pro for iPad

You can add your own collections of audio samples to the Browser for use in your projects. After you add sample folders, you can search for samples and preview them in the Browser. Similar to samples shown in Samples view, you can drag them to the Tracks area or to sample-based software instrument plug-ins, such as Drum Machine Designer, Quick Sampler, or Sample Alchemy. See Work with samples in the Browser.



If your samples are organized into multiple nested folders, the file hierarchy is maintained within the Browser. However, it's possible to "flatten" the folders inside an enclosing folder and view all the samples they contain within a single list. This can be helpful if, for example, you want to quickly audition various kit pieces from a sample pack without having to navigate through multiple folders.

If you want to import other kinds of files into Logic Pro, see Import media.

Add a sample folder to the Browser

1. At the top level of the Browser in Logic Pro, do one of the following:
   - *Add the first folder:* Tap Add Sample Folders, then tap Choose Folder.
   - *Add an additional folder:* Tap Sample Folders, tap the More button ···, then tap Add a Sample Folder.
2. Navigate to the folder containing the samples you want to add, then tap Open.

   The folder is added to the Browser in Sample Folders view.

Use Flat View to see all files within an enclosing folder

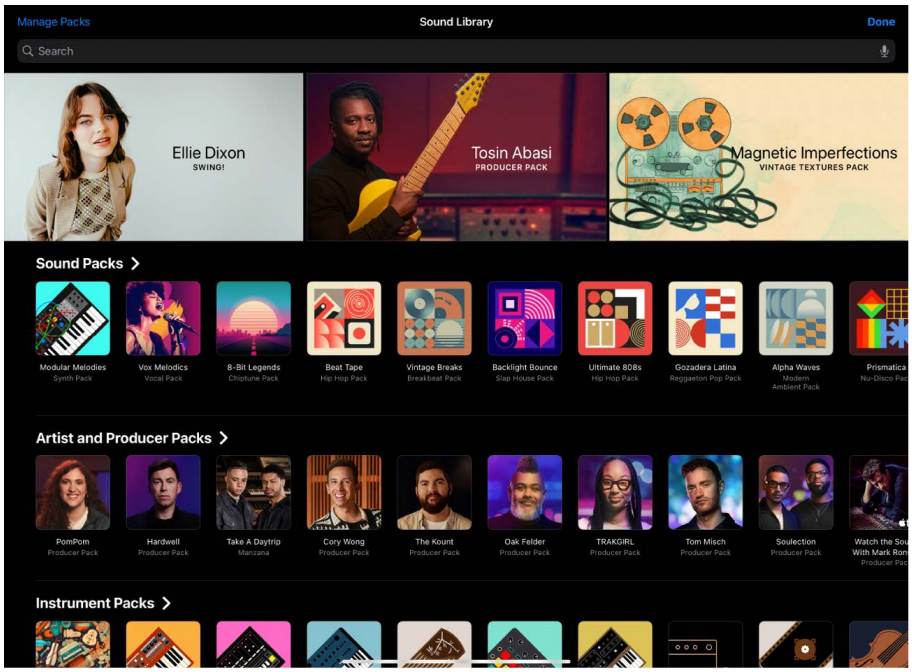
1. In Sample Folders view in the Browser in Logic Pro, navigate to the folder where you want to see all of the files.
2. Tap the Flat View button to the right of the search field.

   All the files within the enclosing folder are presented in a single list.

To view the nested folders again, turn off Flat View.

Download additional sound packs in Logic Pro for iPad

After you install Logic Pro for iPad, you can download additional sound packs in the Sound Library. Sound packs contain Apple Loops, patches, drum kits, and other material that you can use in your projects.



Each sound pack in the Sound Library has a name and an icon that you can tap to see a brief description and a Preview button.

Some sound packs may also be required in order to perform certain tasks, such as opening a Logic Pro for Mac project or a GarageBand song created on another device. If so, a message appears asking whether you want to download the required sound pack.

A red badge on the Browser button and a numbered badge next to Get More Sounds in the Browser indicate that new or updated sound packs are available in the Sound Library.

You can download some or all available sound packs, or you can delete them to manage storage space.

Open the Sound Library

You access the Sound Library in the Browser.

1. In Logic Pro, tap the Browser button on the left side of the view control bar.
2. In the top-level view of the Browser, tap Get More Sounds.

Download sound packs

1. In the Sound Library, tap the sound pack you want to download.

   Swipe horizontally or tap See All to view more sound packs for each section.
2. Do any of the following:
   - Tap the Preview button to hear a sample.
   - Tap the Play button in the upper-left corner of Producer packs to watch a video.
   - In Producer packs, tap the Apple Music or the Apple TV+ buttons for any additional material by the artist or producer.
3. Tap Get to download.

Search for sound packs in the Sound Library

1. Tap anywhere in the search field along the top of the Sound Library, then enter a search term.

   As you type, matching sound packs are shown below.
2. Do either of the following:
   - Tap one of the matching results.
   - Tap Cancel or the Cancel button to cancel your search.

Delete sound packs

1. In the Sound Library, tap the sound pack you want to delete, then tap Delete.
2. Tap Delete to confirm the deletion.

Manage sound packs

You can manage sound packs to free up storage space on your iPad. The total amount of space used for all installed sound packs is shown at the top of the list. The size of each sound pack is shown in the list.

1. In the Sound Library, tap Manage Packs in the upper-left corner.
2. Do any of the following:
   - *Download all available sound packs:* Tap the Get All button next to All available Packs.
   - *Delete a sound pack:* Tap Edit in the upper right, tap the Delete button next to the sound pack you want to delete, then tap Delete. Alternatively, you can swipe left on the sound pack, then tap Delete.
   - *Delete all installed sound packs:* Tap Edit in the upper right, tap the Delete button next to All installed Packs, then tap Delete.
   - *Download a sound pack:* Tap Get next to the sound pack you want to download.
3. Tap Done in the upper-right corner when you’re finished.

Import media files

Import media into Logic Pro for iPad

In Logic Pro for iPad, you can import audio and MIDI files for use in tracks, cells, and software instruments such as Quick Sampler, Sample Alchemy, and Drum Machine Designer. Files are imported by dragging them into Logic Pro from the Files app in Split View or Slide Over.

Logic Pro supports the most common audio file formats. See Supported media and file formats.

You can access your own collections of audio loops and samples in the Browser. See Add your own sample folders to the Browser.

You can also open and edit songs in Logic Pro for iPad that were originally created in Logic Pro for Mac or GarageBand for iPhone or iPad. See Open GarageBand songs and Work with projects from Logic Pro for Mac.

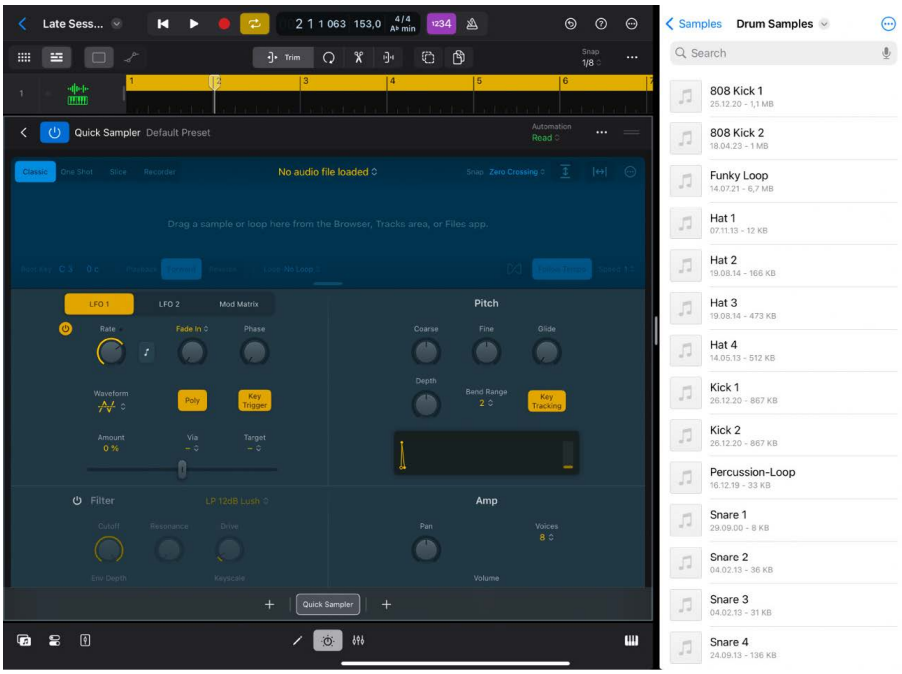
Import media files in Split View

1. In Logic Pro, tap the Multitasking button ••• at the top of the screen, then tap Split View.

   Logic Pro moves aside, and your Home Screen appears.

2. Tap the Files app on your Home Screen.

The Files app appears side by side with Logic Pro. To adjust the apps' sizes, drag the app divider to the left or right.



3. In the Files App window, touch and hold the file you want to import until it appears to lift off the screen slightly. To select multiple files, touch and hold one, drag it slightly, then continue to hold it while you tap additional files with another finger. A badge indicates the number of selected items.
4. Drag the file to the intended destination in the Logic Pro window.

   As you drag, the Insert icon appears wherever you can drop the item.
5. When you finish, tap the Multitasking button at the top of the Files App window, then tap Close.

Tip: If you use the Files app in Slide Over, you can temporarily hide the Files app and then open it whenever you want to import files into Logic Pro. To open the Files app in Slide Over, tap the Multitasking button at the top of the Files App window, then tap Slide Over.

To learn more about working in Split View and Slide Over, see the iPad User Guide.

Supported file formats in Logic Pro for iPad

Audio files imported into a Logic Pro project can be at any supported bit depth and sample rate. Logic Pro supports bit depths of 16, 24, and 32 bits and sample rates of 44.1, 48, 88.2, and 96 kHz. Logic Pro can use the file's sample rate, or it can perform a real-time sample rate conversion if it differs from the project sample rate.

In addition to audio files, Logic Pro can also import MIDI files.

You can import the following file formats into Logic Pro:

- *WAVE and AIFF files:* Wave (WAVE) and Audio Interchange File Format (AIFF) audio files are very similar. They can be stored at different bit depths (16, 24, and 32 bit are supported by Logic Pro), in mono and stereo, and at sample rates up to 96 kHz.
- *Core Audio Format files:* Core Audio Format (CAF) files are containers that support integer and float PCM formats, A-law, u-law, and a number of others, including AAC and the Apple Lossless Audio Codec (ALAC). Unrestricted file sizes are possible, at high sample rates and bit depths.
- *MP3, Apple Lossless, and AAC files:* MP3 and AAC files contain compressed audio information. They are usually much smaller than equivalent WAVE and AIFF files. This reduction in file size is due to encoding techniques that "throw away" some of the audio information. As a result, there may be a loss in audio quality compared to their WAVE or AIFF audio counterparts, depending on the source audio material. Apple Lossless files also contain compressed audio information. As the name suggests, the compression used (ALAC) does not discard audio information in the same fashion as MP3 and AAC files. The sound of the compressed audio file is identical to the original recording.
- *QuickTime Audio:* QuickTime Audio (QTA) files contain layered Voice Memo recordings. When you drag a QTA file to the Tracks area, Logic Pro for iPad creates a separate audio track for each layer of the recording. QTA files are supported on devices running iOS 18.2, iPadOS 18.2, macOS Sequoia 15.2, or later.
- *Apple Loops:* Audio loops contain additional metadata, such as time and date, category, mood, key, and tempo. They also contain a number of transient markers, which break them down into small time slices. The main advantage of Apple Loops is their ability to automatically match the tempo and key of a Logic Pro project. MIDI, Session Player, and pattern loops contain information about the included MIDI notes and the required instrument patch. When added to a software instrument track, the MIDI note information can be edited the same way as any MIDI region. When added to an audio track, an audio version of the loop is created.
- *Standard MIDI files:* Standard MIDI file (SMF) is the standard file format used in MIDI sequencers. Standard MIDI files can be read and saved in Logic Pro. MIDI files may contain note, lyric, controller, and SysEx data. You can add them to software instrument tracks in your project.

Open GarageBand songs in Logic Pro for iPad

You can open a song in Logic Pro for iPad that was originally created in GarageBand for iPad or iPhone. Before you start, update both apps to the latest versions. Then simply open the song in Logic Pro for iPad. There's no need to import or convert any files. The app recognizes the song and translates it directly into a new Logic Pro for iPad project.

- Logic Pro for iPad automatically creates the required number and type of tracks to mirror those used in the GarageBand song.
- The new Logic Pro for iPad project uses the tempo of the GarageBand song.
- The initial key signature is set in accordance with the GarageBand song key.
- Software instrument parts are played by their respective Logic Pro for iPad counterparts. Logic Pro for iPad also imports any mixing data and effects (plus their settings) used by software instruments or Apple Loops–based tracks in GarageBand.
- GarageBand patches translate one-to-one into Logic Pro for iPad—with the added benefit that you can now access the individual plug-ins that are inserted into a patch.
- The two GarageBand bus effects (Reverb and Echo) are also translated when opened in Logic Pro for iPad. They are replaced by the PlatinumVerb and Echo effects on busses 1 and 2.

Once the GarageBand song information is loaded into Logic Pro for iPad, you can freely change parts, mixing levels, and plug-in parameters as in any Logic Pro for iPad project. When you close the project, it is saved as a Logic Pro project.

Open a song created in GarageBand for iPhone or iPad

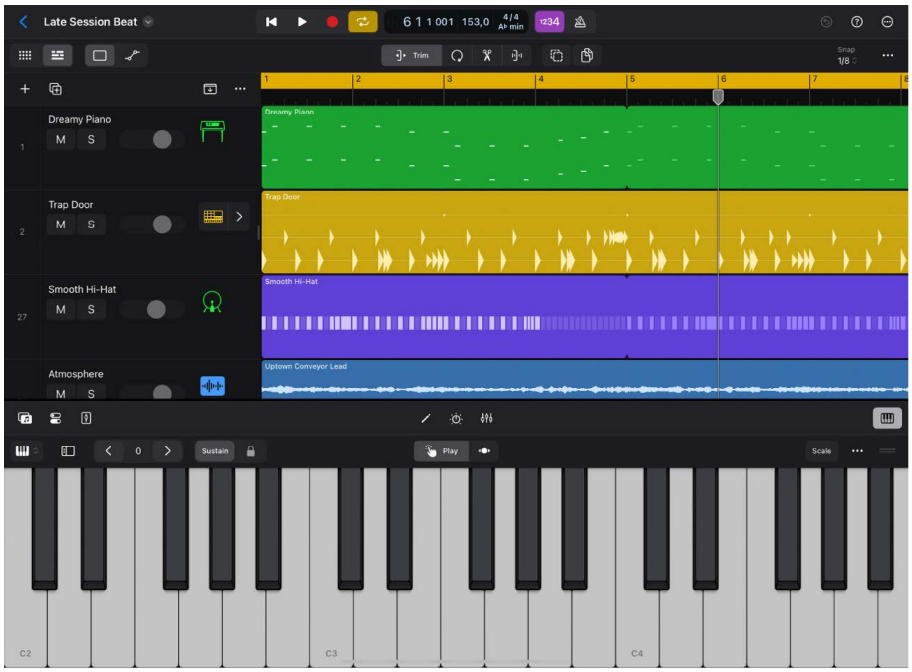
1. In Logic Pro, tap the Projects Browser button ﹤ on the left side of the control bar.
2. In the Projects browser, find the GarageBand song you want to open, then tap it.
3. Tap Continue.

   Logic Pro opens a converted copy of your GarageBand song.

Use Play Surfaces

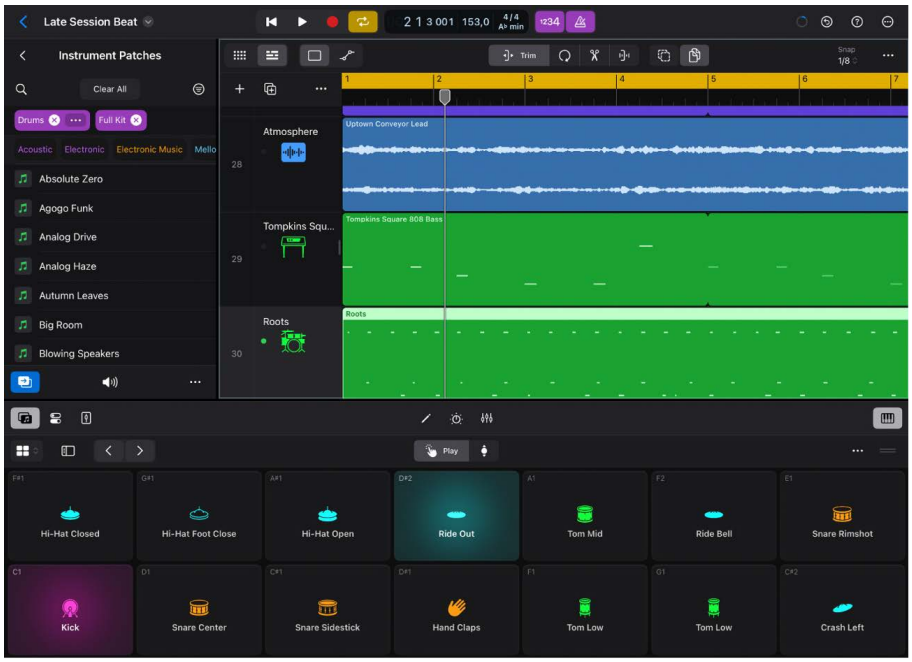
Intro to Play Surfaces in Logic Pro for iPad

In Logic Pro for iPad, you can use Play Surfaces to play and control the various software instruments in your project by touching the screen of your iPad.



By default, the Play Surface shown depends on the type of instrument patch loaded on the selected software instrument track. However, you can play any software instrument with any of the Play Surfaces. If you prefer to always use a particular Play Surface, you can set it as the default for all instrument patches by locking the Play Surface.

You can turn on side controls to show performance controls, including pitchbend, modulation, note repeat, and velocity range.



For more information about Play Surfaces, see the following topics:

- Use side controls with the Play Surfaces
- Play the Keyboard
- Play the Drum Pads
- Play the Fretboard
- Play the Chord Strips
- Play the Guitar Strips

Note: Drum patches that use track stacks use an enhanced Drum Pads Play Surface that offers extended features and flexibility for designing your own drum patches. See Drum Machine Designer overview.

You can also play software instruments using an external MIDI device connected to your iPad.

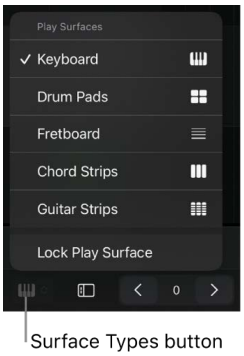
Open the Play Surfaces area

- In Logic Pro, select a software instrument track, then do one of the following:
  - Tap the Play Surfaces button on the right side of the view control bar.
  - Drag the view control bar up.

You can set whether the Play Surface opens when a new software track with MIDI as the default region type is created. See Create tracks.

Choose a different Play Surface

- Tap the Surface Types button, then choose a Play Surface from the menu.



  The icon for the Surface Types button changes to indicate which Play Surface is active.

Lock the default Play Surface

- Tap the Surface Types button, then tap Lock Play Surface.

  A lock symbol appears on the Surface Types button when Lock Play Surface is on.

Change size of the Play Surface

- Drag the resize handle ═ up or down.

Play within a particular scale

You can play the Keyboard and Fretboard Play Surfaces in various scales. After you choose a scale, the Play Surface changes to show notes in the scale.

- In the Play Surface menu bar, tap the Scale button, tap the Activate switch, then choose the root note and scale from the pop-up menus.

Use side controls with the Play Surfaces in Logic Pro for iPad

The side controls consist of pitchbend, modulation, note repeat, and velocity range. You can use these to change the character of the sound when using a Play Surface. The controls for pitchbend and modulation and those for note repeat are mutually exclusive, so turning on one set of controls turns off the other. When you open the side controls, they appear on the left side of the Play Surface.



Turn on the side controls

- In the Play Surface menu bar, tap the Side Controls button .

  The side controls appear to the left of the Play Surface. By default, the pitch and modulation controls are active and the velocity range control is visible.

Use note repeat in the side controls

1. In the Play Surface menu bar, tap the More button •••, tap View Options, then tap Note Repeat.

   Controls for note repeat appear to the left of the Play Surface.



2. Touch a bar/beat value in the Rate slider to set the repeat rate.
3. Play notes in the Play Surface.
4. Drag the Gate slider up or down to set the length of the repeated note.

Change the values for the note repeat controls

1. In the Play Surface menu bar, tap the More button •••, then tap Configuration.
2. Under Note Repeat, do the following:
   - *Change the gate range:* Tap the Gate Range fields and set the Low or High values.
   - *Change the note repeat values:* Tap a value for the corresponding slot and choose a bar/beat value.

Use the mod wheel to send MIDI expression control change

- In the Play Surface menu bar, tap the More button •••, tap Configuration, then tap Expression (CC# 11) in the Mod Wheel pop-up menu.

Change the velocity mode

The velocity mode determines how the velocity values for MIDI notes are created. You can set the velocity to a fixed value or set it to be determined by how hard you tap the Play Surface. The velocity for drum pads can also be determined by the vertical tap position on the drum pad.

- In the Play Surface menu bar, tap the More button •••, tap Surface Settings, then choose one of the following values for Velocity Mode:
  - *Fixed:* Forces all notes to the same velocity set by the velocity value.
  - *Dynamic:* The velocity value is determined by how hard you tap the drum pads. Minimum and maximum velocity are determined by the Velocity Range values.
  - *Y-Position:* The velocity value is determined by the vertical tap position on the drum pad. Minimum and maximum velocity are determined by the Velocity Range values.

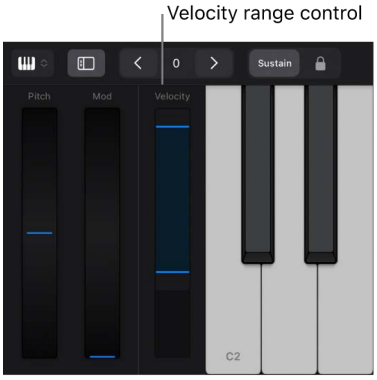
You can use the Velocity controller in the Play Surface to change the velocity range or the fixed velocity value.

Change the velocity range

Depending on the velocity mode setting, you can change velocity range or set a fixed velocity value.

1. In the Play Surface menu bar, tap the More button •••, tap View Options, then tap Velocity.
2. Tap the Side Controls button.

   The velocity range control appears to the left of the Play Surface.



3. If the velocity mode is set to Dynamic or Y-Position, do one of the following:
   - Drag the top slider of the velocity range control up to change the maximum velocity value.
   - Drag the bottom slider of the velocity range control down to change the minimum velocity value.
   - Touch the velocity range control between the sliders and drag up or down to move the velocity range.
4. If the velocity mode is set to Fixed, drag the velocity slider up or down to set the velocity value.

Use the Keyboard Play Surface in Logic Pro for iPad

In Logic Pro, you can use the Keyboard Play Surface to play software instruments by tapping the keys. You can play higher or lower on the keyboard, hold notes, and change the keyboard size and scale.



Change the octave on the keyboard

- To shift the keyboard an octave down or up, tap the Octave Down button or Octave Up button.
- To move higher or lower on the keyboard, tap the Scroll button, then drag the keyboard to the left or right.

Add sustain to notes

- Touch and hold the Sustain button as you play.

You can also drag the Sustain button to the right to lock it.

Change the size of the keyboard

1. In the Play Surface menu bar, tap the More button, then tap Surface Settings.
2. Tap Size, then choose a size.

Use polyphonic pitchbend

Some instrument patches let you slide smoothly between notes (an effect called *portamento*) when using the Keyboard Play Surface. When you load these patches, the Pitch button appears above the keyboard between the Play and Scroll buttons.

Controllers and Audio Units instruments that support MPE (MIDI Polyphonic Expression) have a similar effect called *polyphonic pitchbend*. To use this feature, you need to turn it on in the surface settings.

- In the Play Surface menu bar, tap the More button, then tap Surface Settings.
- Tap the Polyphonic Pitchbend switch.

  The Pitch button appears above the keyboard between the Play and Scroll buttons.



View note labels on the keyboard

You can view note labels for every key on the keyboard.

- Tap the More button •••, tap Surface Settings, then tap the Show Note Names switch.

When you load an instrument patch with articulations, you can choose articulations from the Articulation pop-up menu in the Play Surface menu bar. See Studio Horns keyswitch mapping and Studio Strings keyswitch mapping.

Use the Drum Pads Play Surface in Logic Pro for iPad

In Logic Pro, you can use the Drum Pads Play Surface to play a drum kit by tapping the onscreen pads. The drum sounds are determined by the instrument patch loaded on the selected software instrument track.

You can change the size of the pads, shift their position, display General MIDI (GM) drum names and kit piece icons, and set the velocity mode.



Note: Drum patches that use track stacks use an enhanced Drum Pads Play Surface that offers extended features and flexibility for designing your own drum patches. See Drum Machine Designer overview.

Change the size of the drum pads

1. In the Drum Pads Play Surface, tap the More button •••, then tap Surface Settings.
2. Tap Size, then choose a size.

Turn kit piece icons on or off

You can hide or show the icons on each drum pad.

1. In the Drum Pads Play Surface, tap the More button •••, then tap Surface Settings.
2. Tap the Show Kit Piece Icons switch.

Turn GM drum names on or off

You can show or hide the General MIDI (GM) drum names in the top-left corner of each drum pad.

1. In the Drum Pads Play Surface, tap the More button •••, then tap Surface Settings.
2. Tap the Show GM Drum Names switch.

Scroll drum pads

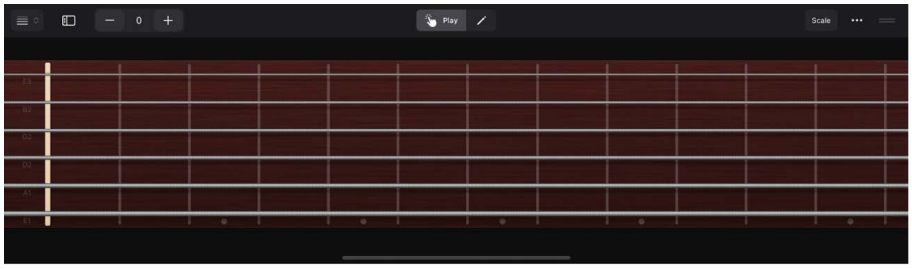
- In the Drum Pads Play Surface, tap the Scroll button, then swipe vertically to see other drum pads for the currently visible instrument patch.

Shift drums pads to the left or right

- Tap ‹ to shift the drum pads to the left.
- Tap › to shift the drum pads to the right.

Use the Fretboard Play Surface in Logic Pro for iPad

In Logic Pro, you can use the Fretboard Play Surface to play notes by tapping strings on the onscreen fretboard. You can choose from various layouts that resemble different kinds of stringed instruments, such as guitar, bass, ukulele, and classical instruments. Each string on the fretboard can be tuned individually, allowing you to create your own alternate tunings. You can transpose the whole fretboard up and down in half-step increments and turn frets on and off.



Play notes

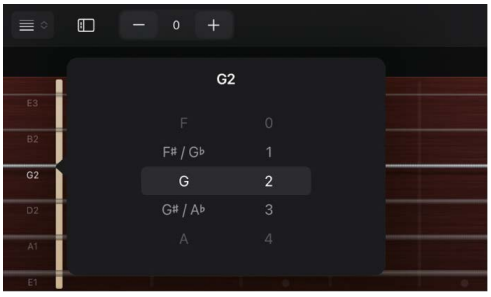
- In Logic Pro, tap the strings on the Fretboard Play Surface at the fret for the note you want to play. You can also bend strings vertically to bend the pitch of a note.

Choose a different fretboard layout

1. In the Fretboard Play Surface, tap the More button ···, then tap Surface Settings.
2. Tap the Layout pop-up menu, then choose an instrument.

Tune the strings

1. In the Fretboard Play Surface, tap the Edit button in the Play Surface menu bar.
2. Tap a string, then drag up or down to select a note and octave value in the menu.



3. When you're finished, tap the Play button, then tap the strings to hear the change.

Transpose the fretboard in half-step increments

- In the Fretboard Play Surface, do any of the following:
  - Tap – to transpose down a half step.
  - Tap + to transpose up a half step.
  - Double-tap the number in the middle to remove the transposition.

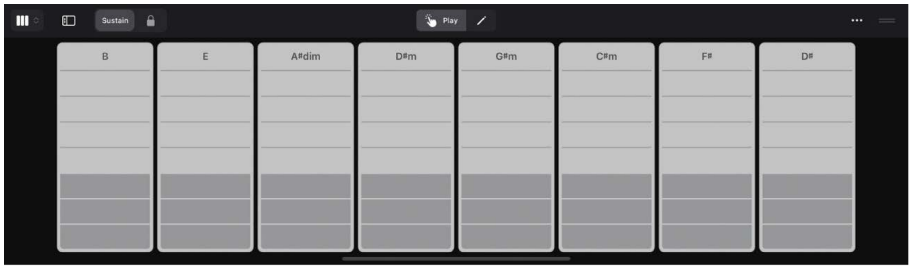
Turn frets on or off

1. In the Fretboard Play Surface, tap the More button ···, then tap Surface Settings.
2. Tap the Frets switch.

When you load an instrument patch with articulations, you can choose articulations from the Articulation pop-up menu in the Play Surface menu bar. See Studio Horns keyswitch mapping and Studio Strings keyswitch mapping.

Use the Chord Strips Play Surface in Logic Pro for iPad

In Logic Pro, tap the Chord Strips Play Surface to play chords and bass notes. You can edit chords and add sustain to the notes you play.



Play chords or bass notes

- In the Chord Strips Play Surface, do any of the following:
  - *Play chords higher or lower on the keyboard:* Tap one of the upper segments of a chord strip.
  - *Play a bass note or sets of bass notes:* Tap one of the lower segments of a chord strip.
  - *Play chords and bass notes together:* Tap an upper and a lower segment at the same time.

Add sustain to notes

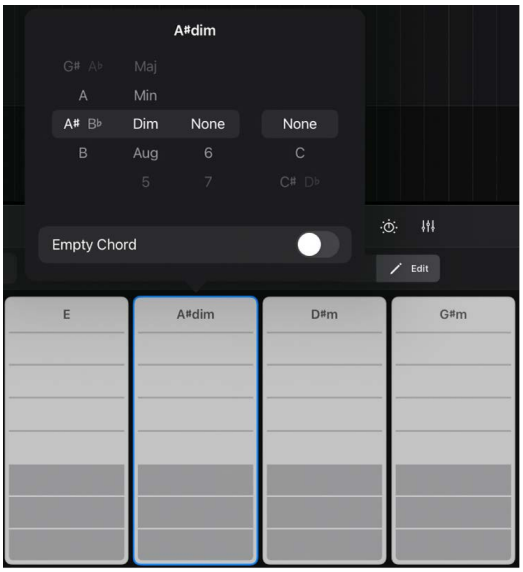
- In the Chord Strips Play Surface, touch and hold the Sustain button as you play.

  You can also drag the Sustain button to the right to lock it.

Edit chords

You can create your own custom chords by modifying existing chords for the Chord Strips Play Surface. Custom chords can include extensions (added notes) and alternate bass notes. When you add a custom chord, it's also available in the Guitar Strips Play Surface.

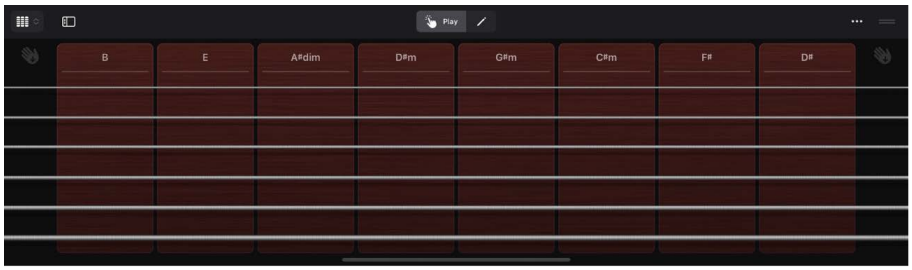
1. In the Chord Strips Play Surface, tap the Edit button in the Play Surface menu bar.
2. Tap the chord strip you want to use for the custom chord.
3. Swipe the wheels to set the chord root and tonality, add an extension (added note), and add a different bass note.



4. When you're finished, tap anywhere outside the menu, then tap the Play button.

Use the Guitar Strips Play Surface in Logic Pro for iPad

In Logic Pro, you can use the Guitar Strips Play Surface to strum and pick chords like you do with a real stringed instrument. This helps create a realistic sounding performance when using string-based instrument patches. You can edit each strip to play a different chord and mute the strings while you play.



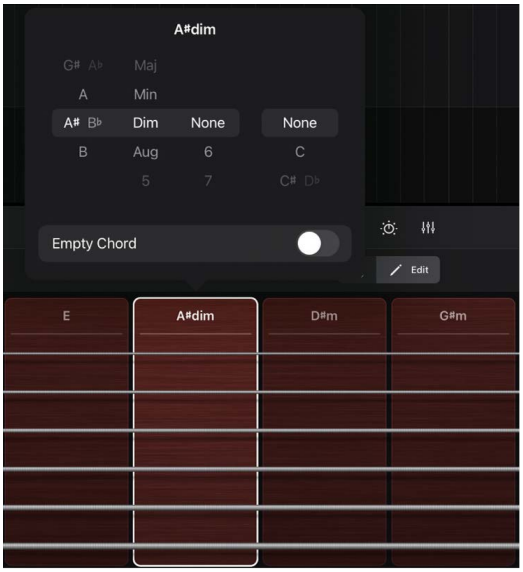
Play chords

- In the Guitar Strips Play Surface, do any of the following:
  - *Play individual notes of a chord:* Tap a string.
  - *Strum a chord:* Swipe vertically across the strings in one of the guitar strips.
  - *Play the full chord:* Tap the top of a guitar strip.
  - *Mute the strings:* Touch and hold the empty area to the left or right of the chord strips as you play.

Edit chords

You can create your own custom chords by modifying existing chords for the Guitar Strips Play Surface. Custom chords can include extensions (added notes) and alternate bass notes. When you add a custom chord, it's also available in the Chord Strips Play Surface.

1. In the Guitar Strips Play Surface, tap the Edit button in the Play Surface menu bar.
2. Tap the chord strip you want to use for the custom chord.
3. Swipe the wheels to set the chord root and tonality, add an extension (added note), and add a different bass note.



4. When you're finished, tap anywhere outside the menu, then tap the Play button to exit Edit mode.

Record vocals and instruments

Intro to recording in Logic Pro for iPad

In Logic Pro for iPad, you have many powerful options for recording vocals, acoustic instruments, electric instruments, and software instruments. When recording either audio or MIDI, you can choose to record one track at a time, record multiple tracks at once (called *multitrack recording*), or replace audio or MIDI recordings. You can record multiple audio and MIDI performances over the same section of a track, called *take recording*, and then choose the best take to include for playback in your project. You can also record over specific parts of an audio region to create a composite take.

You can simultaneously record to multiple software instrument or audio tracks, and you can record audio and software instruments at the same time, which allows you to easily capture multiple performances.

To help you stay in time, you can use the metronome and count-in for your performances.

Record audio

Before recording audio in Logic Pro for iPad

In Logic Pro for iPad, you can record vocals, an acoustic instrument, or any other sound using your iPad's built-in microphone or a microphone connected to your iPad, either directly or via an audio interface. You record sound from a microphone to an audio track.

Before you start recording audio, do the following:

- Check hardware connections and settings, making sure that any sound source you plan to use in your session—microphone, guitar, or keyboard, for example—is connected to the audio input of your device and is working. See Connect external devices.
- Choose an audio device, which is necessary if you are using an audio interface connected to your iPad.
- Add an audio track, which is used to record a voice, an acoustic instrument, or any other audio signal, and set the audio input and channel format in the Fader.
- Set the metronome, which plays a steady beat so that you can play and record in time and hear a count-in before recording starts.

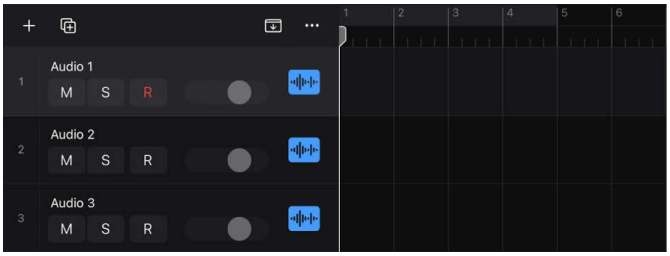
- Set up input monitoring, which allows you to hear the output of audio tracks that are not enabled for recording, if desired. Many audio interfaces offer a direct or hardware monitoring option, which sends the audio signal being recorded to a monitor output before the signal is sent to Logic Pro. If your interface offers direct monitoring, you should use it, and only use input monitoring if you want to hear effects on a channel strip before recording.
- Set the track volume level, which controls the playback level, not the recording level.
- Tune any instruments that are connected to your system to ensure that your external instrument recordings are in tune with any software instruments, samples, or existing recordings in your project. You can access the Tuner using the Tuner button in the control bar. For details about the Tuner plug-in, see Use Tuner utility and plug-in.

Record sound from a microphone or instrument in Logic Pro for iPad

You can record sound from a microphone (to record vocals or an acoustic instrument, for example), or from an electric instrument (such as an electric guitar or keyboard) connected to your iPad, to an audio track. Before you start recording, make sure you create an audio track to record to.

Record live audio

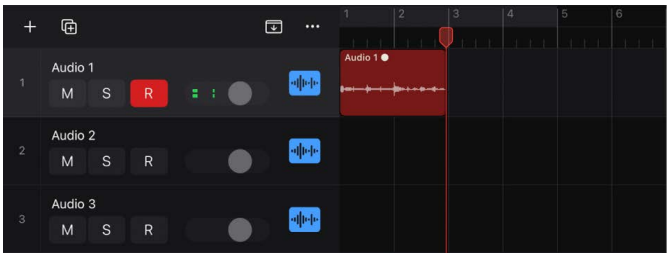
1. In Logic Pro, tap the header of the audio track you want to record to.



   The letter “R” of the Record Enable button R turns red to indicate that the track will be automatically enabled for recording.

2. Position the playhead at the point in the ruler where you want to start recording.
3. Set the metronome and set a count-in 1234 for recording if you want.
4. Tap the Record button in the control bar to start recording.
5. Start singing or playing your instrument.

   Your performance appears as a new audio region on the track as you record.



6. Tap the Stop button in the control bar to stop recording.

Record multiple audio takes in Logic Pro for iPad

When you're recording in Logic Pro for iPad, you can record multiple versions, or *takes*, of a phrase or section in quick succession. Take recording can be especially helpful when you're improvising a lead or solo part and want to capture several versions while you're feeling inspired.

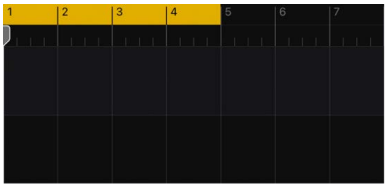
When you record multiple takes, a *take folder* containing the take recordings is created on the track. Later, you can choose the take you want to use in the project. See Intro to takes.

You can also record multiple audio takes into Live Loops cells. See Record and edit takes in cells.

Note: If you have the Replace button in the control bar, make sure it is off. When Replace mode is on, Logic Pro replaces the audio region instead of creating a take folder.

Record multiple audio takes

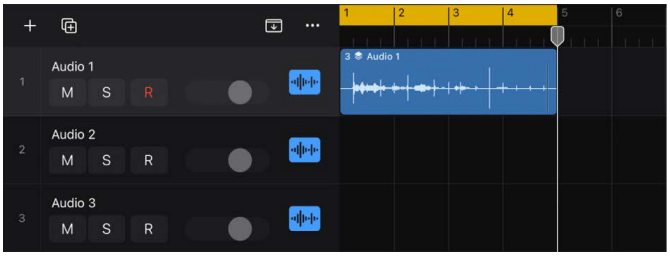
1. In Logic Pro, tap the header of the audio track you want to record to.
2. Set the cycle area in the ruler if you want to record several takes in quick succession.



3. Set the metronome and set a count-in for recording if you want.
4. Tap the Record button in the control bar to start recording.

   Recording starts automatically at the beginning of the defined cycle area. Record as many cycle passes as you want. After the second cycle pass, a take folder is created on the track. Each subsequent cycle pass is added to the take folder.

5. Tap the Stop button in the control bar after you finish capturing cycle passes.



To easily differentiate multiple takes, you can automatically colorize take regions. See Recording project settings.

Record to multiple audio tracks in Logic Pro for iPad

In Logic Pro for iPad, you can record to more than one audio track at a time, which allows you to record several instruments at once—placing each instrument on a separate track, for example.

To record multiple input sources simultaneously, you need an audio interface that has multiple inputs.

Record to multiple audio tracks simultaneously

1. In Logic Pro, tap the Fader button on the left side of the view control bar, tap the Options button, then tap Input.

   Note: You can also set the input using the Input slot in the Mixer. See Channel strip controls.

2. Set the instrument or microphone input source for each track you want to record to. To record multiple sources onto multiple tracks, set the input source for each track to a different input.

3. Tap the Record Enable button in the track header of each track you want to record to.

   Each activated Record Enable button blinks red to indicate that the track is ready for recording.

   Note: You can enable multiple Record Enable buttons only when each track is set to a different input.

4. Position the playhead at the point in the ruler where you want to start recording.

5. Set the metronome and set a count-in for recording if you want.

6. Tap the Record button in the control bar to start recording.

7. Everyone being recorded can start singing or playing their instruments.

   A new audio region appears on each of the record-enabled tracks.

8. Tap the Stop button in the control bar to stop recording.

Replace audio recordings in Logic Pro for iPad

In Logic Pro for iPad, you can record over an existing audio recording, or a portion of it, replacing the original recording with the new recording. You do this by recording in Replace mode. In Replace mode, any audio regions from when you start recording until the end of recording will be erased, even if nothing is played.

Note: You can also replace software instrument recordings. For information on replacing MIDI recordings, see Replace software instrument recordings.

1. In Logic Pro, tap the Replace button in the control bar to turn on Replace mode.

   Note: If the Replace button is not visible in the control bar, you will need to customize the control bar to add it. See Change the controls in the control bar.

2. Tap the track header of the audio track you want to record to.

3. Position the playhead at the point in the ruler where you want to start recording.

4. Tap the Record button in the control bar to start recording.
5. Start singing or playing your instrument.
6. Tap the Stop button in the control bar to stop recording.

The original recording is replaced with the new recording.

Delete audio recordings in Logic Pro for iPad

In Logic Pro for iPad, you can delete an audio region that was recorded before or since the current project session was opened.

Delete an audio recording from the Tracks area

- In Logic Pro, tap an audio region to select it, tap it again, then tap Delete.

The audio region is removed from the Tracks area and the audio file is deleted from the project.

Record software instruments

Before recording software instruments in Logic Pro for iPad

In addition to using onscreen Play Surfaces in Logic Pro for iPad, you can also connect a music keyboard or controller that is Core MIDI compliant to your iPad. Before you can play or record a software instrument, you need to add a software instrument track and choose a patch from the Browser.

You can also set the metronome, which plays a steady beat so that you can play and record in time, or as a count-in before recording starts.

Connect a music keyboard or controller to your iPad

In Logic Pro, do one of the following:

- If the keyboard is a USB music keyboard, connect the USB cable from the keyboard to your iPad, using a USB-C adapter if needed.
- If the keyboard is a standard MIDI music keyboard, connect the keyboard to a MIDI interface using standard MIDI cables, then connect the MIDI interface to your iPad.
- If the keyboard is a Bluetooth or Wi-Fi music keyboard, consult its support materials for instructions on how to pair it to your iPad. See In/Out MIDI settings on how to pair MIDI Bluetooth devices.

For information about connecting a keyboard or controller, see Connect external devices. Be sure to follow the instructions that came with the keyboard or controller. If you're using a MIDI interface, be sure to follow the instructions that came with the interface.

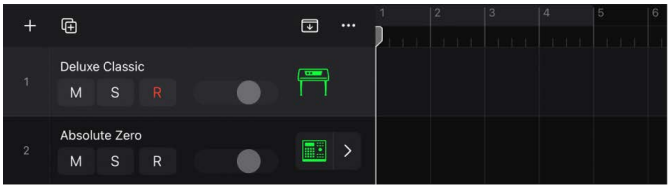
Record software instruments in Logic Pro for iPad

Before you start recording, make sure you create a software instrument track to record to. You can also familiarize yourself with how to use the Play Surfaces in Logic Pro for iPad. Additionally, you can connect a MIDI device that is Core MIDI compliant.

Record a software instrument

1. In Logic Pro, tap the track header of the software instrument track you want to record to.

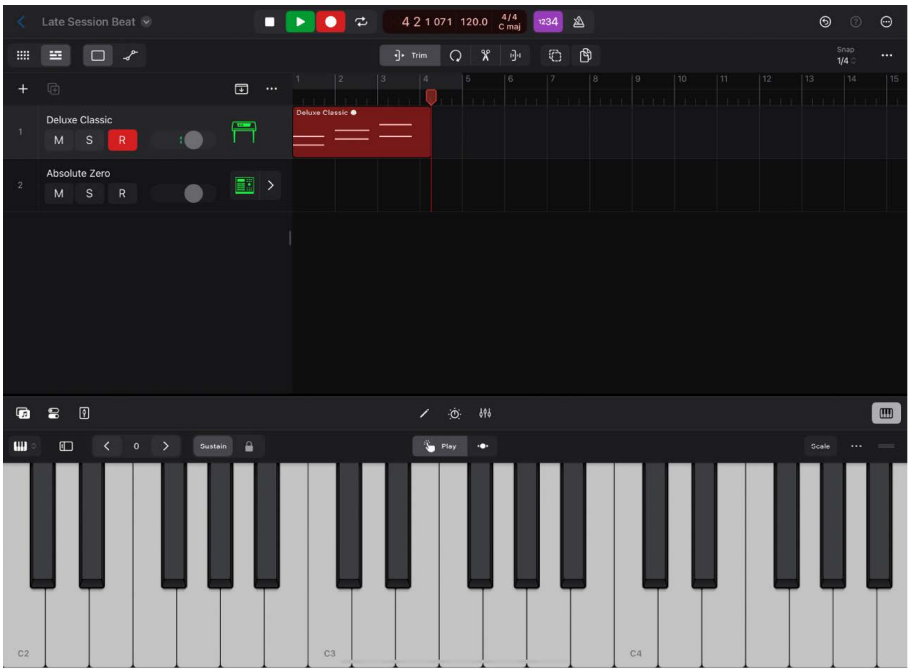
   Note: You can choose to record from a specific MIDI In port and MIDI In channel in the Track inspector. See Edit track parameters.



   The letter *R* of the Record Enable button R turns red to indicate that the track is automatically enabled for recording.

2. Position the playhead at the point in the ruler where you want to start recording.
3. Set the metronome and set a count-in 1234 for recording if you want.
4. Tap the Record button in the control bar to start recording.
5. Use the Play Surface or a MIDI keyboard to play some notes.

   Your performance appears as a new MIDI region on the track as you record.



6. Tap the Stop button in the control bar to stop recording.

Record additional software instrument takes in Logic Pro for iPad

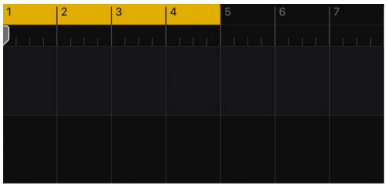
You can record multiple versions, or takes, in quick succession in Logic Pro for iPad. When you record multiple takes, a *take folder* containing the take recordings is created on the track. Later, you can choose the take you want to use in the project, see Intro to takes.

Record multiple software instrument takes

1. In Logic Pro, tap the More button in the control bar, choose Settings > App Settings > Recording > Cycle On, and then tap Create Take Folder.

   Note: You can also choose to record multiple software instrument takes when Cycle mode is off.

2. Tap Done or tap anywhere outside of the Settings dialog to close it.
3. Tap the header of the software instrument track you want to record to.
4. Set the cycle area in the ruler.

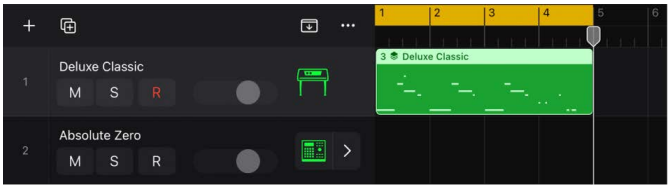


5. Tap the Record button in the control bar to start recording.

   Recording starts automatically at the beginning of the defined cycle area.

6. Use the Play Surface or a MIDI controller to play some notes. Record as many cycle passes as you want.
7. Tap the Stop button in the control bar to stop recording.

   The selected track contains a take folder with multiple take regions inside.



Record to multiple software instrument tracks in Logic Pro for iPad

You can record to multiple software instrument tracks simultaneously with a Play Surface or a MIDI controller in Logic Pro for iPad. A MIDI region is recorded to each record-enabled software instrument track.

Before you start recording, make sure you create software instrument tracks.

1. In Logic Pro, tap the Record Enable button R in the track header of each track you want to record to.

   Each activated Record Enable button blinks red to indicate that the track is ready for recording.

2. Position the playhead at the point in the ruler where you want to start recording.
3. Set the metronome and set a count-in 1234 for recording if you want.
4. Tap the Record button in the control bar to start recording.
5. Use the Play Surface or a MIDI controller to play some notes.
6. Tap the Stop button in the control bar to stop recording.

Record multiple MIDI devices to multiple tracks in Logic Pro for iPad

In Logic Pro for iPad, you can record multiple MIDI input devices, such as hardware and iOS music apps, simultaneously, with each device representing a unique performance and triggering different sounds on multiple instrument tracks.

Before you start recording, make sure you create software instrument tracks for each MIDI Input device you want to record. You can also configure your MIDI sources in In/Out MIDI settings.

Record multiple MIDI input devices to multiple instrument tracks

1. In the Track inspector for each track, use the MIDI In Port and MIDI In Channel pop-up menus to choose the MIDI In port and MIDI In channel that matches the MIDI output port and channel for the MIDI input device sending to that specific track. For more information about track parameters, see Edit track parameters.
2. Tap the Record Enable button R in the track header of each track you want to record to.

   Each activated Record Enable button blinks red to indicate that the track is ready for recording.

3. Position the playhead at the point in the ruler where you want to start recording.
4. Set the metronome and set a count-in 1234 for recording if you want.
5. Tap the Record button in the control bar to start recording.
6. Use each MIDI input device to record parts.
7. Tap the Stop button in the control bar to stop recording.

A MIDI region is recorded to each record-enabled track.

Record software instruments and audio simultaneously in Logic Pro for iPad

In Logic Pro for iPad, you can record software instruments using MIDI input devices or the Play Surfaces and audio using microphones, electric, electronic, and acoustic instruments simultaneously. You can choose to record to a single software instrument track or multiple, separate software instrument tracks while simultaneously recording audio tracks.

Record a software instrument and audio simultaneously

1. In Logic Pro, tap the Record Enable button R in the track header of each track you want to record to.

   On audio tracks, the activated Record Enable buttons blink red to indicate that the tracks are ready for recording. On software instrument tracks, the activated Record Enable buttons turn red to indicate that the tracks are ready for recording.

2. Tap one of the software instrument tracks to select it.
3. Position the playhead at the point in the ruler where you want to start recording.
4. Set the metronome and set a count-in 1234 for recording if you want.
5. Tap the Record button in the control bar to start recording.
6. Use the Play Surface or a MIDI controller to play some notes and start singing or playing instruments.
7. Tap the Stop button in the control bar to stop recording.

Record multiple MIDI input devices and audio simultaneously

You can record multiple MIDI input devices simultaneously, each device representing a unique performance and triggering different sounds on multiple software instrument tracks at the same time you record multiple audio sources.

Before you start recording, make sure you create software instrument tracks for each MIDI Input device you want to record. You can also configure your MIDI sources in In/Out MIDI settings.

1. In the Track inspector for each software instrument track, use the MIDI In Port and MIDI In Channel pop-up menus to choose the MIDI In port and MIDI In channel that matches the MIDI output port and channel for the MIDI input device sending to that specific track. For more information about track parameters, see Edit track parameters.
2. Tap the Record Enable button R in the track header of each track you want to record to.

   Each activated Record Enable button blinks red to indicate that the track is ready for recording.

3. Position the playhead at the point in the ruler where you want to start recording.
4. Set the metronome and set a count-in 1234 for recording if you want.
5. Tap the Record button in the control bar to start recording.
6. Use each MIDI input device to record software instrument parts and start singing or playing instruments.
7. Tap the Stop button in the control bar to stop recording.

Merge software instrument recordings in Logic Pro for iPad

You can record additional performances on top of an existing performance, merging them into a single region in Logic Pro for iPad. You can use this process to add a supplementary recorded sound to a previously recorded performance, for example. You set the behavior when recording over existing MIDI regions in Recording settings. You can choose to create take folders or merge previously and newly recorded MIDI events when Cycle mode is on and off.

Merge a software instrument recording with Cycle mode on

1. In Logic Pro, tap the More button in the control bar, choose Settings > App Settings > Recording > Cycle On, and then tap Merge.
2. Tap the header of the software instrument track you want to record to.
3. Set the cycle area in the ruler.
4. Tap the Record button in the control bar to start recording.
5. Use the Play Surface or a MIDI controller to play some notes.
6. Tap the Stop button in the control bar to stop recording.

The end result is a single MIDI region that contains the merged performances from each cycle pass. However, you can also merge a MIDI recording when not in Cycle mode.

Spot erase software instrument recordings in Logic Pro for iPad

You can use spot erase to remove any unwanted notes from a recorded software instrument performance in Logic Pro for iPad.

Note: The Spot Erase button is visible only if you have selected Note Repeat in View Options. See Use note repeat in the side controls.

1. In Logic Pro, select a software instrument track, then tap the Play Surfaces button.
2. In the Play Surface, tap the Side Controls button.
3. Tap the Play button, touch and hold the Spot Erase button, and then tap the notes on the Play Surface that you want to delete as the playhead passes over them.

Replace software instrument recordings in Logic Pro for iPad

When you're recording, you can replace all or part of a previous performance while recording a new one. You do this by recording in Replace mode in Logic Pro for iPad. In Replace mode, MIDI regions are erased only where new MIDI events are recorded.

Note: You can also replace audio recordings. For information on replacing audio recordings, see Replace audio recordings.

1. In Logic Pro, tap the Replace button in the control bar to turn on Replace mode.

   Note: If the Replace button is not visible in the control bar, you need to add it by customizing the control bar. See Change the controls in the control bar.
2. Tap the header of the software instrument track you want to record to.
3. Position the playhead at the point in the ruler where you want to start recording.
4. Tap the Record button in the control bar to start recording.

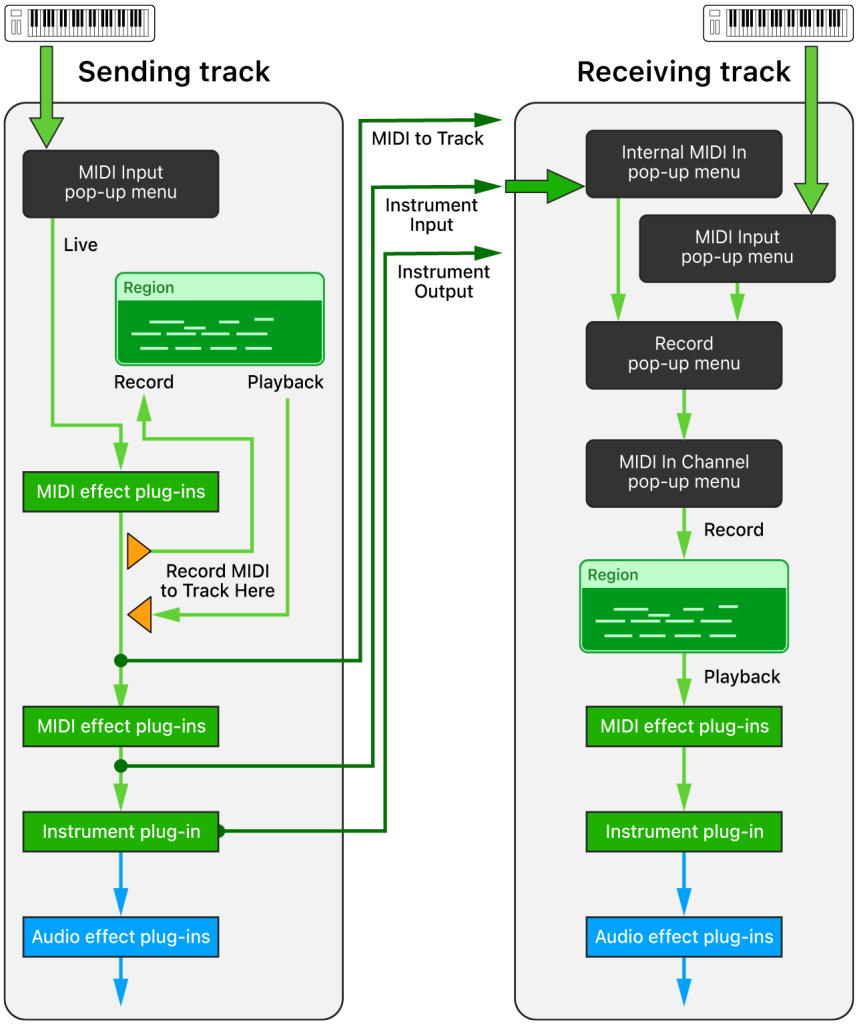
5. Use the Play Surface or a MIDI keyboard to play some notes. Record as many cycle passes as you want.
6. Tap the Stop button ■ in the control bar to stop recording.

Your new recording now replaces the previously recorded portion of your material.

Route MIDI internally to software instrument tracks in Logic Pro for iPad

With the Internal MIDI In feature, you can route and record the MIDI output of MIDI effect or software instrument plug-ins from one software instrument track (sending track) to any other software instrument track (receiving track) in your project. This concept is similar to using aux sends, where you route audio signals internally from one track to another in addition to sending it to the main output. And similar to aux sends, where you can tap the signal at different points in the signal flow, such as pre-fader or post-fader, internal MIDI routing in Logic Pro lets you tap the MIDI signal at different points along the MIDI signal path of a software instrument track. These points are referred to as *MIDI to Track*, *Instrument Input*, and *Instrument Output*.

Once you select an Internal MIDI In source on the receiving track, the Record pop-up menu appears in the Track inspector. This menu lets you choose whether to receive only that Internal MIDI In signal or also the MIDI Input signal on that track.



MIDI to Track

The MIDI to Track submenu of the Internal MIDI In pop-up menu in the Track inspector lists the tracks in your project that use Record MIDI to Track Here on their MIDI Effect slots. You can record the output of the MIDI effect plug-in of the sending track (marked as *Record MIDI to Track Here*) to any software instrument track by choosing this option in the Internal MIDI In pop-up menu of the receiving track.

Tip: Play your MIDI keyboard while it's routed to a track that has MIDI effects plug-ins loaded, and record that processed MIDI signal to any other software instrument track.

Instrument Input

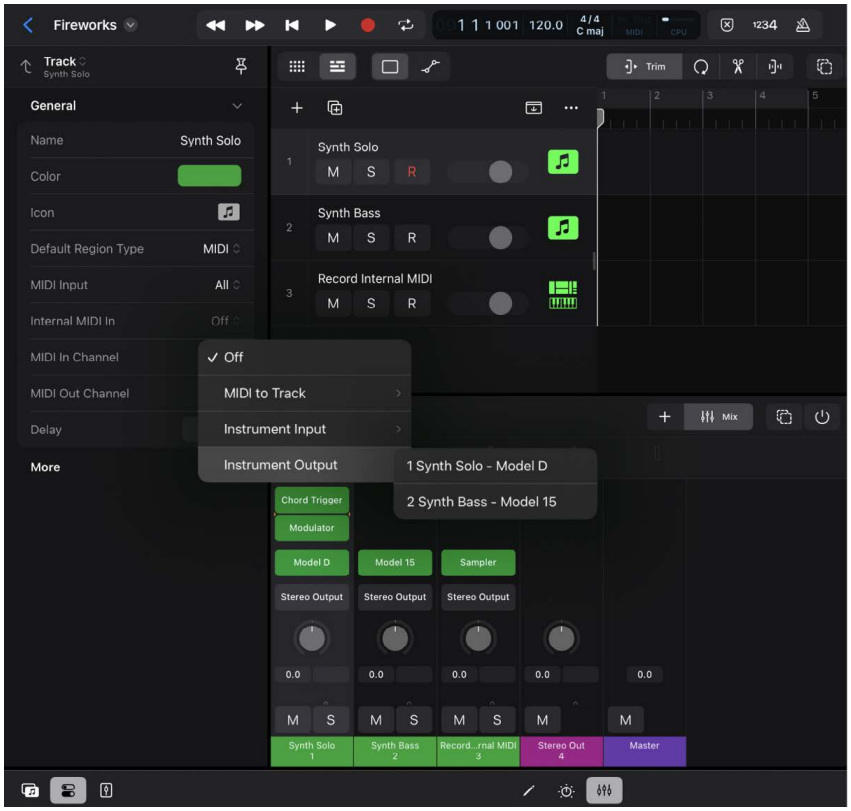
The Instrument Input submenu of the Internal MIDI In pop-up menu in the Track inspector lists all the software instrument tracks that have a software instrument plug-in loaded. This signal represents the output of the last MIDI effect plug-in of the sending track, which is the same point along the MIDI signal path as the input of its instrument plug-in.

Tip: Play back the MIDI regions on a sending track that has MIDI effect plug-ins loaded, and record that processed MIDI signal to a receiving track.

Instrument Output

The Instrument Output submenu of the Internal MIDI In pop-up menu in the Track inspector lists all the software instrument tracks that have a software instrument plug-in loaded capable of sending out MIDI events. You can route the MIDI output of such a plug-in to any other software instrument track in your project by selecting it in the Instrument Output menu of the receiving track.

Tip: If an instrument plug-in can send multiple MIDI signals on dedicated MIDI channels, you can choose that sending track on multiple receiving tracks, set each track to a dedicated MIDI input channel, and record that MIDI multitrack signal in one pass.



Record the MIDI output of a MIDI effect plug-in to any software instrument track

1. On the software instrument track you want to use as the output (sending) device, choose Record MIDI to Track Here from its MIDI plug-in pop-up menu.

   The track is now listed in the MIDI to Track submenu of the Internal MIDI In pop-up menu, an element of the Track inspector on all software instrument tracks.

2. Select the software instrument track where you want to receive that MIDI signal.
3. In the Track inspector, tap the Internal MIDI In pop-up menu, then choose the sending track from the MIDI to Track submenu.

   The sending track is listed by its track number and track name.

4. In the Track inspector, tap the Record pop-up menu and choose whether to receive only the Internal MIDI In signal or both the Internal MIDI In signal and the MIDI Input signal.
5. Do one of the following:

   - Tap the Input Monitoring button on the receiving track, then play the sending track to monitor the incoming signal.
   - Tap the Record Enable button R on the receiving track, then start recording the signal from the sending track.

Record existing MIDI regions with MIDI effect plug-ins to a different software instrument track

You can record MIDI regions that exist on software instrument tracks (including all processing of the MIDI effect plug-ins applied on that track) to any other software instrument track in your project.

1. Position the playhead before the first region of the track that functions as the output (sending) track.
2. Select the software instrument track that functions as the input (receiving) track where you want to record the regions.
3. In the Track inspector of the receiving track, tap the Internal MIDI In pop-up menu, then choose the sending track from the Instrument Input submenu.

   The sending track is listed by its track number and track name and the name of the instrument plug-in on that track.

4. In the Track inspector, tap the Record pop-up menu and choose whether to receive only the Internal MIDI In signal or both the Internal MIDI In signal and the MIDI Input signal.
5. Do one of the following:

   - Tap the Input Monitoring button on the receiving track, then play the sending track to monitor the incoming signal.
   - Tap the Record Enable button R on the receiving track, then start recording the signal from the sending track.

Record the MIDI output of an instrument plug-in to any software instrument track

1. On the software instrument track that functions as the output (sending) track, add a software instrument plug-in that is capable of sending MIDI events.
2. Select the software instrument track where you want to record the MIDI signal from the sending track.
3. In the Track inspector, tap the Internal MIDI In pop-up menu, then choose the sending track from the Instrument Output submenu.

   The sending track is listed by its track number and track name and the name of the instrument plug-in on that track.
4. In the Track inspector, tap the Record pop-up menu and choose whether to receive only the Internal MIDI In signal or both the Internal MIDI In signal and the MIDI Input signal.
5. Do one of the following:
   - Tap the Input Monitoring button on the receiving track, then play the sending track to monitor the incoming signal.
   - Tap the Record Enable button on the receiving track, then start recording the signal from the sending track.

Record the MIDI output of a multitrack instrument plug-in to multiple software instrument tracks

1. On the software instrument track that functions as the output (sending) track, add a multitrack instrument plug-in.

   The sending track is now listed in the Instrument Output submenu of the Internal MIDI In pop-up menu, an element of the Track inspector on all software instrument tracks. It is listed by its track number and track name, followed by the instrument plug-in name.
2. Create multiple software instrument tracks that function as the receiving tracks to record the individual MIDI outputs of the multitrack instrument plug-in.
3. From the Internal MIDI In pop-up menu in each receiving track's Track inspector, choose the sending track.
4. From the MIDI In Channel pop-up menu in each receiving track's Track inspector, choose the MIDI channel you want to route to that track.
5. In the Track inspector, tap the Record pop-up menu and choose whether to receive only the Internal MIDI In signal or both the Internal MIDI In signal and the MIDI Input signal.
6. Do one of the following:
   - Tap the Input Monitoring button on each receiving track, then play the sending track to monitor the incoming signals.
   - Tap the Record Enable button on each receiving track, then start recording the signals from the sending track.

Record with Low Latency Monitoring mode in Logic Pro for iPad

All plug-ins cause timing delays, known as latency, when processing audio. Small delays are not audible; however, the more processor-intensive a plug-in is, the bigger its latency will be. In addition, many channel strips in your project might have different plug-ins, meaning different tracks are played back with a different delay, causing sync issues. Logic Pro automatically applies plug-in delay compensation (PDC) by detecting the channel strip with the maximum latency due to its latency-causing plug-ins, and based on that, delaying the other channel strips in real time by an individual amount so that all tracks play back in sync.

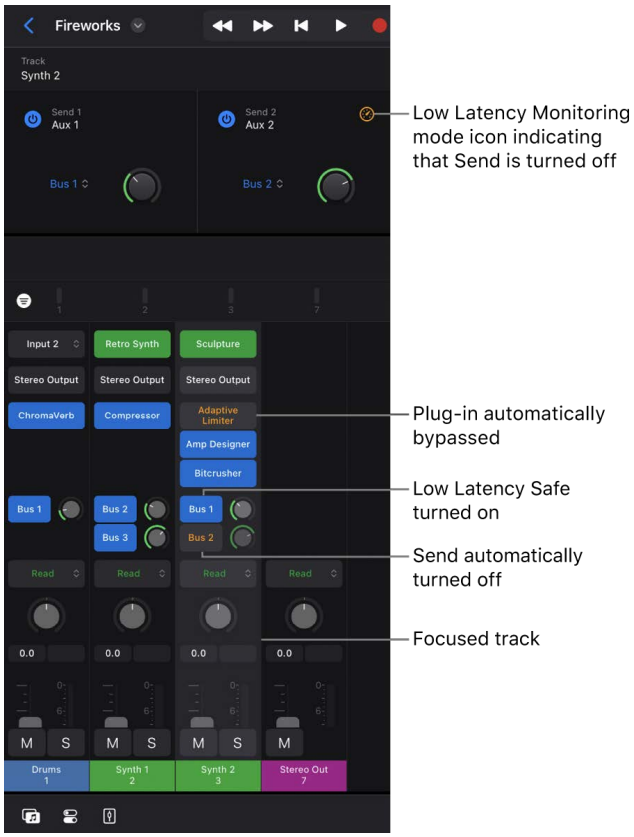
Although this slight playback delay is not a problem when you play back your project during mixing, it makes it difficult to perform with proper timing when you record on a track. To avoid that delay, you can turn on Low Latency Monitoring mode that turns off plug-in delay compensation on the focused instrument track and any record-enabled tracks. This affects the plug-ins and the Aux sends on those tracks:

- *Bypassed plug-ins:* Any plug-in that pushes the track's total latency value above the set limit is bypassed. Those plug-ins show a gray plug-in button with orange text in the Mixer and an orange plug-in name and Low Latency Monitoring mode icon in the Details view of the Plug-ins area.

  Focused instrument tracks show the bypassed slots once you start the playback.

- *Deactivated Aux sends:* Every Send slot is turned off. This is indicated by a gray Send button with orange text and an orange Low Latency Monitoring mode icon in the Sends view of the Plug-ins area.

  Tip: A Low Latency Safe option in the Sends pop-up menu lets you turn on a Send slot again, which is useful when you routed the track's signal to a reverb that you want to hear during recording.

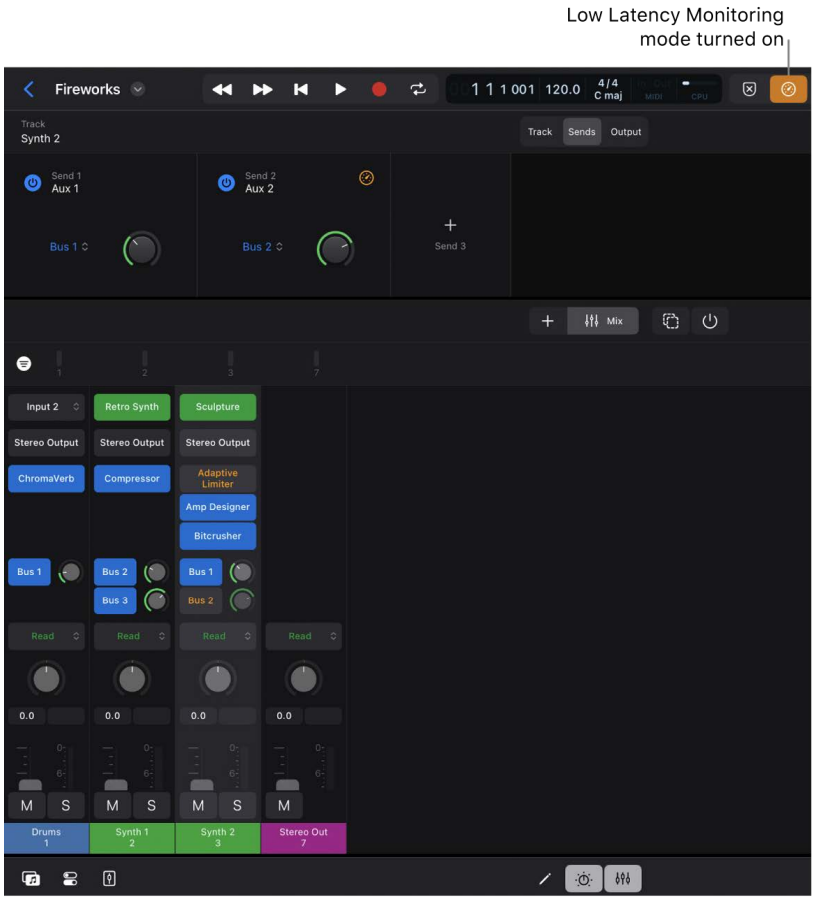


Note: In addition to the plug-in latencies, there are other components that introduce latencies. For example, MIDI controllers connected via Bluetooth, the input and output stage of your selected audio interface, or the I/O Buffer Size value. For details, see Audio Devices settings.

Turn Low Latency Monitoring mode on or off

- In Logic Pro, do one of the following:
  - Tap the Low Latency Monitoring Mode button in the control bar.

    The Low Latency Monitoring Mode button does not appear in the control bar by default. To add this button to the control bar, see Customize the control bar.
  - Tap the More button in the control bar, tap Settings > App Settings > Audio > General, then tap the Low Latency Monitoring Mode switch.



When you turn on Low Latency Monitoring mode, the Limit field below the Low Latency Monitoring Mode switch appears in the General Audio settings. It lets you determine the maximum amount of allowed latency across the entirety of the record-enabled track's signal path (up to 30 ms).

WARNING: The sound may change when you turn on Low Latency Monitoring mode. Depending on the plug-ins in use, the change in sound can be anything from subtle to dramatic. If plug-ins being used do not exceed the total latency limit, there is no audible difference.

Reactivate an Aux send in Low Latency Monitoring mode

With Low Latency Monitoring mode turned on, all Send slots on a record-enabled channel strip are turned off. This is indicated by their gray buttons with orange text in the channel strip and by an orange Low Latency Monitoring mode icon in the Sends view of the Plug-ins area.

1. In Logic Pro, select the record-enabled track and do one of the following:
   - Tap the Mixer button in the view control bar to show the channel strip you want to record on.
   - Tap the Plug-ins button in the view control bar, then tap the Sends button.
2. Tap the Sends pop-up menu and choose Low Latency Safe.

   The Send button changes to blue, and the orange Low Latency Monitoring mode icon disappears.

To deactivate the Send again, tap the Low Latency Safe option in the Sends pop-up menu to deselect it.

Use the metronome in Logic Pro for iPad

Logic Pro for iPad includes a metronome, which plays a steady beat (like a “click track”) to help you play and record in time. You can turn the metronome on or off before you record, while you’re recording, or any time your project is playing. The metronome always plays at the project tempo. This means that if a tempo map has been created by Smart Tempo, the metronome automatically follows it. It also means that if Smart Tempo is automatically adapting the project tempo to the performance being recorded, the timing of the metronome adapts along with it.

Note: If the Metronome button is not visible in the control bar, you will need to customize the control bar to add it. See Change the controls in the control bar.

Important: When you record audio using a microphone and have the metronome playing, you should use headphones to avoid including the sound of the metronome in your recording.

Turn the metronome on or off

- In Logic Pro, tap the Metronome button in the control bar.

Change the metronome behavior

- In Logic Pro, touch and hold the Metronome button in the control bar, then choose one of the following:
  - *Simple Mode:* The metronome clicks only when you turn it on. With this mode selected, the other metronome settings in the menu are unavailable.

    Note: When Simple Mode is enabled, the Metronome button is white when turned off.
  - *Click while Recording:* The metronome clicks during recording whether or not the metronome is turned on (the Metronome button has a purple outline).
  - *Only during Count-in:* The metronome clicks only during the count-in whether or not the metronome is turned on (the Metronome button has a purple outline).

    Note: Click while Recording must also be chosen for “only during Count-in” to work.
  - *Click while Playing:* The metronome clicks only during playback (the Metronome button is purple). This setting has the same effect as turning the metronome on and off.

You can choose Metronome Settings from this menu to access the rest of the metronome settings available in Settings > Project Settings > Metronome. See Metronome project settings.

Use the count-in in Logic Pro for iPad

Count-in in Logic Pro for iPad is a predefined number of clicks that the metronome plays before recording starts, which helps you to prepare to play in time.

Note: If the Count-in button is not visible in the control bar, you need to add it by customizing the control bar. See Change the controls in the control bar.

Turn the count-in on or off

- In Logic Pro, tap the Count-in button 1234 in the control bar to have the metronome play a predefined count-in before recording starts.

Set the number of bars or beats for the count-in

In Logic Pro, do one of the following:

- Tap the More button ⋯ on the right side of the control bar, choose Settings > Project Settings > Recording > Count-in, and then choose the number of bars or beats.
- Touch and hold the Count-in button 1234, then choose the number of bars or beats.

Use Flashback Capture

Intro to Flashback Capture in Logic Pro for iPad

Using Flashback Capture in Logic Pro for iPad, you can capture a recent MIDI performance or a recent audio performance, even if Logic Pro wasn't recording while you were playing. This is becauseLogic Pro captures and temporarily stores incoming MIDI events or audio from a performance. You can capture audio and MIDI while playing back a project. You can also capture MIDI when the project is stopped. You can use Flashback Capture to create MIDI regions and audio regions that contain the performance.

Capture your most recent MIDI performance in Logic Pro for iPad

Using Flashback Capture, you can capture your most recent MIDI performance, even if Logic Pro for iPad wasn't recording while you were playing. You can capture MIDI notes while a project is playing or stopped.

When playback is stopped, Flashback Capture creates a separate region containing all the MIDI events received since the last playback; however, after a pause of 20 seconds between incoming MIDI events, those initial MIDI events before the pause are discarded. If you perform some MIDI events and then pause for 1.5 bars or longer, those initial notes are not included in the visible part of your region. If you want those MIDI events to be included in the created region, you can drag the left region boundary to expose them.

Note: The Flashback Capture button ⏺ in the control bar and Flashback Capture in the shortcut menu changes from a dimmed state to an active state to indicate that MIDI has been captured and can be added as a region to your project.

Capture a recent MIDI performance

In Logic Pro, make sure a software instrument track is focused, then do one of the following:

- Tap the Flashback Capture button in the control bar.

  Note: If the Flashback Capture button is not visible in the control bar, you can add it by customizing the control bar. See Change the controls in the control bar.

- Touch and hold the Record button, then tap Flashback Capture.

Use Flashback Capture to create take regions in Cycle mode

1. In Logic Pro, tap the More button in the control bar, choose Settings > App Settings > Recording > Cycle On, and then tap Create Take Folder.
2. Turn on Cycle mode.
3. Start playback and create/perform MIDI events.
4. When you've finished your performance, do one of the following:
   - Tap the Flashback Capture button in the control bar.
   - Touch and hold the Record button, then tap Flashback Capture.

Capture a recent audio performance in Logic Pro for iPad

Using Flashback Capture, you can capture a recent audio performance to an audio track, even if Logic Pro for iPad wasn't recording. You can only capture audio while the project is playing. While a project is stopped, no audio is captured. To capture multiple sections of audio, you can stop playback, move the playhead to a different position, and restart playback.

Flashback Capture saves your performance when there is an incoming audio signal on the track but not when there is silence. The project must play for a minimum of four seconds. Flashback Capture can save up to one minute of audio. The settings of the last focused audio track are used for the captured recording. For example, if you last focused an audio track that is set to record in stereo using channel inputs 1 and 2, subsequent captured recordings also use these settings.

Note: The Flashback Capture button in the control bar and Flashback Capture in the shortcut menu changes from a dimmed state to an active state to indicate that audio has been captured and can be added as a region to your project.

Capture a recent audio performance

1. In Logic Pro, tap an audio track to give it focus.
2. Tap the Play button in the control bar and sing or play your instrument.

   Any incoming audio is captured while the project is playing.
3. To create a region containing your recent audio performance, make sure the audio track is in focus, then do one of the following:
   - Tap the Flashback Capture button in the control bar.

     Note: If the Flashback Capture button is not visible in the control bar, you can add it by customizing the control bar. See Change the controls in the control bar.

- Touch and hold the Record button in the control bar, then tap Flashback Capture.

  An audio region is created at the position where incoming audio was detected.

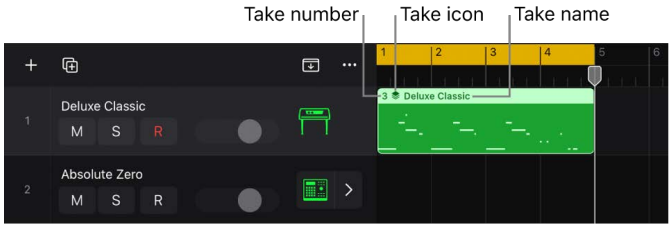
  Note: If you stopped and restarted playback in step 2, you can repeat step 3 to create separate audio regions corresponding to the times when the project was playing.

Work with takes and comps

Intro to takes and comps in Logic Pro for iPad

When you record multiple audio or software instrument performances over an entire region in Logic Pro for iPad, a take folder containing the takes is created on the track, which allows you to choose your preferred take for playback. When you record over *specific* parts of an audio region, composite takes (referred to as *comps*) are also added to the take folder. This allows you to combine different performances to create a composite take.

You can choose an active take or comp for playback, rename takes and comps, and delete takes and comps. You can also automatically colorize takes while recording so that you can easily identify which take is the active take.



The number of the currently active take or comp, the take icon, and the take or comp name are shown along the top of the take folder.

Comp your audio recordings

You can create composite recordings in Logic Pro for iPad by recording over specific parts of an audio region. The part you record over is combined with the rest of the previously recorded material to create a comp. For information about how to record audio, see Record live audio.

Create a comp

1. In Logic Pro, tap the header of the audio track you want to record to.
2. Position the playhead at the point in the ruler where you want to start recording.
3. Set the cycle area in the ruler if you want to record several takes in quick succession.
4. Set the metronome and set a count-in 1234 for recording if you want.
5. Tap the Record button in the control bar to start recording.

   Recording starts at the playhead position.
6. Tap the Stop button in the control bar to stop recording.

A take folder containing the comp is created on the track (if you haven't previously recorded multiple takes), and comp operations are now available in the Takes and Folders submenu.

Choose takes and comps in Logic Pro for iPad

You can switch takes or comps in Logic Pro for iPad and then play back the project to hear them. For information about how to record multiple takes, see Record multiple audio takes and Record multiple software instrument takes.

Choose a take or comp

- In Logic Pro, tap the take folder to select it, tap it again, tap Takes and Folders, then choose a take or comp.

The chosen take or comp is now active, and its information is shown in the top left of the take folder. Play back the project to hear it.

Rename takes and comps in Logic Pro for iPad

You can rename takes and comps in Logic Pro for iPad.

Rename a take or comp

1. In Logic Pro, choose the take or comp you want to rename.
2. Tap the take folder, tap Takes and Folders, then tap Rename Take or Rename Comp.
3. Enter the new name in the dialog that appears, then tap OK.

Color takes while recording in Logic Pro for iPad

You can color take regions in a take folder, providing you with a visual reference while recording in Logic Pro for iPad.

Color an audio take automatically while recording

1. In Logic Pro, tap the More button ⋯ on the right side of the control bar, then choose Settings > Project Settings > Recording.
2. Tap the Automatically Colorize Takes switch to turn it on.

   When this setting is on, audio take folders use the color selected in the Color palette for the first take, but different colors for each of the following takes in that take folder. All colors used in an audio take folder are selected from the same color row in the Color palette, advancing by a predefined number of columns after each take.

   Note: The Automatically Colorize Takes switch is visible only if Region Color is set to Individual in the View app settings.

Delete takes and comps in Logic Pro for iPad

You can delete takes and comps from take folders at any time in Logic Pro for iPad. When deleted, they no longer appear in the take folder's list of takes and comps and are also deleted from the project.

Delete a take or comp

1. In Logic Pro, choose the take or comp you want to delete.
2. Tap the take folder, tap Takes and Folders, then choose Delete Take or Delete Comp.

Manage take folder contents

Export takes and comps in Logic Pro for iPad

You can export an active take or comp from a take folder to a new track, leaving the original take folder content intact.

Export an active take to a new track

1. In Logic Pro, choose the take or comp you want to export.
2. Tap the take folder, tap Takes and Folders, then tap Export active Take to New Track or Export active Comp to New Track.

The active take or comp is copied to a new track, which is created below the take folder track. The content of the original take folder remains intact.

Move takes and comps in Logic Pro for iPad

You can move an active take or comp from a take folder to a new track, which removes it from the original take folder.

Move an active take or comp to a new track

1. In Logic Pro, choose the take or comp you want to move.
2. Tap the take folder, tap Takes and Folders, then tap Move active Take to New Track or Move active Comp to New Track.

The active take or comp is moved to a new track, which is created below the take folder track. It is no longer available in the original take folder.

Flatten take folders in Logic Pro for iPad

You can flatten a take folder in Logic Pro for iPad, which replaces the take folder with the active take or comp. All take and comp regions that are not active are deleted.

Flatten takes

1. In Logic Pro, choose the take or comp you want to keep.
2. Tap the take folder, tap Takes and Folders, then tap Flatten.

The take folder is replaced with the active take or comp.

Unpack take folders in Logic Pro for iPad

You can unpack take folders to new tracks in Logic Pro for iPad, using different channel strips for each new track. This replaces the selected take folder with new tracks for each take and comp. The first track contains the active take or comp, followed by the remaining takes and comps in the order they appear in the Takes and Folders submenu.

Unpack a take folder

- In Logic Pro, tap the take folder to select it, tap it again, tap Takes and Folders, then tap Unpack.

New tracks are created for each take and comp, with a different channel strip for each new track that is assigned the original channel strip setting. This ensures that the playback result remains unchanged. Edits can be made to each of the tracks independently.

Pack regions into take folders in Logic Pro for iPad

In Logic Pro for iPad, you can select multiple regions and place them all into a single take folder.

Pack regions into a take folder

- In Logic Pro, tap the Multiple Select button to turn it on.
- Select the regions you want to pack, then tap the Multiple Select button again to turn it off.
- Tap one of the regions to select it, tap it again, tap Takes and Folders, then tap Pack Take Folder.

Arrange a project

Intro to arranging in Logic Pro for iPad

As you add regions to your project by recording, adding loops, creating Session Player regions or Step Sequencer patterns, and adding media files, you build the project by arranging the regions in the Tracks area. While you are working, you can play the project at any time to hear your latest changes.

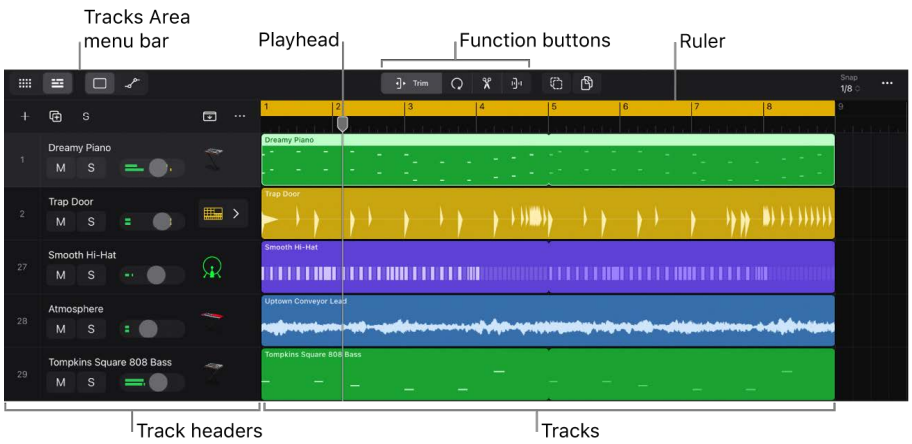
As you work in the Tracks area, you can arrange regions in a variety of ways. You can also edit region parameters in the inspector to control the sound, position, and appearance of regions.

Work in the Tracks area

Intro to the Tracks area in Logic Pro for iPad

You arrange regions in the Tracks area to build a project. The Tracks area shows a visual representation of time moving from left to right. You build a project by arranging regions in rows called *tracks* that run horizontally across the Tracks area.

At the top of the Tracks area, the ruler shows units of time. You can position items in the Tracks area with the units on the ruler and snap regions and other items to the grid to precisely align them with bars, beats, or other time divisions. When two regions overlap, the overlapped area of the left (earlier) region is shortened.



The *playhead* moves across the Tracks area as the project plays, showing the point currently playing. You can drag the top of the playhead to move the playhead to different points in the project.

Along the left side of the Tracks area is the *track list*, consisting of the track headers for all tracks in the project. Track headers show the track icon and track number and contain a set of track controls you can use while arranging.

You can also adjust track volume and pan, mute or solo the track, and access other mixing functions using the Fader.

You can scroll the Tracks area to see another part of the project, and you can zoom in for precise editing or zoom out to see more of the project.

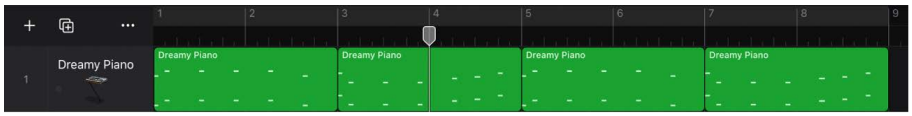
Open the Tracks area

The Tracks area occupies the central area of the Logic Pro window. It is typically visible unless Live Loops or the Mixer is open.

- In Logic Pro, tap the Tracks View button in the Tracks area menu bar.

Position items using the ruler in Logic Pro for iPad

The *ruler* extends across the top of the Tracks area, displaying the time format in bars and beats or in minutes and seconds.



As the project plays, the playhead moves across the Tracks area, showing the part currently playing. When you move the playhead or move regions or other items in the Tracks area, you can use the ruler to position them at the correct point in time.

You can also Copy and paste the playhead position to move the playhead.

When you move regions or other items in the Tracks area, alignment guides appear to help you align the items with the time divisions in the ruler and with other items in the Tracks area.

You can Snap items to the grid so that they align with bars, beats, and other time divisions in the Tracks area.

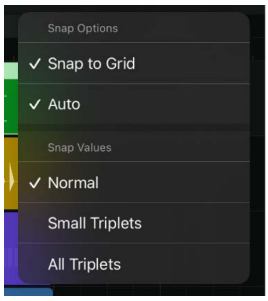
Snap items to the grid in Logic Pro for iPad

The Tracks area includes a grid that helps you align regions, automation points, and other items with the time divisions in the ruler. When you perform any of the following actions, items move according to the current Snap value:

- Moving and resizing regions
- Moving the playhead
- Adjusting the cycle region
- Dragging loops to the Tracks area
- Moving automation points

The Snap pop-up menu is available in the Tracks area, and also in the Piano Roll Editor, the Audio Editor, and the Automation view of the Session Player Editor. It can be set independently for each area. Using the Snap pop-up menu, you can set the Snap value and choose Snap options. You can also turn Snap to Grid off to move items freely in time.

When Auto is selected, the Snap value changes depending on the zoom level of the grid. You can set whether the Snap value uses normal (non-triplet) values (such as Bar, 1/2, 1/4, 1/8, and so on) or triplet values, and whether it uses all available triplet values or only smaller values (1/8 T, 1/16 T and 1/32 T). When closed, the Snap pop-up menu shows the current Snap value.



When you change the Snap value, the grid lines in the Tracks area grid change to reflect the new Snap value, indicating where regions and other items will snap to when you move them horizontally.

Set the Snap value for the Tracks area

When Auto is deselected, the range of Snap values become available in the Snap pop-up menu.

1. In Logic Pro, tap the Snap pop-up menu in the Tracks area menu bar.
2. If Auto is selected, tap to deselect it to show Snap values in the menu.
3. Tap the Snap pop-up menu again, then tap a Snap value.
4. Tap the Snap pop-up menu again, then tap Auto to select it.

Set Snap options for the Tracks area

- In Logic Pro, tap the Snap pop-up menu in the Tracks area menu bar, then set the Snap options:
  - *Snap to Grid:* When selected, items snap to the grid. When Snap to Grid is deselected, you can move items freely in time (no snapping).
  - *Auto:* When selected, the Snap value changes with the zoom level of the Tracks area. The current Snap value appears in the menu bar, and you can see it change as you zoom in or zoom out.

Set Auto to use different note values

1. In Logic Pro, tap the Snap pop-up menu in the Tracks area menu bar.
2. With Auto selected, choose one of the following:
   - *Normal:* The Snap value changes between non-triplet values: Bar, 1/2, 1/4, 1/8 as you change the zoom level.
   - *Small Triplets:* The Snap value changes between the triplet values 1/8 T, 1/16 T and 1/32 T as you change the zoom level.
   - *All Triplets:* The Snap value changes between the triplet values 1/2 T, 1/4 T, 1/8 T, 1/16 T, and 1/32 T as you change the zoom level.

Resize the Tracks area

You can resize the Tracks area both vertically, making tracks and track headers larger or smaller, and horizontally, showing a smaller or larger part of the project.

Resize the tracks area vertically

- Pinch vertically to zoom in or out.

Resize the tracks area horizontally

- Pinch horizontally to zoom in or out.

Use the cycle area in Logic Pro for iPad

You can use the cycle area to play a defined part of a project repeatedly. The cycle area can be used for composing, practicing a part before recording, recording multiple takes, and more. The cycle area is available in the Tracks area, and also in the Piano Roll Editor, the Audio Editor, and the Automation view of the Session Player Editor.



When Cycle mode is on, the cycle area is displayed as a yellow strip in the upper part of the ruler (or in the center, when the secondary ruler is visible).

The left and right locators are the start and end points of the cycle area. When Cycle mode is turned off, the cycle area is dimmed.

You can also create a skip cycle to skip a passage during playback; for example, to try out different transitions from one section to another without moving regions. A Skip cycle is also useful when editing, to leave out parts of the project that you don't want to be affected by the edit.

You can show or hide the Cycle button in the control bar. See Customize the control bar.

Turn Cycle mode on or off

In Logic Pro, do one of the following:

- Tap the Cycle button in the control bar.
- Tap the upper part of the ruler.

Set the cycle area in the ruler

- In Logic Pro, drag left or right in the upper part of the ruler.

The cycle area appears as a yellow strip in the ruler, and Cycle mode is automatically turned on.

Move the cycle area

- In Logic Pro, drag the center part of the cycle area and drag it left or right.

Resize the cycle area

- Drag the left or right edge of the cycle area, then drag left or right to move the start or end point.

Set the cycle area to a selection

1. Select one or more regions.
2. Do one of the following:
    - Tap one of the selected regions, tap Cycle, then tap Selection.
    - To round the cycle area to the nearest bar, tap one of the selected regions, tap Cycle, then tap Rounded Selection.

Create a skip cycle

1. In Logic Pro, set the cycle area to the part of the project you want to skip.
2. Touch and hold the Cycle button in the control bar, then tap Skip Cycle.

    The cycle area changes to black with a yellow outline, indicating that it is now a skip cycle.
3. When you finish using the skip cycle, touch and hold the Cycle button, then tap Skip Cycle to deselect it.

    The cycle area returns to its yellow color.

Cut or copy the regions below the cycle area

- In Logic Pro, tap the More button ••• in the Tracks area menu bar, then do one of the following:
    - To cut the regions below the cycle area, tap Cut Cycle Section.
    - To copy the regions below the cycle area, tap Copy Cycle Section.

Note: When the cycle area extends over part of a region, only the part below the cycle area is cut or copied.

Repeat the regions in the cycle area

- In Logic Pro, tap the More button ••• in the Tracks area menu bar, then tap Repeat Cycle Section.

  The regions below the cycle area are repeated after the end of the cycle area.

Insert silence within the cycle area

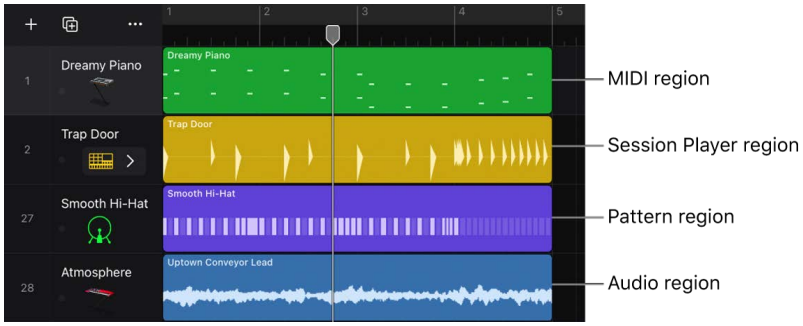
1. In Logic Pro, set the cycle area to the part of the project where you want to insert silence.
2. Tap the More button ••• in the Tracks area menu bar, then tap Insert Silence within Cycle.

Regions inside the cycle area are moved by the length of the cycle area. Regions extending below the start of the cycle area are cut at that point, and the following part moved by the length of the cycle area.

Arrange regions in the Tracks area

Intro to regions in Logic Pro for iPad

Regions are the building blocks of a project. When you record an instrument, drag a loop to the Tracks area, or add an audio file, a region is created containing the content of the recording, loop, or audio file. Regions appear as rounded rectangles in the Tracks area, with different region types having different default colors.



You can arrange and edit the following types of regions in the Tracks area:

- *Audio regions* (blue) from audio recordings, audio Apple Loops, and imported audio files on audio tracks. Audio regions show an audio waveform representing the audio data.
- *MIDI regions* (green) from software instrument recordings, software instrument Apple Loops, and imported MIDI files on software instrument tracks. MIDI regions contain MIDI note events and other MIDI data such as modulation or pitch bend data.
- *Session Player regions* (yellow) created using the Session Player Editor and Session Player Apple Loops on software instrument tracks. Session Player regions contain performance instructions that you can edit in the Session Player Editor.
- *Pattern regions* (violet) containing Step Sequencer patterns on software instrument tracks. Each step represents either a MIDI note event or automation data.

You can edit regions in the Tracks area in a variety of ways. For example, you can:

- Select regions
- Cut, copy, and paste regions
- Move regions
- Trim regions
- Loop regions
- Mute and solo regions
- Split and join regions
- Change the gain of audio regions
- Create regions in the Tracks area
- Rename regions
- Change the color of regions
- Create fades on audio regions
- Delete regions

Note: When selecting or editing regions on tracks that are members of a Mixer group, the same selection or edits apply to the corresponding range of all tracks in the group.

Select regions in Logic Pro for iPad

You select regions in the Tracks area to perform various arranging tasks, such as moving, copying, or looping them. You can select multiple regions on a track and select regions on different tracks to move or perform other operations on them.

Selected regions are highlighted in the Tracks area. When a single region is selected, handles appear on the left and right edges of the region that you can use to move or resize the region. When multiple regions are selected, a thin white highlight appears around each of the selected regions.

Select a region

- In Logic Pro, tap the region in the Tracks area.

Select multiple regions

In Logic Pro, do one of the following:

- Tap the Multiple Select button in the Tracks area menu bar, then tap regions to select them.

  Note: After performing a multiple selection, tap the Multiple Select button again (or tap one of the Function buttons) to revert to single selection. Function button operations such as trimming or looping regions cannot be performed while multiple selection is active.

- Touch and hold the background, then drag around the regions to enclose them.

Select all regions on a track

Do one of the following:

- In Logic Pro, select the track.
- Tap an empty area of the track, then tap Select All On Track.
- To select all regions following (to the right of) a region on a track, double-tap the region, tap Select, then tap All Following of Same Track.

Select all regions within the cycle area

- In Logic Pro, tap the background, then tap Select All Inside Cycle.

Select all regions in the project

Do one of the following:

- In Logic Pro, tap an empty part of the Tracks area, then tap Select All.

  If any regions are selected, first tap an empty part of the Tracks area to deselect them.
- Tap a region, tap Select, then tap All.

Deselect all selected regions

Do one of the following:

- Tap an empty area of the Tracks area.
- Double-tap a region, tap Select, then tap Deselect All.

You can set whether selecting a track selects all regions on the track in General App settings. If you don't want all regions on the track to be selected when you select the track, tap the "Select Regions on Track Selection" switch to turn this feature off.

Cut, copy, and paste regions in Logic Pro for iPad

You can cut or copy regions in the Tracks area and paste them at a different position. You can also paste a copied region at the same time position, to double the content of the region on another track.

Cut regions

- In Logic Pro, double-tap the region, then tap Cut.
- To cut multiple regions, select the regions, double-tap one of them, then choose Cut.

Copy regions

- In Logic Pro, do one of the following:
  - Double-tap a region, then tap Copy.
  - Tap the Copy button in the Tracks area menu bar, then drag a region to a new position to copy it.
- To copy multiple regions, select the regions, double-tap one of them, then choose Copy.

Paste cut or copied regions

1. In Logic Pro, move the playhead to the position where you want the pasted region to start.
2. Tap an empty part of the track, then tap Paste at Playhead.

   If any regions are selected, first tap an empty part of the Tracks area to deselect the regions.

When pasting multiple regions, the regions keep the same relative positions as when you cut or copied them.

Paste a region at its original position

- In Logic Pro, tap the background, then tap Paste at Original Position.

  If any regions are selected, first tap an empty part of the Tracks area to deselect the regions.

The region is pasted at the position at which it was cut or copied. If you select a different track before pasting, the region is pasted on the selected track, at its original time position.

Move regions in Logic Pro for iPad

You can move regions to a different point in the same track, or move them to another track of the same type. You can move an audio region to another audio track, for example, but not to a software instrument track, or vice versa.

When you move a region, it snaps to the nearest position on the Tracks area grid, using the current Snap value. You can change the Snap value, or turn off Snap to Grid in order to position items freely in the Tracks area.

Move a region

- In Logic Pro, from the middle part of the region, drag the region to a new position.

Move a region to start at the playhead position

1. In Logic Pro, tap a region to select it.
2. Tap the region again, tap Move, then tap Move to Playhead Position.

Edit the region start position in the inspector

1. In Logic Pro, select the region.
2. Tap the Inspector button to open the inspector.
3. Tap the Details disclosure triangle if needed to show Details region parameters.

   In the Details section are Position and Length values that determine the start point and length of the selected region.
4. To edit the region start point, do one of the following:
   - Drag the Position value up or down to edit the start position.
   - Tap a Position value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Remove gaps between regions in Logic Pro for iPad

You can remove gaps between regions produced by moving or deleting regions in the Tracks area. When you remove gaps between regions, you *shuffle* the regions to remove all space between them and the preceding or following regions on the track or tracks.

Shuffle regions left to remove preceding space

1. Select the region or regions you want to shuffle.
2. Tap one of the selected regions, tap Move, then tap Shuffle Left.

Shuffle regions right to remove following space

1. Select the region or regions you want to shuffle.
2. Tap one of the selected regions, tap Move, then tap Shuffle Right.

Delay region playback

You can shift the playback offset of regions on a track using the Delay parameter. Positive values shift regions forward in time (laid-back playing style or dragging), while negative values shift regions back in time for a pre-delay (driving or rushing the music). The Delay value is shown in ticks.

Some MIDI instruments may have a slow response time. In this case, you might want to move the region slightly ahead of the beat for notes to sound in time. Instead of moving regions or individual note events, you can apply a small amount of pre-delay using the Delay parameter.

Shift the playback offset of selected regions

1. In Logic Pro, select the regions.
2. Tap the Inspector button to open the inspector.
3. Tap the General disclosure triangle if needed to show General region parameters.
4. To edit the Delay parameter, do one of the following:
   - Drag the Delay value up or down to edit the delay in ticks.
   - Tap the Delay value, then edit the value (in ticks) in the Delay window using the Value Up/Value down buttons or the scroll wheel.

Trim regions in Logic Pro for iPad

You can trim regions to lengthen or shorten them. You can also trim the length of regions in the inspector. Trimming a region produces different results, depending on the region type:

- *MIDI regions:* Lengthening a MIDI region adds silence in the lengthened area of the region. Any notes in the shortened part of the region are muted, but not deleted, and will play again if the region is re-lengthened.
- *Audio regions:* Audio regions can be lengthened to the duration (length) of the original audio file.
- *Session Player region:* If a Session Player region contains fills, the fills always occur at the end of the region, and so are controlled by the location of the right edge of the region.
- *Pattern regions:* Lengthening or shortening a pattern region affects how much of the pattern plays. See Change the musical length of a pattern for detailed information.

You can trim multiple regions by selecting the regions, then trimming one of the selected regions. All regions are trimmed by the same amount (observing the differences between different region types).

Trim a region in the Tracks area

1. In Logic Pro, tap the Trim button in the Tracks area menu bar.
2. Tap a region to select it.



3. Drag the trim handle on either the left or right edge of the region to trim the region start or region end.

   If you touch and hold the trim handle before dragging it, the Tracks area zooms horizontally to allow you to trim more precisely.

Trim a region to start at the beginning of the bar

1. In Logic Pro, select a region.
2. Tap the region, tap Trim, then tap Set Region Start to Bar.

   The left edge of the region moves to the beginning of the bar.

Trim a region to end at the start of the next region

1. In Logic Pro, select a region.
2. Tap the region, tap Trim, then tap Trim End to Next Region.

   The right edge of the region moves to the start of following region.

Trim a region to fill the cycle area

1. In Logic Pro, select a region.
2. Tap the region, tap Trim, then tap Trim to Fill within Locators.

   The edges of the region extend to fill the length of the cycle area.

Crop a region so that it does not extend past the edges of the cycle area

1. In Logic Pro, select a region.
2. Tap the region, tap Trim, then tap Crop Outside Locators.

   The edges of the region are cropped to the edges of the cycle area.

Trim the region length in the inspector

1. In Logic Pro, select the region.
2. Tap the Inspector button to open the inspector.
3. Tap the Details disclosure triangle if needed to show Details region parameters.

   In the Details section are Position and Length values that determine the start point and length of the selected region.
4. To edit the region length, do one of the following:
   - Drag the Length values up or down to edit them.
   - Tap the Length value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

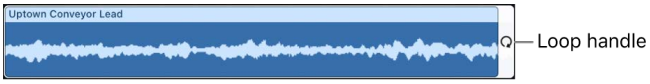
Loop regions in Logic Pro for iPad

You can loop regions so that they play repeatedly, and extend them to fill any amount of time in the Tracks area. When you play the project, the regions repeat for the number of times they are looped. Each repetition appears as a notch in the looped region.

You can also loop a region that has been trimmed. When you loop a trimmed region, only the visible portion of the region repeats when you play the project. If you add silence by lengthening a region, the silence is included in each repetition of the loop.

Loop a region

1. In Logic Pro, tap the Loop button in the Tracks area menu bar.
2. Tap the region to select it.



3. Drag the loop handle on the right edge of the region to set the number of times the region repeats.

Loop a region continuously

1. In Logic Pro, tap the region to select it.
2. Do one of the following:
   - Tap the region again, then choose Edit > Loop.
   - Tap the Inspector button to open the Inspector, tap the General disclosure triangle (if General parameters are hidden), then tap the Loop switch.

     The region loops continuously until the start of the next region on the track, or until the end of the project. You can unloop the region by tapping the Loop switch or choosing Loop again.

If you trim a looped region, the repetitions are also trimmed, but the loop keeps its overall duration.

Repeat regions

You can repeat one or more selected regions in the Tracks area. Repeating a region pastes a copy of the region after (to the right of) the selected region on the same track.

1. In Logic Pro, select the region or regions.
2. Tap the region (or one of the selected regions).
3. Tap Edit, then tap Repeat Region.

The repeated regions are pasted after the selected regions. If the repeated regions overlap an existing region, the existing region is truncated.

Note: When you repeat a looped region, the copy may overlap any existing loop repetitions of the region.

Mute regions in Logic Pro for iPad

You can mute one or more regions in the Tracks area to silence them during project playback. Muted regions appear dark gray with a circle next to the region name.

Mute a region

1. In Logic Pro, select the region or regions.
2. Tap a selected region, tap Edit, then tap Mute.
3. To unmute the region or regions, tap a selected region, tap Edit, then tap Mute again.

Mute a region in the inspector

1. In Logic Pro, select the region or regions.
2. Tap the Inspector button to open the inspector.
3. Tap the General disclosure triangle if needed to show General region parameters.
4. Tap the Mute switch.

Split and join regions in Logic Pro for iPad

You can split regions in the Tracks area, and use the segments of the region in different places in the project. Splitting a region can produce different results depending on the region type:

- *MIDI regions:* Any MIDI notes at the split point are shortened to that point. If you subsequently lengthen the region to the left, the notes regain their full length (duration).

  Note: When you split a MIDI region at a point where one or more MIDI notes exist, an Overlapping Notes dialog opens, asking whether you want to keep, shorten, or split the notes.

- *Audio regions:* On any region segments following the first (initial) one, a decimal and a sequential number are added to the end of the region name.

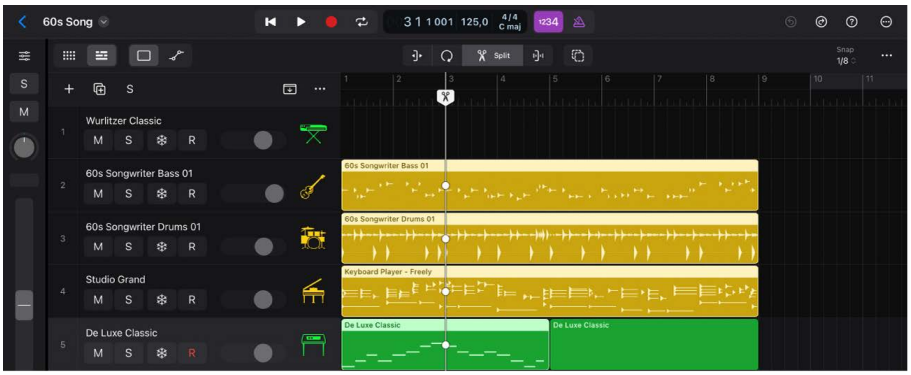
- *Session Player region:* Splitting a Session Player region might change the pattern, depending on the Fills setting. After splitting, settings for the region segments can be edited independently in the Session Player Editor.
- *Pattern regions:* After splitting, each region segment plays the part of the pattern contained in that segment of the original region.

In Logic Pro for iPad, you can split all regions under the playhead in one action (using the Split tool in the ruler), or split a single selected region (using the Split tool in the selected region).

Split all regions under the playhead

1. In Logic Pro, tap an empty area of the Tracks area to deselect any selected tracks.
2. Move the playhead to the position where you want to split regions in the Tracks area.
3. Tap the Split button in the Tracks area menu bar.

   The top of the playhead changes to a Scissors tool, and a white dot appears in each region under the playhead, indicating the point at which it will be split.



4. Swipe down with the Scissors tool.

   The indicated regions are split into two regions, each with the name of the original region. On split audio regions, each new segment created by splitting has a dot and a sequential number added to the end of the region name.

   Note: The length of the swipe motion doesn't affect which regions are split. You don't need to swipe to the bottom of the Tracks area (or to the last region) to split all indicated regions.

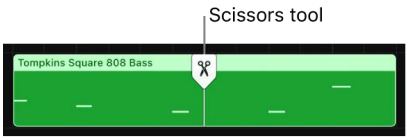
Note: When you finish splitting regions, tap the Trim button in the Tracks area menu bar to avoid splitting regions unintentionally with the Scissors tool.

Split a selected region

1. In Logic Pro, tap the region to select it.
2. Tap the Split button in the Tracks area menu bar.

   A Scissors tool appears in the upper area of the selected region.

   Note: Before splitting the region, you can move the Scissors tool to any region on the same track as the selected region.



3. Move the Scissors tool to the position where you want to split the region.
4. Swipe down with the Scissors tool.

   The region is split into two regions, each with the name of the original region. On split audio regions, each new segment created by splitting has a dot and a sequential number added to the end of the region name.

You can split a region multiple times. To split a region again, move the Scissors tool to a new position on one of the region segments, then swipe down again.

Note: When you finish splitting regions, tap the Trim button in the Tracks area menu bar to avoid splitting regions unintentionally with the Scissors tool.

Split a region at the edges of the cycle area

1. In Logic Pro, select a region.
2. Tap the region, tap Split, then tap Split by Locators.

   The region is split at the left and right edges of the cycle area. If the region extends beyond the cycle area in only one direction, it is split into two regions, if it extends beyond the cycle area in both directions, it is split into three regions.

Join regions

1. In Logic Pro, select the regions.
2. Tap one of the selected regions.
3. Tap Bounce and Join, then tap Join.

Regions being joined must be of the same type (audio, MIDI, or Session Player). Pattern regions can't be joined.

If regions are on different tracks, they are joined to a new region on the first (highest) track containing the selected region or regions. When you join audio regions on different tracks, a Mixdown dialog opens; you can use it to choose Mono or Stereo format for the mixdown.

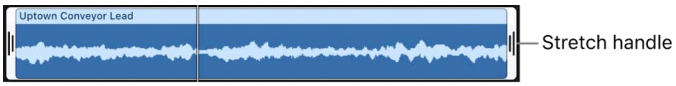
Stretch regions in Logic Pro for iPad

You can *time stretch* regions to shorten or lengthen the relative distance between events in the regions without changing the pitch. Expanding regions increases the distance (the amount of time) between events in the regions, while compressing regions decreases the distance.

For example, you can make a region play in half time by stretching it to twice its original length, or play in double time by shortening it to half its original length.

Time stretch regions

1. In Logic Pro, tap the Stretch button in the Tracks area menu bar.
2. Tap a region to select it.



3. Drag the stretch handle on either the left or right edge of the region to stretch the region start or region end.

When you time stretch an audio region, the audio is stretched or compressed by the amount that the region is altered in length, and the original region is replaced with a new PCM audio file (in the original file format, or AIFF, if the original was not PCM).

Time stretching is limited to the value of the current Tracks area grid setting (in the Snap pop-up menu).

Separate a MIDI region by note pitch

You can separate a MIDI region by note pitch, resulting in separate MIDI regions, each containing the MIDI note events at a single pitch.

Separate a MIDI region by note pitch

1. In Logic Pro, select a region.
2. Tap the region, tap Convert, then tap Separate by Note Pitch.

   The MIDI region is separated so that, for each pitch in the region, a separate MIDI region is created, containing the MIDI note events at that pitch.

Bounce regions in place in Logic Pro for iPad

You can bounce regions in place, creating audio files that are placed at the same position as the original regions in the Tracks area. Using Bounce in Place, you can bounce regions of any type. You set the bounce destination and additional options in the Bounce in Place dialog when you create the bounce.

When multiple regions are selected, you can choose whether the result is:

- A single audio file
- A single audio file per track
- An audio file for each selected region, replacing the region

In all cases, the resulting audio file(s) may include an audio tail from any effects extending past the end of the source region.

Bouncing in place might seem similar to the Freeze function. Both save CPU power by rendering all effect plug-ins of a track (and, for software instrument tracks, the instrument). Freeze uses the 32-bit float format to safeguard against volume clipping.

Note: A bounce in place is performed offline for audio and software instrument tracks with internal sound sources. When audio or MIDI signals are routed to external sound sources, Logic Pro performs a real-time bounce.

Bounce one or more regions in place

1. In Logic Pro, select the region or regions.
2. Tap one of the selected regions, then tap Bounce and Join.
3. Tap Bounce in Place.
4. In the Bounce in Place dialog, edit any of the following parameters:
    - *Name field:* Tap the name, then enter a new name for the bounce file. The default name is the region name of the first selected region, with the extension _bip added at the end.
    - *Destination pop-up menu:* Choose the track type on which the bounce file is placed. The choices are:
        - *New Track:* Creates a new audio track below the selected track and places the bounce region on that track.
        - *Selected Track:* Places the bounce region on the selected track. This option is available only if an audio track is selected.

      Note: When multiple files are selected and the destination file is set to either One File per Track or One File per Region, the “Selected Track” option appears as “Source Tracks.”
    - *Destination File pop-up menu:* Choose whether the bounce result is a single audio file, an audio file per track with selected regions, or an audio file per selected region.
        - *One File:* The bounce results in a single audio file replacing the selected region or regions, plus any audio tail following the last selected region (default).
        - *One File per Track:* The bounce results in an audio file for each track that extends from the beginning of the first selected region to the end of the last selected region, plus any audio tail following the last selected region.

- *One File per Region:* The bounce results in an audio file for each selected region, replacing the region. Each bounced region contains the audio tail from any effects extending past the end of the source region. On all but the last region, the tail is shortened so that the region keeps its original borders.

- *Source pop-up menu:* Choose whether the source regions are muted, deleted, or left in place.
- *Include Effect Plug-ins switch:* When selected, all plug-ins on the source track are included during the bounce process.
- *Include Audio Tail in File switch:* When selected, the bounce process continues after the end of the bounce range—either to the end of the cycle or to the end of the last selected region—until there is no longer any signal. Otherwise, only the bounce range is bounced.
- *Include Audio Tail in Region switch:* When selected, the entire bounce file is included in the bounce region. Otherwise, the bounce region only includes the bounce range.

  Note: The Include Audio Tail in Region switch is available only when the Include Audio Tail in File switch is on.
- *Include Volume/Pan Automation switch:* When selected, volume and pan automation is performed during the bounce process, affecting the bounce file. Otherwise, the volume and pan automation is simply copied, not performed.
- *Normalize pop-up menu:* Choose one of the normalization options:
  - *On:* The bounce files are bidirectionally normalized.

    (When the maximum level of the bounce file is below 0 dB, its level is increased to 0 dB. When the maximum level is above 0 dB, its level is reduced to 0 dB to avoid clipping.)
  - *Off:* The level of the bounce files is unchanged.
  - *Prevent Overload:* When the level of a bounce file is above 0 dB, its level is reduced to 0 dB to avoid clipping. When the level is below 0 dB, it is unchanged.

5. Tap Bounce at the top of the dialog.

Change the gain of audio regions in Logic Pro for iPad

You can edit the gain of regions in the Tracks area to change their apparent loudness relative to other regions.

Change the gain of an audio region

1. In Logic Pro, select the audio region or regions.
2. Tap the Inspector button to open the inspector.
3. Tap the General disclosure triangle to show General region parameters.
4. Do one of the following:
   - Drag the Gain value up or down to change the amount of gain.
   - Tap the Gain value, then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Normalize audio regions in the Tracks area in Logic Pro for iPad

You can normalize the gain of selected regions in the Tracks area without opening the regions in the Audio Track Editor. In Logic Pro for iPad, the Normalize Region Gain command is nondestructive so that you alter only the normalized region, not the original file.

Normalize the gain of audio regions in the Tracks area

1. In the Logic Pro Tracks area, select one or more audio regions. You can select all regions on a track by tapping the track header (when Select Regions on Track Selection is turned on in General settings).
2. Tap one of the selected regions, then tap Normalize Region Gain.
3. In the Normalize Gain dialog, do the following:
   - In the Process pop-up menu, choose whether all regions are processed equally, regions are processed equally per track, or regions are processed individually.
   - In the Method pop-up menu, choose the normalization algorithm used for processing (Peak or Loudness).
   - Use the Target Level value slider to set the level of normalization in decibels (Peak) or in LUFS (Loudness).
4. Tap Apply.

Create regions in the Tracks area in Logic Pro for iPad

You can create an empty MIDI region or pattern region, or create a Session Player region with a default pattern on a software instrument track, then edit the region.

Create an empty MIDI region

1. In Logic Pro, select the software instrument track.
2. Tap the background, then tap Create MIDI Region.

   An empty region is created at the position where you tap.

Create an empty pattern region

1. In Logic Pro, select the software instrument track.
2. Tap the background, then tap Create Pattern Region.

   An empty region is created at the position where you tap.

Create a Session Player region

1. In Logic Pro, select the software instrument track.
2. Tap the background, then tap Create Session Player Region.

   A region with a default preset is created at the position where you tap.

Convert a MIDI region into a pattern region in Logic Pro for iPad

In Logic Pro, you can convert a MIDI region in the Tracks area into a pattern region and edit the region in Step Sequencer.

Convert a MIDI region into a pattern region in the Tracks area

1. In the Tracks area in Logic Pro, select the MIDI region.
2. Tap the selected MIDI region, tap Convert, then tap Convert to Pattern Region.

Replace a MIDI region with a Session Player region in Logic Pro for iPad

In Logic Pro, you can replace a MIDI region in the Tracks area with a Session Player region. The replacement region can be edited in the Session Player Editor.

Replace a MIDI region with a Session Player region in the Tracks area

1. In the Tracks area in Logic Pro, select the MIDI region.
2. Tap the selected MIDI region, tap Convert, then tap Replace with Session Player Region.

Rename regions in Logic Pro for iPad

By default, recorded regions take the patch name of the track on which they are recorded, and regions from loops or audio files keep the loop or file name. You can rename regions in the Tracks area and use region names to keep your projects organized.

When multiple regions are selected, the Name field shows the number of regions in place of a region name. If you rename the regions with a name ending in a number (example: Bass 02), the regions will be numbered sequentially starting from that number (Bass 02, Bass 03, Bass 04, and so on).

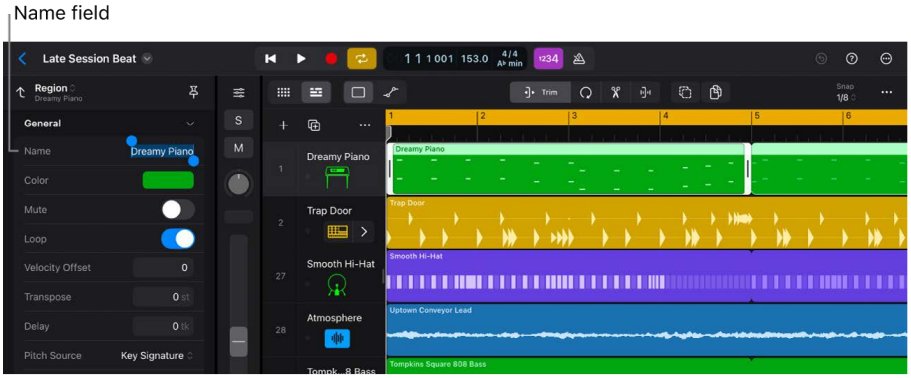
You can also rename regions using Apple Pencil.

Note: When you rename a track having a default track name and that has not previously been renamed (for example, Audio 1 or Inst 1), any regions on the track with the track name as their region name and that have not previously been renamed, as well as the source audio files, are renamed using the new name.

Rename a region

1. In Logic Pro, select one or more regions.
2. Tap a selected region, tap Name and Color, then tap Rename.

   The inspector opens with the region name selected. If multiple regions are selected, the number of regions appears in place of the name.



3. Enter a new name.
4. Tap Done on the onscreen keyboard.
5. Tap the Inspector button to close the Region inspector.

Rename regions with the track name

1. In Logic Pro, select one or more regions.
2. Tap a selected region, tap Name and Color, then tap Rename Regions by Tracks.

Change the color of regions in Logic Pro for iPad

You can change the color of regions to identify sections of your arrangement, distinguish between track types, or for other uses. Newly recorded or added regions use the color of the track. If you have changed the color of individual regions or added regions of a different color, you can also color the regions to match the track color.

Change the color of a region

1. In Logic Pro, select one or more regions.
2. Tap the Inspector button in the view control bar to open the inspector.



3. Tap the General disclosure triangle if needed to show General region parameters.
4. Tap the color well, then choose a new color from the Colors palette. You can change the brightness of the region color by tapping in the Brightness strip at the bottom of the Colors palette.

Color regions with the track color

1. In Logic Pro, select one or more regions.
2. Tap a selected region, tap Name and Color, then tap Color Regions by Tracks.

Delete regions in Logic Pro for iPad

You can delete regions if you no longer want to use them in a project.

Delete a region

- In Logic Pro, double-tap the region, then tap Delete.

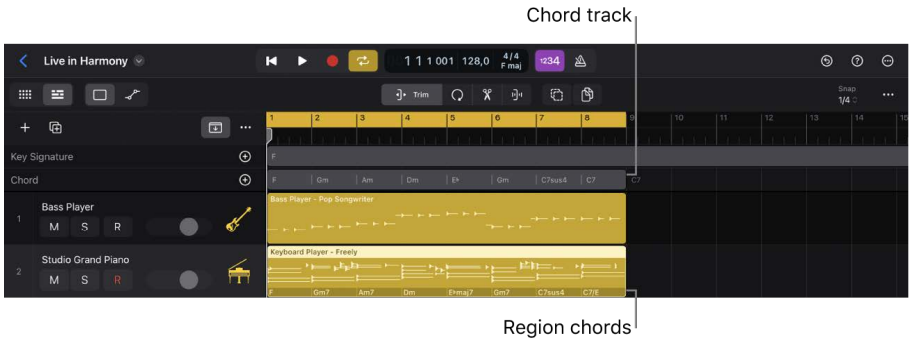
Delete multiple regions

1. In Logic Pro, select the regions.
2. Double-tap one of the selected regions, then tap Delete.

Work with chords

Intro to chords in Logic Pro for iPad

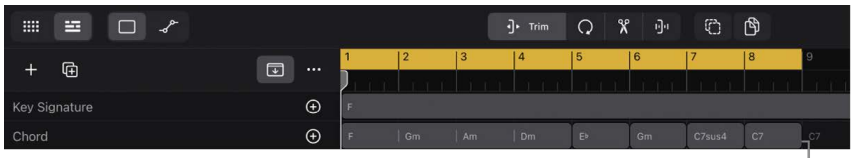
You can use chords in a Logic Pro for iPad project, both on the global Chord track and on individual Session Player regions. You can add chords to the Chord track and have the Session Players follow them, playing in sync harmonically. When you edit the chords, the performances of the Session Players change to reflect your edits.



You can also add chords to individual Session Player regions so that a Session Player plays different chords from the ones on the Chord track. This allows the keyboard to play different chord extensions or scales from the bass, for example, or the bass to play a stepwise bass line using notes other than the roots of the chords.

The Chord track

In a Logic Pro project, you can access the Chord track in the global tracks. You can add chords to the Chord track and have the Session Players in the project follow them, playing in sync with each other. You can add chord progressions to the Chord track, and create chord groups that you can copy or loop to reuse the same sequence of chords in different parts of the project.

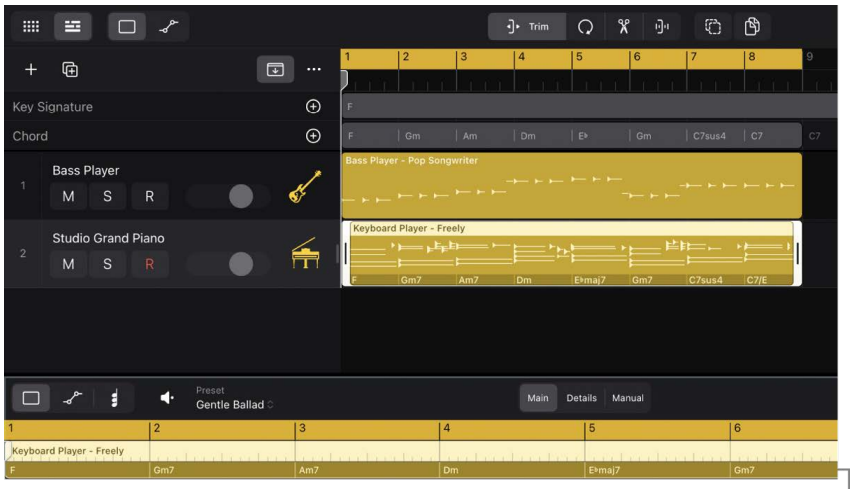


Chords on the Chord track

Region chords

Session Player regions can contain region chords. You can add region chords, edit region chords, and choose a chord progression for a Session Player region.

When a Session Player region contains region chords, it follows those region chords. You can also Set a Session Player region to follow the Chord track instead of its region chords. You can copy and paste chords between regions, paste chords from the Chord track to a region, and paste region chords to the Chord track.



Region chords in the Session Player Editor

Apple Loops and chords

Apple Loops can also contain region chords. When you add a loop containing region chords to the Tracks area, you can choose to have the chords be copied to the Chord track so that they are followed by the Session Players in the project. See Add chords from Apple Loops to your project.

Show the Chord track

1. In Logic Pro, tap the Global Tracks button above the track headers to show the global tracks.
2. Tap the More button ••• above the track headers, then tap Customize Global Tracks.
3. Tap Chords, then tap outside the dialog to close it.

For more information, see Show and hide global tracks.

View region chords in the Session Player Editor

1. In Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the Editors button in the view control bar.
3. Tap the Chord View button in the Editor menu bar.

Region chords appear in the lower half of the region in the Session Player Editor. See The Session Player Editor.

Add and delete chords in Logic Pro for iPad

You can add chords to a Logic Pro project, both on the Chord track and on Session Player regions. All the Session Players in the project can follow the chords on the Chord track, playing harmonically in sync with each other, or they can follow their individual region chords.

When you add a chord to either the Chord track or a Session Player region, by default the chord is based on the tonic of the key and has the chord type (major or minor) corresponding to the key. For this reason, it is recommended that you set the key (or add a key signature change) before adding chords. See Intro to key signatures. You can also Analyze a range of chords to determine the key signature and have Logic Pro add the results to the Signature track.

After you add a chord, you can choose a chord progression to use instead of a single chord.

Add a chord to the Chord track

1. In Logic Pro, place the playhead at the position where you want to add a chord, then tap the Add Chord button + in the Chord track header.

   An eight-bar chord based on the tonic of the key appears on the Chord track. If another chord exists within the eight-bar range, the new chord fills the space until the start of the existing chord.
2. To replace the chord with a chord progression, double-tap the chord, choose Chord Progressions from the shortcut menu, then choose a progression from the submenu.

Add a region chord to a Session Player region

1. In Logic Pro, tap a Session Player region in the Tracks area to select it.
2. Tap the Editors button in the view control bar to open the Session Player Editor (if it is not already open).
3. In the Session Player Editor, tap the Chord View button .

4. Tap the Add Chord button + in the Editor menu bar, then tap the lower half of the region at the position where you want to add a chord.
5. Tap the Move button in the Editor menu bar to avoid adding a chord unintentionally.

   You can move, resize, or edit the region chord in the Session Player Editor.

Delete a chord

You can delete chords, either on the Chord track or on a selected Session Player region.

1. In Logic Pro, tap the chord on the Chord track or in the Session Player Editor.
2. Tap the chord again, then tap Delete.

To delete a chord that is part of a chord group without selecting the entire group, first ungroup the chord group.

Delete all chords on a Session Player region

- In Logic Pro, tap the region in the Session Player Editor, then tap Delete Region Chords.

Note: When you delete the last chord on a region, the region plays the chords on the Chord track until you add region chords again.

Select chords in Logic Pro for iPad

You select a chord before editing it in various ways.

Select a chord on the Chord track

1. In Logic Pro, show the Chord track if it is not already visible.
2. Tap a chord on the Chord track to select it.

To select a chord that is part of a chord group, first ungroup the chord group.

Select multiple chords on the Chord track

1. In Logic Pro, tap the Multiple Select button in the Tracks area menu bar.
2. On the Chord track, tap chords to select them.
3. After selecting the chords, tap the Multiple Select button again to deactivate it, or tap the Trim tool.

To select chords that are part of a chord group without selecting the entire group, first ungroup the chord group.

Select all chords on the Chord track

- Double-tap a chord or chord group on the Chord track, then tap Select All.

Select all chords in the cycle area on the Chord track

- In Logic Pro, double-tap a chord or chord group on the Chord track, then tap Select All In Cycle.

Select a region chord on a Session Player region

1. In Logic Pro, tap the Session Player region so that it appears in the Session Player Editor.
2. In the Session Player Editor, tap the Chord View button (if it is not already active).
3. In the Session Player Editor, tap the region chord to select it.

Select multiple region chords on a Session Player region

1. In Logic Pro, tap the Session Player region so that it appears in the Session Player Editor.
2. In the Session Player Editor, tap the Chord View button (if it is not already active).
3. Tap the Multiple Select button in the Editor menu bar.
4. In the Session Player Editor, tap region chords to select them.
5. After selecting the region chords, tap the Multiple Select button again to deactivate it, or tap the Trim tool.

Cut, copy, and paste chords in Logic Pro for iPad

You can cut, copy, and paste chords on the Chord track and on Session Player regions. Using menu commands, you can copy all chords on one region and paste them to another region, paste chords from the Chord track to a Session Player region, and paste region chords to the Chord track.

Cut a chord

- In Logic Pro, double-tap the chord, then tap Cut.

To cut a chord that is part of a chord group without cutting the entire group, first ungroup the chord group.

To cut multiple ungrouped chords, select the chords, tap one of the selected chords, then tap Cut.

Copy a chord

- In Logic Pro, double-tap the chord, then tap Copy.

To copy a chord that is part of a chord group without copying the entire group, first ungroup the chord group.

To copy multiple ungrouped chords, select the chords, tap one of the selected chords, then tap Copy.

Paste a cut or copied chord

1. In Logic Pro, place the playhead at the position where you want to paste the chord.
2. Do one of the following:
   - *On the Chord track:* Tap the Chord track, then tap Paste at Playhead.
   - *On a Session Player region:* Tap the region at the position of the playhead then tap Paste.

Note: Chords from the Chord track cannot be pasted to a Session Player region, and region chords cannot be pasted to the Chord track, except using the menu commands described below.

Copy and paste all chords from one region to another region

1. In Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the region in the Session Player Editor, then tap Copy Region Chords.
3. Select a different Session Player region in the Tracks area.
4. Tap the region in the Session Player Editor, then tap Paste Region Chords.

Paste chords from the Chord track to a Session Player region

1. In Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the region in the Session Player Editor, then tap Paste Chords from Global Track.

   The chords remain on the Chord track and are also pasted to the selected region.

Paste chords from a Session Player region to the Chord track

1. In Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the region in the Session Player Editor, then tap Paste Region Chords to Global Track.

   The chords are removed from the region and pasted to the Chord track.

Move and resize chords in Logic Pro for iPad

You can move and resize chords, both on the Chord track and on Session Player regions. When you move a chord, it keeps its length, and any preceding or following chords resize if needed to accommodate the moved chord.

When you move a chord so that it is completely within the boundaries of another chord, the other chord is in effect split into two chords, remaining in place and filling the space before and after the moved chord.

When you resize a chord, the preceding and following chords also resize to accommodate the length of the resized chord. When you resize a chord so that it completely overlaps another chord, the overlapped chord is overwritten.

Move chords on the Chord track

- In Logic Pro, drag the chord to the left or right to a new position.

  Note: For shorter chords, be sure to drag from the middle of the chord so that you don't inadvertently resize the chord.

Move chords on a Session Player region

- In Logic Pro, drag the chord to the left or right to a new position.

Resize chords

1. In Logic Pro, tap the Trim button in the Tracks area menu bar (if it is not already active).
2. Tap the chord to select it.
3. Touch and hold the left or right edge of the chord, then drag to shorten or lengthen it.

When you lengthen a chord from its right edge, the chord extends for the amount of time you lengthen it. When you lengthen a chord from its left edge, the beginning of the chord keeps the same position, but a new instance of the chord extends to the left for the amount of time you lengthen the region. This keeps the start of any strumming pattern, arpeggio, fill, or other motion in the part playing the chord in the same position so that it aligns with other tracks in the project.

Loop chords on the Chord track in Logic Pro for iPad

You can also loop chords and chord groups on the Chord track to have them repeat multiple times.

Loop chords on the Chord track

1. In Logic Pro, tap the Loop button in the Tracks area menu bar.
2. On the Chord track, tap a chord or chord group to select it.

   The right edge of the selected chord or chord group shows a Loop icon.
3. Drag the right edge out to the point where you want it to stop playing repeatedly.

   As you drag, “notches” appear at the top and bottom of the chord, showing the beginning and end of each complete repetition.

Color chords on the Chord track in Logic Pro for iPad

You can color chords and chord groups on the Chord track using any available color.

Color chords on the Chord track

1. In Logic Pro, select one or more chords or chord groups on the Chord track.
2. Tap the Inspector button to open the Chord inspector.
3. In the Chord inspector, tap the Color rectangle, then tap the color for the chord(s).

Edit chords in Logic Pro for iPad

You can edit chords on both the Chord track and Session Player regions. You can edit the root note and chord type, add or remove chord extensions, and add a bass note other than the root note. You can also choose a scale to associate with the chord to control what non-chord tones the Session Player plays—for example, in fills.

You can view and edit the settings for a selected chord in the Edit Chord dialog or the Chord inspector.

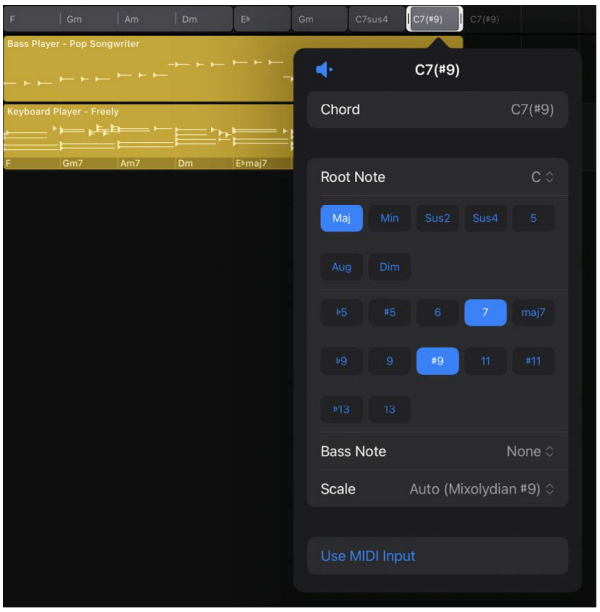
If you have an external computer keyboard connected to your iPad, while the Edit Chord dialog is open you can move to the start of the next bar (or to the next chord, if a chord exists before the next bar) by pressing the Tab key on your keyboard until you reach the end of the chord or chord group, and you can move to the start of the previous bar by pressing Shift–Tab.

You can also edit chords by playing the chords with a connected MIDI controller, or you can edit them directly as text, using the same chord symbols that appear in Logic Pro.

Edit a chord

1. In Logic Pro, do one of the following:
   - To edit a chord on the Chord track, tap the chord to select it.
   - To edit a chord on a Session Player region, select the region in the Tracks area, tap the Editors button to open the Session Player Editor, tap the Chord Mode button to view region chords, then tap the chord on the region to select it.
   - Alternatively, with the chord selected, you can tap the Inspector button to open the Chord inspector.
2. Tap the chord again, then choose Edit Chord.

   The Edit Chord dialog appears.



3. In the Edit Chord dialog, do any of the following:
   - *Change the root note of the chord:* Choose a note from the Root Note pop-up menu.

     Each chord consists of at least three notes: the root (first), third, and fifth. The root note is the one on which the chord is based, and by which it is identified. In a C major chord, the root is C; in an F# minor chord, the root is F#.
   - *Change the chord type:* Tap one of the Chord Type buttons.

     Most commonly used chords are either major or minor, which is determined by the third of the chord. Additional types include augmented, diminished, and suspended (sus4 and sus2) chords. Suspended chords do not contain a third.
   - *Add chord extensions:* Tap one or more of the Chord Extension buttons. To remove a chord extension, tap a highlighted Chord Extension button.

     Extensions are added notes at higher intervals than the fifth. They include 7ths, 9ths, 11ths, and 13ths. Some extensions, such as b5 and #9, are chromatic to the key. Extensions modify the color or character of a chord, and they can also add tension.

- *Add a bass note (other than the root):* Choose a note from the Bass Note pop-up menu.

  Typically, the bass plays the root or fifth of the chord (except during fills), but sometimes you want the bass to play a different note, either to create a stepwise progression or to add dissonance (especially when the bass note is a non-chord tone).

- *Change the scale associated with the chord:* Choose a scale from the Scale pop-up menu.

  Each chord has a scale that determines which non-chord tones the Session Player can play over the chord—for example, in fills. When you add a chord, the scale associated with the chord depends on the chord type and the key signature, but you can choose a different scale.

- *Hear an example of the chord with your changes:* Tap the Preview button.

- You can also enter chord symbols as text in the Edit Chord dialog.

Edit a chord using a MIDI controller

1. Make sure the MIDI controller is connected to your iPad and working.
2. In Logic Pro, select the chord, either on the Chord track or on a region in the Session Player Editor.

   Note: On the Chord track, be sure to select a single chord, not a chord group.

3. Tap the chord, then do one of the following:
   - Choose Edit Chord from the shortcut menu.
   - Tap the Inspector button to open the Chord inspector.
4. Tap the Use MIDI Input button.
5. Play a chord on your MIDI controller. You can also play a chord on an open Play Surface in Logic Pro for iPad.

   The selected chord changes to the chord you played.

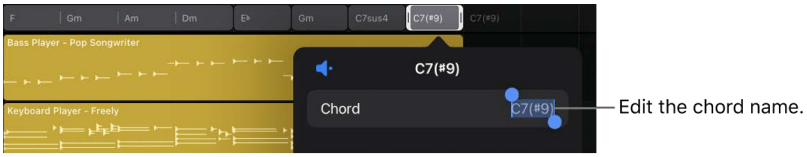
Enter chord symbols as text

In addition to editing chords using the menus and buttons in the Edit Chord dialog or Chord inspector, you can edit them directly as text. If you are familiar with the chord symbols used in Logic Pro, this can be a quick way to edit chords while you work on a project.

Some common symbols include:

- Chord name with no other symbol = major
- m = minor
- aug = augmented
- dim = diminished
- sus = suspended (2 or 4)
- 5 = only the root and fifth, no third
- b = flat (lowered note)
- # = sharp (raised note)
- / = bass note other than the chord root

1. In Logic Pro, double-tap a chord, then tap Edit Chord.
2. In the Chord field, enter the chord as text, using the same kinds of chord symbols that appear in Logic Pro.

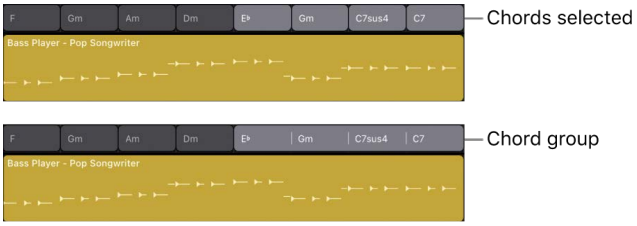


Work with chord groups in Logic Pro for iPad

In Logic Pro you can combine chords on the Chord track into a chord group. You can copy, move, and loop a chord group as a unit in order to use the same sequence of chords in different parts of a project. You can ungroup the chords in a chord group and use or edit them individually.

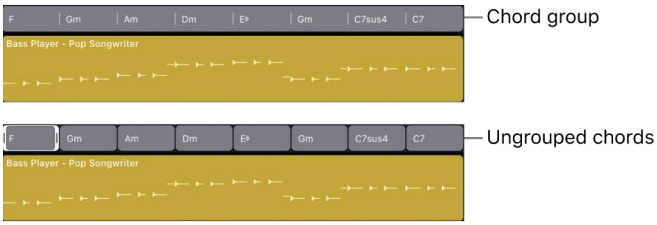
Group chords on the Chord track

1. In Logic Pro, select multiple chords on the Chord track.
2. Tap one of the selected chords, then choose Group Chords.



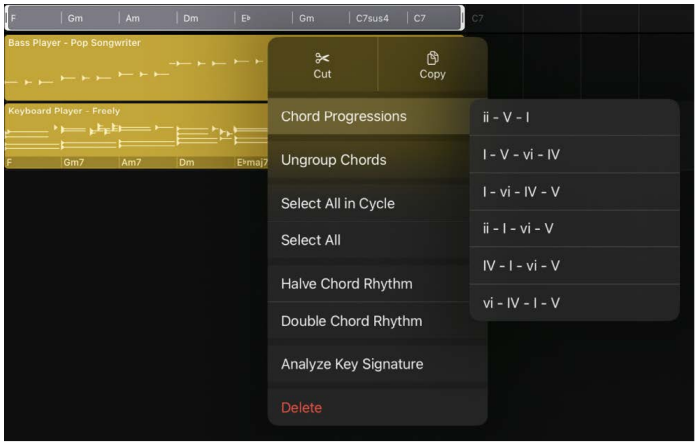
Ungroup chords

1. In Logic Pro, select a chord group on the Chord track.
2. Tap the selected chord group, then choose Ungroup Chords.

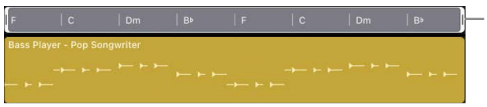


Use chord progressions in Logic Pro for iPad

Logic Pro includes a set of chord progressions that you can use on the Chord track and on Session Player regions. Chord progressions appear in the Chord Progressions submenu with roman numerals (I, ii, IV, V, and so on) for chords indicating their relation to the key signature, rather than as key-specific chord symbols. When you add a chord progression, it adapts to the key signature at the position where it is added.



When you add a chord progression to a project, it functions as a chord group and can be moved, copied, or looped. You can ungroup the chords in a chord progression to use or to edit them individually.



When you add a Session Player to a project, if no chords exist on the Chord track, a default eight-bar chord progression is added to the Chord track rather than a single chord. Each Session Player style has a different default chord progression.

Choose a chord progression

In Logic Pro, do one of the following:

- Tap a chord or chord group on the Chord track, tap it again, choose Chord Progressions, then choose a chord progression from the submenu.
- In the Session Player Editor, tap the Chord Mode button to view region chords. Tap a region, tap Chord Progressions, then choose a chord progression from the submenu.

When you add a chord progression, any existing chords are replaced by the chord progression.

If the region is shorter than the chord progression, it plays the part of the progression that fits its length. You can lengthen the region to play more of the chord progression.

If the region is longer than the chord progression, the chord progression repeats to fill the remaining length of the region.

Turn off adding a default chord progression

1. In Logic Pro, select a Session Player region.
2. Tap the Editors button to open the Session Player Editor .
3. In the Session Player Editor menu bar, tap the More button •••.
4. In the More menu, choose Default Chord Progression for New Regions to turn it off.

Change the chord rhythm in Logic Pro for iPad

The rate at which chords change is called the *chord rhythm*. You can halve or double the chord rhythm of a chord group or of the chords on a Session Player region, which affects the chords as follows:

- *Halve the chord rhythm:* Chords change half as quickly (each chord lasts twice as long).
- *Double the chord rhythm:* Chords change twice as quickly (each chord lasts half as long).

Halve the chord rhythm of a chord group on the Chord track

- In Logic Pro, double-tap the chord group, then choose Halve Chord Rhythm.



Halve the chord rhythm of a Session Player region

1. In Logic Pro, select the region in the Tracks area.
2. In the Session Player Editor, tap the region, then tap Halve Chord Rhythm.

Double the chord rhythm of a chord group on the Chord track

- In Logic Pro, double-tap the chord group, then choose Double Chord Rhythm.



Double the chord rhythm of a Session Player region

1. In Logic Pro, select the region in the Tracks area.
2. In the Session Player Editor, tap the region, then tap Double Chord Rhythm.

Choose which chords a Session Player region follows in Logic Pro for iPad

A Session Player region can follow either region chords or the Chord track. By default, when it contains region chords, it follows the region chords. When it contains no region chords, it follows the chords on the Chord track. If you delete the chords on a Session Player region, it follows the chords on the Chord track until you add region chords to it again.

You can override the default behavior using menu commands in the Chords menu in the Session Player Editor or using the Pitch Source parameter in the Region inspector. When you set a region that contains region chords to follow the Chord track, its region chords are not deleted. The region chords reappear when you set the region to follow them again.

A Session Player region follows chords from one source (its region chords or the chords on the Chord track) for its entire duration. When you want it to sometimes play in sync with other Session Players and sometimes play different chords or extensions, you can paste the chords from the Chord track onto the region and then edit the chords you want to be different.

Set a Session Player region to follow the Chord track

1. In Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the region in the Session Player Editor, then tap Follow Global Chord Track.

Set a Session Player region to follow its region chords

1. In Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the region in the Session Player Editor, then tap Follow Region Chords.

When you set a Session Player region to follow its region chords, the Pitch Source parameter changes to Region Chords. Similarly, when you change the Pitch Source parameter to Region Chords, the region follows its region chords (if any exist).

Analyze the key signature of a range of chords in Logic Pro for iPad

Logic Pro can analyze a series of selected chords—either on the Chord track or on a Session Player region—to determine the key signature, and then add the determined key signature to the Signature track as a key signature change.

Analyze the key signature of selected chords on the Chord track

1. In Logic Pro, select a series of chords on the Chord track. The selected chords can be individual chords, grouped chords, or a mixture of both, but they must be contiguous.
2. Tap one of the selected chords, then tap Analyze Key Signature.

   Logic Pro analyzes the selected chords to determine the key signature, and then it adds the resulting key signature to the Signature track as a key signature change.

   If no key signature change exists in the project before the last chord in the chord group, the initial key signature changes to the result. If a key signature change does exist, a key signature change event is added at the start position of the chord group.

Analyze the key signature of chords on a Session Player region

1. In Logic Pro, tap the Session Player region to select it.
2. Do one of the following:
   - Tap the region again, then tap Chords > Analyze Key Signature.
   - Tap the Editors button to open the Session Player Editor, tap the Chord Mode button, tap the upper part of the region in the editor, then tap Analyze Key Signature.

   Logic Pro analyzes the chords on the region to determine the key signature, and then adds the resulting key signature to the Signature track as a key signature change.

   If no key signature change exists in the project before the last chord on the region, the initial key signature changes to the result. If a key signature change does exist, a key signature change event is added at the start position of the region.

Create fades on audio regions in Logic Pro for iPad

You can fade in the beginning of audio regions, and fade out the end of audio regions (including audio Apple Loops) using the Fade Start and Fade End parameters in the inspector. Fades are visible in the Tracks area when you have zoomed in enough to see the waveform in the audio region.

You can edit the length of a fade, the fade curve shape, and the fade type. You can also edit the playback speed of fades using the Speed Up (for fade-ins) and Slow Down (for fade-outs) Style settings.

Create a fade-in on an audio region

1. In Logic Pro, select one or more audio regions.
2. Tap the Inspector button to open the inspector.
3. Tap the Fade Start disclosure triangle to show region parameters for fade-ins.

   Note: Time values for fade-ins are expressed in milliseconds with a maximum fade time of 99,999 ms (nearly 100 seconds).
4. Tap the Style menu, then choose Fade-In (for normal speed) or Speed Up (for a speed-up effect).
5. To set the length of the fade, do one of the following:
   - Drag the Time value up or down to edit the fade length.
   - Tap the Time value, then then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
6. Do one of the following to set the fade curve shape:
   - Drag the Curve value up or down to edit the fade curve.
   - Tap the Curve value, then then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Create a fade-out on an audio region

1. In Logic Pro for iPad, select one or more audio regions.
2. Tap the Inspector button to open the inspector.
3. Tap the Fade End disclosure triangle to show region parameters for fade-outs.

   Note: Time values for fade-outs are expressed in milliseconds with a maximum fade time of 99,999 ms (nearly 100 seconds).
4. Tap the Style menu, then choose Fade-Out (for normal speed) or Slow Down (for a slow-down effect).
5. To set the length of the fade, do one of the following:
   - Drag the Time value up or down to edit the fade length.
   - Tap the Time value, then then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
6. Tap the Type pop-up mend and choose the fade-out type. The choices are:
   - *Out:* Creates a standard fade-out whenever the Fade tool or Fade parameter is used.
   - *X (Crossfade):* Crossfades the selected region with the following region when you use the Fade tool or Fade parameter.
   - *EqP (Equal Power Crossfade):* Results in an equal power crossfade. This minimizes volume dips between audio regions, resulting in a more even crossfade between regions that may be slightly different in level.
   - *X S (S-Curved Crossfade):* Delivers an S-curved crossfade. The fade curve, as the name suggests, is S shaped.

     The last three items in the pop-up menu can only be applied to the first of two consecutive regions. Also note that the Fade In (and corresponding Curve) parameters are made redundant when any of the X, EqP, or X S options are chosen.
7. Do one of the following to set the fade curve shape:
   - Drag the Curve value up or down to edit the fade curve.
   - Tap the Curve value, then then edit the value in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Extract vocal and instrumental stems with Stem Splitter in Logic Pro

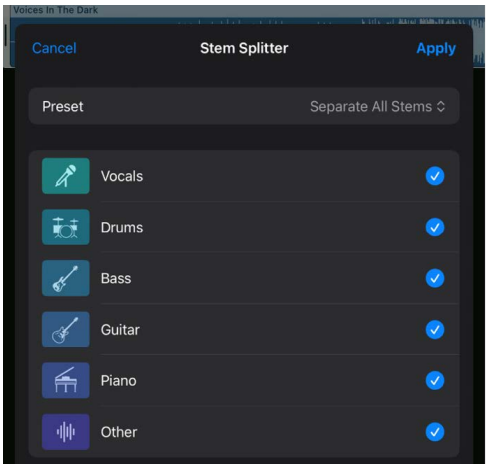
With Stem Splitter, you can isolate the different vocal and instrument parts in a multitrack mix and extract them to individual audio regions that you can use in your projects. You can extract stems for vocals, drums, bass, guitar, piano, and other instrumental parts.

Stem Splitter includes a set of presets you can use to quickly extract different combinations of stems. The preset names indicate which stems are extracted separately and which are combined into submixes. You can also create a custom submix containing multiple stems, and select which stems in the submix to extract.

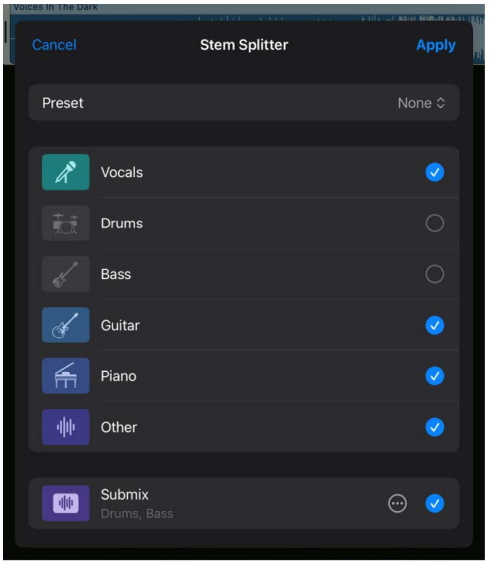
Stem Splitter is available on iPads with an M1 or later Apple silicon processor.

Extract stems from an audio region with Stem Splitter

1. In the Tracks area in Logic Pro, tap the audio region to select it.
2. Tap the region again, then tap Stem Splitter.

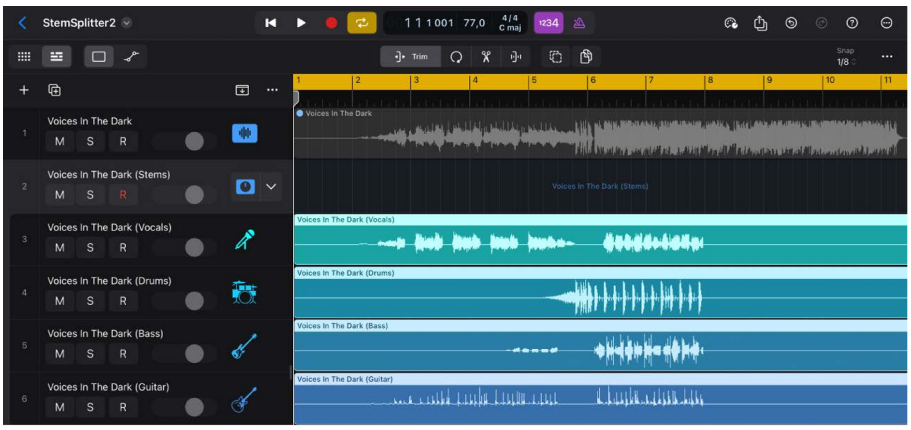


3. In the Stem Splitter window, do one of the following:
   - Tap the Preset pop-up menu, then tap a preset to select it.
   - Tap the checkboxes for individual stems to select or deselect them. Selected stems are extracted individually. Two or more deselected stems are combined into a submix, which appears at the bottom of the Stem Splitter window.



4. If you're extracting a submix, select the Submix checkbox. You can also tap the More button ••• for the submix, then deselect individual checkboxes for stems you don't want to include in the extracted submix.

5. Tap Apply.

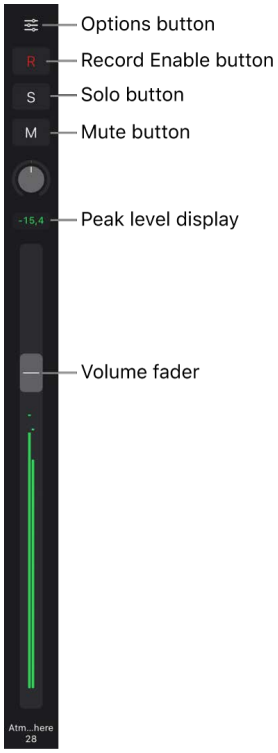


A summing stack is created below the track with the selected audio region, with subtracks containing the extracted stems. The original region is muted so that you can listen to the extracted stems immediately. You can solo individual stems using the Solo buttons in the subtrack headers, and you can move, copy, or edit each part in the same way as any audio region.

Access mixing functions using the Fader in Logic Pro for iPad

While you are building a project, you sometimes might need to quickly access various mixing functions for a track, such as checking and adjusting the volume level and pan position, muting or soloing the track, or changing the audio input or output. You can access these and other functions for the selected track using the Fader.

The Fader features Solo and Mute buttons, a Pan/Balance knob, a peak level display, and a Volume fader to control the selected track (when multiple tracks are selected, they control the focused track). When an audio track is focused, the Fader also includes a Record Enable button. Above these controls is an Options button that you can use to access audio routing and other options for the track.



- *Options button:* Tap the Options button above the controls to edit audio routing and other options for the track, including Freeze and Solo Safe switches and a Group menu.
- *Record Enable button:* Tap to enable the track for recording (on audio tracks only).
- *Solo button:* Tap to solo or unsolo the track.
- *Mute button:* Tap to mute or unmute the track.
- *Pan/Balance knob:* Swipe up or down to adjust the track pan position in the stereo field.
- *Peak level display:* Shows the peak level reached during playback, ranging from green (below –3 dB) to orange. Above 0 dB, the text on the display becomes white. You can reset the peak level display by tapping it.
- *Volume fader and level meter:* Drag the handle up or down to adjust the track volume level. The integrated level meter shows the current level during playback, ranging from green (below –12 dB) through yellow (below –3 dB) to orange (up to 0 dB).
- *Track name:* Shows the name and number of the track the Fader controls.

You can quickly switch between tracks by tapping their track icons in the Tracks area, then mute and solo them, adjust volume or pan, or change other track options using the Fader.

You can show a second Fader to access the output destination for the selected track or the aux used by a send on the track, or to show both the main track and a focused subtrack of a Drum Machine Designer track stack.

When you show a second Fader, it appears to the right of the track Fader. The second Fader includes the same controls, but it does not include an Options button or a Record Enable button.



Show the Fader

1. In Logic Pro, select a track in the Tracks area. If multiple tracks are selected, make the track the focused track.
2. Tap the Fader button on the left side of the view control bar.

Edit audio input and output options for the selected track

1. In Logic Pro, tap the Options button on the Fader.
2. Under Audio Routing, tap the Output pop-up menu, then choose an audio output or a bus.
3. When an audio track is selected, tap the Input pop-up menu, then choose an audio input. You can also tap Mono, Stereo, Left, or Right to choose the input format for the track.

Freeze the selected track

1. In Logic Pro, tap the Options button on the Fader.
2. Under Further Options, tap the Freeze switch.

For information about freezing tracks, see Freeze tracks.

Set the selected track to Solo Safe mode

When you solo a track, other tracks are automatically muted. You can set a track to Solo Safe mode so that when another track is soloed, the Solo Safe track is not muted.

1. In Logic Pro, tap the Options button on the Fader.
2. Tap the Solo Safe switch in the Further Options section.

Add the selected track to a mixer group

1. In Logic Pro, tap the Options button on the Fader.
2. Under Further Options, tap the Group menu, then choose a group or choose Create New Group.

For information about mixer groups, see Mixer groups.

Make the selected audio track ready for recording

1. In Logic Pro, tap the red Record Enable button R in the Fader.

   Tap the Record Enable button again to deactivate the track for recording.

Mute or solo the selected track

Do one of the following:

- In Logic Pro, tap the Mute button M in the Fader.

  Tap the Mute button again to unmute the track.

- Tap the Solo button S in the Fader.

  Tap the Solo button again to unsolo the track.

Adjust pan or balance for the selected track

- In Logic Pro, swipe up or down on the Pan/Balance knob to set the position in the stereo field.

  Tip: To reset the Pan/Balance knob to center position, double-tap it.

For information about setting pan or balance position, see Set channel strip pan or balance.

Adjust the volume level of the selected track

- In Logic Pro, drag the handle of the Volume fader up or down to change the volume level.

  Tip: To reset the Volume fader to 0 dB, double-tap the handle.

The Volume fader features an integrated level meter that shows the output volume for the track as the project plays. You can watch the level meter to see if clipping occurs on the track.

Show a second Fader for the output destination of the track

- In Logic Pro, tap the Plug-ins button, then tap Output.

If you switch to another view, the output Fader closes.

Show a second Fader for the aux of a send of the track

- In Logic Pro, tap the Plug-ins button, then double-tap a send tile.

If you switch to another view, the aux Fader closes.

Show a second Fader for a subtrack of a Drum Machine Designer track stack

1. In Logic Pro, tap the main track of a Drum Machine Designer track stack to make it the focused track.
2. Tap the Play Surfaces button to open the Play Surface showing the Drum Machine Designer drum pads.
3. Tap the Edit button in the Play Surface menu bar, then tap a drum pad to select it.

Show a second Fader for the main track of a Drum Machine Designer track stack

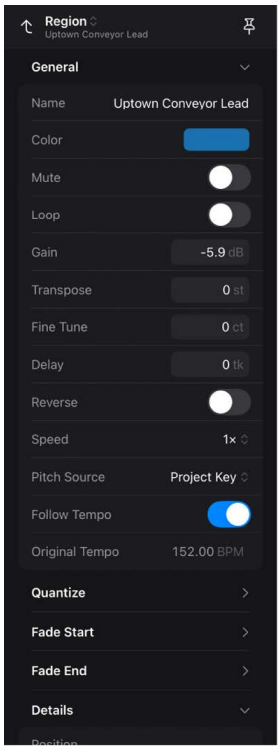
1. In Logic Pro, tap a subtrack of a Drum Machine Designer track stack to make it the focused track.

   Note: To show the subtracks of a track stack, tap the disclosure triangle in the track header of the main track.
2. Tap the Plug-ins button, then tap Output.

Edit region parameters

Intro to region parameters in Logic Pro for iPad

You can view and edit region parameters for selected regions in the inspector.



Some parameters are common to all region types, while others are available for only some region types. For example, Quantize parameters appear in the inspector for audio and MIDI regions, but not for Session Player or pattern regions.

Editing parameters for multiple regions

When multiple regions are selected, the number of selected regions is displayed instead of the region name. Any changes to region parameters affect all selected regions. If a parameter has different values in the selected regions, an asterisk (*) appears in place of the value in the inspector. If you change this parameter for all selected regions by dragging, the relative difference in value is preserved (relative alteration). To set all selected regions to the same value, enter the value numerically rather than by dragging (absolute alteration).

View region parameters

1. In Logic Pro, select one or more regions in the Tracks area.
2. Tap the Inspector button in the view control bar.

   The inspector opens, showing categories of region parameters. The categories vary, depending on the region type.
3. Tap the disclosure triangle for the category you want to view.

   Parameters appear below the category name, with parameter names on the left and values on the right.

Logic Pro for iPad audio region parameters

When one or more audio regions are selected, the following audio region parameters are available in the inspector.

General audio region parameters

- *Name field:* Shows the name of the selected region. Tap the name, then enter a new name. When multiple regions are selected, the number of selected regions appears instead of the region name.
- *Color:* Tap to open the Colors palette, then tap a new region color in the Colors palette.
- *Mute switch:* Tap to mute the selected region or regions to exclude them from playback.
- *Loop switch:* Tap to loop the region continuously until the next region on the track. See Loop regions.
- *Gain:* Drag vertically to set the gain for the audio regions in decibels; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Transpose:* Drag vertically to transpose the pitch of the region in semitones; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad. See Transpose and fine-tune audio regions.
- *Fine Tune:* Drag vertically to adjust the pitch of the region in cents; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad. See Transpose and fine-tune audio regions.
- *Delay:* Drag vertically to adjust the region delay; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad. You can use negative values to have the region play ahead of the beat.

- *Reverse switch:* Tap the switch on to have the region play in reverse. The Reverse parameter is not available if Flex & Follow is turned on in the Region inspector. See Reverse audio regions.
- *Speed pop-up menu:* Choose a multiple by which the original speed of the region changes (audio Apple Loops only). See Change the playback speed of audio regions.
- *Pitch Source:* For audio Apple Loops, this determines whether the region changes pitch based on the key signature. The options are: Off (default) and Key Signature*. See Pitch Source parameter.

  *For projects created in an earlier version of Logic Pro, audio regions also have a Project Key option.

  Note: Audio Apple Loops have a Pitch Source parameter, audio regions do not.
- *Follow Tempo switch:* Tap to set the region to follow the project tempo. The Follow Tempo switch is available for regions on audio tracks with the Flex switch set to Off (audio Apple Loops only).
- *Flex & Follow pop-up menu:* Choose whether the region follows the project tempo, whether it aligns with only bars or with bars and beats, or choose Off. The Flex & Follow pop-up menu is available for regions on audio tracks with the Flex switch set to On. See Set Flex & Follow options for audio regions.
- *Original Tempo:* Shows the original tempo at which the region was recorded. See Change the original tempo of audio regions.

Quantize audio region parameters

- *Quantize pop-up menu:* Choose the note value to which note events in the region are time corrected, or choose Off for no quantization.
- *Q-Swing:* Set the percentage by which the position of every second point in the current quantization grid is altered. Values over 50% delay beats, and values under 50% pre-delay them. The most practical settings fall between 50% and 75%, imparting a swing feel to strictly quantized or tightly played audio or MIDI regions.
- *Q-Strength:* Set the percentage value to determine how far a note is shifted toward the nearest grid position. 100% results in full quantization; 0% leaves the note at its recorded position.
- *Q-Range:* Defines which notes are quantized based on their proximity to quantization grid positions. At the default value of 0, every note is quantized. At positive values, only notes outside the set range (that is, farther away from the grid position) are quantized, and notes in the range keep their original position. At negative values, only notes in the set range are quantized, and notes outside the range remain unchanged. The amount by which notes shift toward the grid positions depends on the Q-Strength setting.

  For example, with Q-Range set to 20 ticks and Q-Strength to 50%, only notes that are more than 20 ticks off are quantized. Those notes are quantized by 50%, which improves the timing without making the performance sound mechanical.

Fade Start audio region parameters

Time values for Fade Start parameters are expressed in milliseconds, with a maximum time value of 99999 ms (100 seconds).

- *Style pop-up menu:* Choose Fade-In or Speed Up.
- *Time:* Adjust the start time of the fade in, either by dragging the value up or down, or by tapping the value, then editing it numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Curve:* Adjust the start curve of the fade in, either by dragging the value up or down, or by tapping the value, then editing it numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Fade End audio region parameters

Time values for Fade End parameters are expressed in milliseconds, with a maximum time value of 99999 ms (100 seconds).

- *Style pop-up menu:* Choose Fade-Out or Slow Down.
- *Time:* Adjust the end curve of the fade in, either by dragging the value up or down, or by tapping the value, then editing it numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Type pop-up menu:* Choose a fade type for the fade out. The choices are:
  - *Out:* Creates a standard fade-out whenever the Fade tool or Fade parameter is used.
  - *X (Crossfade):* Crossfades the selected region with the following region when you use the Fade tool or Fade parameter.
  - *EqP (Equal Power Crossfade):* Results in an equal power crossfade. This minimizes volume dips between audio regions, resulting in a more even crossfade between regions that may be slightly different in level.
  - *X S (S-Curved Crossfade):* Delivers an S-curved crossfade. The fade curve, as the name suggests, is S shaped.

    The last three items in the pop-up menu can only be applied to the first of two consecutive regions. Also note that the Fade In (and corresponding Curve) parameters are made redundant when any of the X, EqP, or X S options are chosen.
- *End Curve:* Adjust the end curve of the fade in, either by dragging the value up or down, or by tapping the value, then editing it numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Details audio region parameters

- *Position:* Shows the region position in bars, beats, division, and ticks. To change the region position, tap the Position value, tap the unit you want to change, then edit it numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Length:* Shows the region length (duration) in bars, beats, division, and ticks. To change the region length, tap the Length value, tap the unit you want to change, then edit it numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Lock Time Position switch:* Tap to lock the time position of the region, so that it cannot be moved inadvertently.

Logic Pro for iPad MIDI region parameters

When one or more MIDI regions are selected, the following MIDI region parameters are available in the inspector.

General MIDI region parameters

- *Name field:* Shows the name of the selected region. Tap the name, then enter a new name. When multiple regions are selected, the number of selected regions appears instead of the region name.
- *Color:* Tap to open the Colors palette, then tap a new region color in the Colors palette.
- *Mute switch:* Tap to mute the selected region or regions to exclude them from playback.
- *Loop switch:* Tap to loop the region continuously until the next region on the track. See Loop regions.
- *Velocity Offset:* Drag vertically to set a velocity value by which MIDI notes in the region are offset from their original values; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Transpose:* Drag vertically to transpose the pitch of the region in semitones; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.
- *Delay:* Drag vertically to adjust the region delay; or tap, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad. You can use negative values to have the region play ahead of the beat.
- *Pitch Source:* Determines whether the region changes pitch based on the key signature, and (for Session Player regions) on the Chord track or on region chords. See Pitch Source parameter. The options and defaults for each region type are:
  - *MIDI:* Off (default), Key Signature*

    *For projects created in an earlier version of Logic Pro, MIDI regions also have a Project Key option.
  - *Pattern:* Off (default), Chord Track, Region Chords
  - *Session Player:* Chord Track, Region Chords
- *Dynamics pop-up menu:* Choose a value to expand or compress the dynamics (the difference between loud and soft) by adjusting the velocity range. This works in a similar way to a compressor or expander. Values above 100% increase the difference between high and low note velocities, while values below 100% decrease the difference.

  The Fixed setting forces all notes to a velocity value of 64. This can be used together with the Velocity Offset parameter (see above) to set any fixed velocity value.

- *Gate Time pop-up menu:* Choose a value to modify the duration (length) of notes in the region, making them either more legato or more staccato. Values below 100% shorten notes, and values above 100% lengthen notes. The Fixed setting produces extreme staccato, and the Legato setting produces strong legato regardless of the notes' original length, eliminating all space between notes.
- *Clip Length switch:* Tap to alter the length of the last notes in a region directly from the Tracks area by adjusting the length of the MIDI region. When switched on, any notes sounding at the region end are abruptly cut off. When switched off, notes are played to their normal end point, regardless of whether the region end is reached sooner.

Quantize MIDI region parameters

- *Quantize pop-up menu:* Choose the note value to which note events in the region are time corrected, or choose Off for no quantization.
- *Q-Swing:* Set the percentage by which the position of every second point in the current quantization grid is altered. Values over 50% delay beats, and values under 50% pre-delay them. The most practical settings fall between 50% and 75%, imparting a swing feel to strictly quantized or tightly played audio or MIDI regions.
- *Q-Strength:* Set the percentage value to determine how far a note is shifted toward the nearest grid position. 100% results in full quantization; 0% leaves the note at its recorded position.
- *Q-Range:* Defines which notes are quantized based on their proximity to quantization grid positions. At the default value of 0, every note is quantized. At positive values, only notes outside the set range (that is, farther away from the grid position) are quantized, and notes in the range keep their original position. At negative values, only notes in the set range are quantized, and notes outside the range remain unchanged. The amount by which notes shift toward the grid positions depends on the Q-Strength setting.

  For example, with Q-Range set to 20 ticks and Q-Strength to 50%, only notes that are more than 20 ticks off are quantized. Those notes are quantized by 50%, which improves the timing without making the performance sound mechanical.
- *Q-Flam:* Notes with the same time position (chords) are spread out by this parameter. Positive values produce an ascending (upward) arpeggio; negative values a descending (downward) arpeggio. The position of the first note (either the bottom or top note, assuming all notes start at the same position) in the arpeggio is unaltered.
- *Q-Velocity:* When used with a groove template, this parameter (expressed as a percentage) determines the amount that the velocity values of quantized notes are affected by the velocity values of a template MIDI region. At a value of 0%, the notes retain their original velocity. At 100%, they adopt the velocity values of the template. Negative values alter the velocity, making the deviation from the template even greater.
- *Q-Length:* When used with a groove template, this parameter (also expressed as a percentage value) determines how the lengths of quantized notes are affected by the equivalent note lengths (notes at the same position) of a template MIDI region. A value of 0% has no effect, while at 100%, the notes adopt the exact note lengths of the template region. Negative values alter note lengths further, resulting in a more significant deviation from the template.

- *Q-Algorithm pop-up menu:* Choose a quantization algorithm to use for the region. The choices are:
  - *Classic Quantize:* Quantizes MIDI notes to the nearest beat or other grid position using the current Quantize setting and any active advanced Quantize parameters.
  - *Smart Quantize:* Works similarly to Flex Time for audio regions. MIDI events near grid positions (defined by the Q-Range setting) are analyzed. Based on a combined weighting of proximity to the target grid position and velocity, a reference point ("center of gravity") is set for each group and moved to the target grid positions. All (nearby) MIDI events move proportionally to the reference point. How far each event moves is determined by the Q-Strength setting. Unlike Classic Quantize, all MIDI events keep their original order, similar to an audio region edited using Flex Time. This includes not only notes but also all MIDI data types (such as Pitch Bend and Control Change events).

    In many cases, Smart Quantize can produce more natural-sounding results than Classic quantization. For example, in a MIDI piano performance, the notes of quickly arpeggiated chords keep their relative positions, as do sustain pedal (on/off) events. Another useful situation is in MIDI drum performances that need some quantizing, but where Classic quantization would distort rolls, flams, and other notes not played strictly on the beat (and also possibly the relative position of Hi-Hat on/off events). In both cases, Smart Quantize keeps the relative position of note on, note off, and CC events.

Details MIDI region parameters

- *Position:* Shows the region position in bars, beats, division, and ticks. To change the region position, drag a Position unit vertically or tap the Position value, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad
- *Length:* Shows the region length (duration) in bars, beats, division, and ticks. To change the region length, drag a Length unit vertically or Tap the Length value, then edit the value numerically in the numeric input dialog using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad
- *Lock Time Position switch:* Tap to lock the time position of the region, so that it cannot be moved inadvertently.

Logic Pro for iPad Session Player region parameters

Session Player regions share the same parameters as MIDI regions, with the following exceptions:

- *General parameters:* Session Player regions have no Velocity, Transpose, Dynamics, Gate Time, or Clip Length parameter.
- *Quantize parameters:* Session Player regions have no Quantize parameters.

Logic Pro for iPad pattern region parameters

Pattern regions share the same parameters as MIDI regions, with the following exceptions:

- *General parameters:* Pattern regions have no Clip Length parameter.
- *Quantize parameters:* Pattern regions have no Quantize parameters.

Copy and paste position and length values in Logic Pro for iPad

You can copy the position or length value for a region in the Region inspector, select another region (or regions), and then paste the value to the Region inspector to have it apply to the selected region(s). You can also paste the copied position value to the display, located in the control bar, to move the playhead to that position, or you can copy the position value in the display and paste it to the Region inspector to move the start of a region to that position.

Copy the position or length value of a region

1. In Logic Pro, select a region, then tap the Inspector button in the view control bar to open the Region inspector.
2. In the Region inspector, tap Details to open the Details section (if it is not already open). You may need to close other sections to view the Details section.
3. Touch and hold either the position value or the length value, then tap Copy.

Copy the position value of the playhead

- In Logic Pro, touch and hold the position value in the display, then tap Copy.

Paste the copied position value to the Region inspector

- In Logic Pro, select a region, then tap the Inspector button to open the Region inspector.
- In the Region inspector, tap Details to open the Details section (if it is not already open). You may need to close other sections to view the Details section.
- Do one of the following:
  - If you copied the position value, touch and hold the position value, then tap Paste.
  - If you copied the length value, touch and hold the length value, then tap Paste.

    Note: Position and length values are not interchangeable. A copied position value cannot be pasted into a length value field, or vice versa.

Paste the copied position value to the display

- In Logic Pro, touch and hold the position value in the display, then tap Paste.

Set region defaults in Logic Pro for iPad

In a Logic Pro for iPad project, each region type (audio, Session Player, MIDI, and pattern) has a set of default parameter values that apply to newly created regions. You can view and edit the defaults for each region type in the inspector.

View and edit region default parameter values

1. In the Tracks area in Logic Pro, select a region of the type for which you want to set default values.
2. Tap the Inspector button in the view control bar to open the inspector.
3. In the inspector, choose Region Defaults from the Level pop-up menu.

   Default parameter values for the selected region type appear in the inspector. In the Level pop-up menu, the selected region type appears below Region Defaults.
4. Edit default values for any region parameters.
5. When you’re done, tap the Inspector button again to close the inspector.

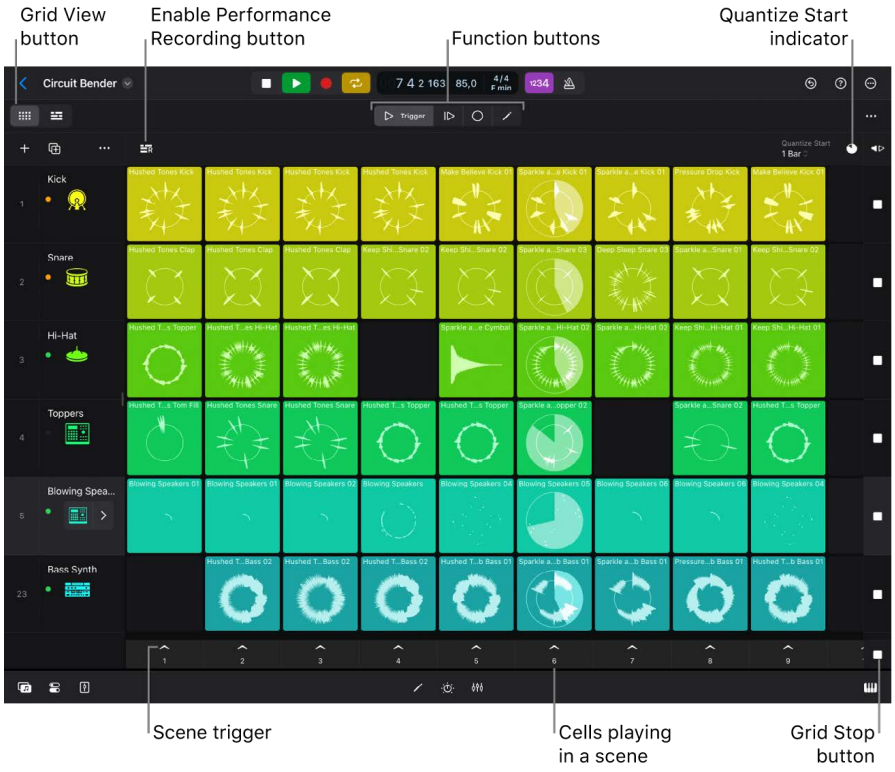
Create with Live Loops

Intro to Live Loops in Logic Pro for iPad

Live Loops lets you arrange and play with musical ideas in real time in a grid of cells, each containing a musical phrase or loop. You can start and stop cells freely while keeping everything in sync with the beat and the project tempo. Each grid row uses the same signal routing and channel strip settings as the adjacent track in the Tracks area. All the cells in a grid column, called a scene, can be triggered together to act as a musical section. An extensive set of editable parameters gives you full control over playback, recording, and looping, so you can take your music in new creative directions.

Buttons in the far right column show the status of playing or queued cells on each track. You can use the buttons to pause, start, or stop cells individually or all at once. You can also use the buttons to switch playback between cells in Live Loops and regions in the Tracks area. See How the Live Loops grid and Tracks area interact.

You can record to both audio and MIDI cells, add regions or Apple Loops to the Live Loops grid, and record a Live Loops performance as regions to the Tracks area. Logic Pro provides several starter grids containing instruments and prerecorded cells to help you get started.



Editing modes

There is a group of four function buttons in the Live Loops menu bar that you use to switch modes for various editing tasks:

- *Cell Trigger mode:* Tap the Cell Trigger button ▷ to turn on Cell Trigger mode. In this mode, tapping cells and scenes triggers them to start or stop playing.
- *Cell Queue mode:* Tap the Cell Queue button |▷ to turn on Cell Queue mode. You can queue cells and scenes to start playing when project playback starts or when you want cells in different scenes to start at the same time.
- *Cell Record mode:* Tap the Cell Record button ◯ to turn on Cell Record mode. Use this mode to record Audio or MIDI to cells.
- *Cell Edit mode:* Tap the Cell Edit button to turn on Cell Edit mode. In this mode, you can select cells and scenes and edit various parameters for playback and recording.

To momentarily switch to a specific mode, touch and hold a function button with one finger, perform a task with another gesture, and then release the button. For example, while in Cell Trigger mode, you can touch and hold the Cell Queue button with one finger, tap one or more cells with another finger to queue them, and then release your finger from the Cell Queue button. See Work with function buttons.

Show the Live Loops grid

- In Logic Pro, tap the Grid View button.

Create a Live Loops project

1. In Logic Pro, tap the Projects Browser button on the left side of the control bar.
2. In the Projects browser, do either of the following:
   - Tap the New Project button + at the top right of the screen.
   - Tap “Create Project” at the top of the list.

     Note: This option is not available when viewing Recents in the Projects browser.
3. In the New Project Chooser, do either of the following:
   - Tap Live Loops under the New Empty Project header.
   - Tap a Live Loops starter grid under Live Loops Grids.

You can also add Live Loops to any existing project by showing the Live Loops grid and adding cells.

Start and stop Live Loops cells in Logic Pro for iPad

You can start and stop cells individually, or start and stop all the cells in a scene (a column in the grid) simultaneously. Only one cell can play on a track at any time. You can queue one or more cells in different scenes and trigger them to play together. While a cell is playing, a circular indicator in the middle of the cell shows the current playback position. If cell looping is turned off, a rectangular indicator shows the current playback position.



The point in time when a cell starts or stops is determined by the Quantize Start value. Quantize Start ensures that cells start at musically meaningful positions (beats or bars), so they are in sync with other cells and the project playhead position. You can change the Quantize Start value for the grid, for scenes, or for individual cells. Triggered cells flash to indicate that they are queued to start at the next quantize start point.

If you trigger a cell too late to start at the desired quantize start point, it starts playing at the next quantize start point. The cell will still be in sync with the project tempo, but it might lead to undesirable musical results, especially when cells are following a short Quantize Start value. Smart Pickup ensures that cells start immediately at the correct position, even when triggered slightly late. However, this can result in the beginnings of the cells being skipped in order to ensure that the cells are at the correct position when they start playing. In order to avoid this and ensure that cells start playing from the Start position set in the Cell inspector, turn Smart Pickup off and trigger cells with enough time before the upcoming quantize start point.

Cells in the Live Loops grid play at the project tempo. Apple Loops added to cells automatically play at the project tempo, as do any audio files containing tempo information. When you add an audio file without tempo information to a cell, Logic Pro analyzes the tempo of the audio file and adjusts the file to the project tempo. You can manually edit regions and automation in the Cell Editor.

By default, when a cell is playing on a track that contains regions in the Tracks area, the regions on that track are silent. You can change this behavior using the buttons in the Divider column. See How the Live Loops grid and Tracks area interact.

Start cells

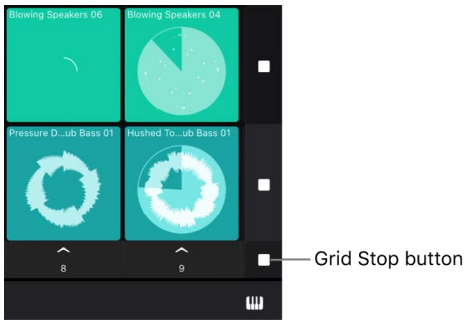
In Logic Pro, tap the Cell Trigger button ▷ in the Live Loops menu bar to turn on Cell Trigger mode, then do any of the following:

- *Start a cell:* Tap a cell.
- *Start all the cells in a scene:* Tap a scene trigger ^.
- *Start all selected cells:* With a keyboard connected to your iPad, press Return.
- *Start all queued cells:* Tap any queued cell.

Stop cells

In Logic Pro, do any of the following:

- *Stop playback of a cell:*
  - Tap a playing cell.
  - Tap an empty cell on the same track as the one playing.
- *Stop playback of all cells at the next quantize start point:*
  - Tap the Grid Stop button at the bottom of the Divider column.



    If you tap the Grid Stop button while cells are playing, the cells stop at the next quantize start point, but the project continues to play.

  - Tap the scene trigger below an empty scene.
- *Stop playback of all cells immediately:* Tap the Stop button in the control bar.
- *Stop playback of all selected cells:* With a keyboard connected to your iPad, press Return.

Queue cells and scenes

You can queue cells and scenes to start playing when project playback starts or when you want cells in different scenes to start at the same time. Playing cells are automatically queued when you stop project playback. When cells are queued, you can move the project playhead and trigger the queued cells at a different project position.

- In Logic Pro, tap the Cell Queue button in the Live Loops menu bar, then do any of the following:
  - *Queue cells:* Tap the cells you want to queue.
  - *Queue a scene:* Tap the scene trigger for the scene you want to queue.

  The queued cells start flashing.

Trigger queued cells

- Do any of the following:
  - In Cell Queue mode, tap the Resume button in the lower right corner of the Live Loops grid.
  - In Cell Trigger mode, tap any of the queued cells.
  - Tap the Play button to start project playback.

Set the Quantize Start value

You can set the Quantize Start value for the entire Live Loops grid, for a scene, or for individual cells, and change it while cells are playing. When you trigger a scene, all cells in the scene use the Quantize Start value for that scene. When you start or stop individual cells, each cell uses its own Quantize Start value.

- *To set the Quantize Start value for the Live Loops grid:* Tap the Quantize Start pop-up menu near the upper-right corner of the grid, then choose a new value from the menu.
- *To set the Quantize Start value for a scene:*
  - Tap the Cell Edit button in the Live Loops menu bar, then select one or more scenes.
  - Tap the Inspector button to open the Scene inspector.
  - Tap the value for Q Start, then choose a new value from the menu.
- *To set the Quantize Start value for cells:*
  - Tap the Cell Edit button in the Live Loops menu bar, then select one or more cells.
  - Tap the Inspector button to open the Cell inspector, then tap the Play disclosure arrow.
  - Tap the value for Q Start, then choose a new value from the menu.

In addition to bar and beat values, you can also choose the following Quantize Start values:

- *Global:* The cell or scene follows the Quantize Start value of the grid. This is the default setting for cells and scenes, and probably the best choice for most situations.
- *Cell End:* If another cell in the same row is playing, the triggered cell starts when the playing cell reaches the end of the loop.
- *Off:* Cells start and stop when you tap them, regardless of the Quantize Start value. Note that this can lead to cells playing out of sync.

Turn on Smart Pickup

When Smart Pickup is on and you trigger cells or a scene slightly past the quantize start point, cells start immediately at the correct position instead of at the next quantize start point. This can result in the beginnings of the cells being skipped in order to ensure that the cells are at the correct position when they start playing.

- Tap the Quantize Start pop-up menu near the upper-right corner of the grid, then choose Smart Pickup from the menu.

Set the trigger mode for cells

The trigger mode determines how a cell starts and stops when you tap it. Both actions are subject to the Quantize Start value. You can choose from three trigger modes:

- *Start/Stop:* Cells start and stop playing when you tap them in Cell Trigger mode.
- *Momentary:* Cells start playing at the next quantize start point when you touch them, and stop playing when you let go.
- *Retrigger:* If a cell is playing and you tap it again, it starts playing from the beginning at the next quantize start point. Cells set to Retrigger can be stopped only by tapping another cell or empty cell in the same row, by tapping the progress indicator in the Divider column, or by stopping the entire grid.

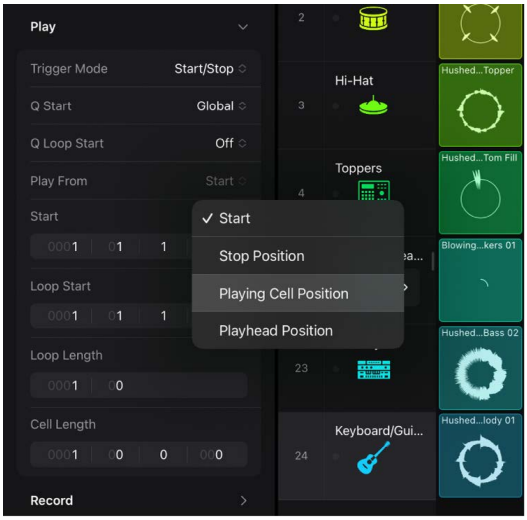
1. Tap the Cell Edit button, then tap a cell to select it.
2. Tap the Inspector button in the view control bar to open the Cell inspector.
3. In the Cell inspector, tap the Play disclosure arrow to view the Play settings.
4. Tap the Trigger Mode pop-up menu, then choose a trigger mode.

Change the start behavior of a cell

The Play From setting determines the start behavior of a cell. By default, cells start playing from the Start position. However, depending on the content and timing of your music, you can choose other start behavior settings to create interesting transitions between cells. You can choose from four settings:

- *Start:* The cell starts at the position determined by the set Start position.
- *Stop Position:* The cell starts playing from the point where it last stopped, similar to Play/Pause.
- *Playing Cell Position:* If another cell in the same row is playing, the cell starts playing from the position where the first cell stops. Otherwise, the cell starts from the Start position.
- *Playhead Position:* The cell starts from the position where it would be if it had been playing from the beginning of the project. Otherwise, the cell starts from the Start position.

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then select one or more cells.
2. Tap the Inspector button in the view control bar to open the Cell inspector.
3. In the Cell inspector, tap the Play disclosure arrow.
4. Tap the Play From pop-up menu, then choose a setting.



Work with Live Loops cells in Logic Pro for iPad

You can add regions or loops to cells in the Live Loops grid, as long as the region or loop matches the track type for the track containing the cell. For example, you can add audio regions to cells on audio tracks, and MIDI, pattern, and Session Player regions to cells on software instrument tracks.

You can convert Session Player and pattern cells to MIDI cells to allow for precise editing not available in the Session Player Editor or Step Sequencer. You can also extract loops from audio cells, with optimal loop start and end points set by Logic Pro.

In addition to adding regions to cells, you can record to Live Loops cells, and record a Live Loops performance as regions to the Tracks area. You can also copy cells to the Tracks area, as well as copy and paste entire scenes to the playhead position in the Tracks area. When copying cells to the Tracks area, take care to match the track type to the cell type (for example, you can paste audio cells only to audio tracks).

When you add an audio file without tempo information to a cell, Logic Pro analyzes the tempo of the audio file.

If you plan to record audio without a constant tempo to a cell, it is recommended that you record the audio to an audio track in the Tracks area using the Smart Tempo functions in Logic Pro. Once the audio region is tagged with correct tempo information, you can add the region to an audio cell and have it play at a constant tempo.

If you want to import files into Live Loops, you can drag them into Logic Pro from the Files app in Slide Over. See Import media.

Working with Session Player regions and cells

Session Player cells behave in much the same way as Session Player regions in the Tracks area. The main difference is that Session Player cells follow only region chords in the cell.

When you copy Session Player regions from the Tracks area to the Live Loops grid, the source of the chords in the resulting Session Player cell is determined by the Pitch Source parameter in the Region inspector. For example, if the Pitch Source parameter for a Session Player region is set to Chord Track and you drag that region to the Live Loops grid, the chords from the Chord track are added to the resulting Session Player cell.

You can also change the pitch source of a Session Player region by choosing Follow Global Chord Track or Follow Region Chords in Chords view in the Session Player Editor. See The Session Player Editor and Intro to chords.

Add loops from the Browser to the Live Loops grid

1. In Logic Pro, tap the Browser button, then tap Loops.
2. Do any of the following:
   - Touch and hold a loop, then drag it to a cell in the Live Loops grid.
   - Tap a loop to select it, drag the patch slowly to the left, then tap the Add button.

     The loop is added to the first empty cell on the selected track.
   - Tap a loop to select it, drag the patch slowly to the left, then tap the Replace button.

     The loop replaces the selected cell in the Live Loops grid. If multiple cells are selected, the first cell is replaced.

For more information, see Add Apple Loops to your project and Find sounds in the Browser.

Copy regions from the Tracks area to the Live Loops grid

1. In the Logic Pro Tracks area, select one or more regions.

   If you selected multiple regions, make sure the Multiple Select button is off before going to the next step.
2. Tap one of the selected regions, tap Edit, then tap Copy Regions to Live Loops Scene.

   The regions are copied to a new scene in the Live Loops grid.

Create new tracks when dragging items in the Live Loops grid

You can create a new track when you drag items (for example, cells, Apple Loops, or files from the Files app) to the Live Loops grid.

- Drag the items to the empty area below the Live Loops grid.

Copy and paste regions to cells in the Live Loops grid

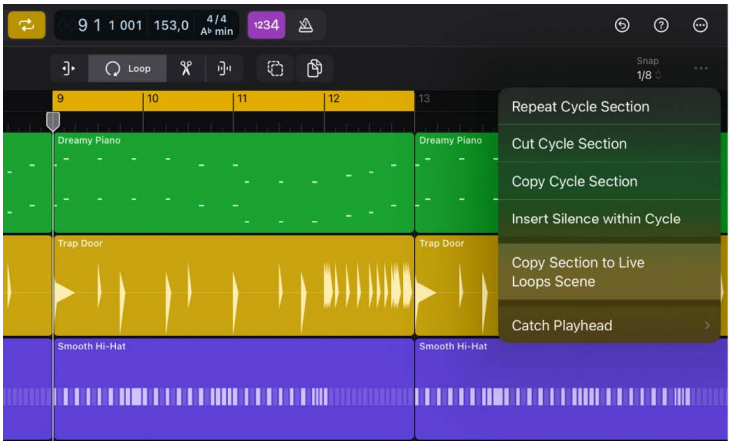
1. In the Logic Pro Tracks area, select one or more regions.

   If you selected multiple regions, make sure the Multiple Select button is off before going to the next step.
2. Tap any of the selected regions, then tap Copy in the menu.
3. Tap the Grid View button to view the Live Loops grid.
4. Tap the Cell Edit button in the Live Loops menu bar, select a cell where you want to paste the regions, tap the cell again, then tap Paste in the menu.

If you copy one region, you can paste it only to a cell on a track of the same type. If you copy multiple regions, you can paste them only to cells on the same tracks where the original regions are located.

Copy regions within the cycle area to Live Loops

1. In Logic Pro, turn on Cycle mode in the Tracks area, then set the left and right locators to the desired position.
2. Tap the More button ••• in the Tracks area menu bar, then tap Copy Section to Live Loops Scene.



Copy a marker section to Live Loops

If you use markers in the global tracks to organize your project, you can copy the regions within a marker section to the Live Loops grid.

1. Tap a marker to select it.
2. Tap the More button ••• in the Tracks area menu bar, then tap Copy Section to Live Loops Scene.

Convert Session Player and pattern cells to MIDI cells

You can convert Session Player cells and pattern cells to MIDI cells, either to edit individual notes of a Session Player performance or to perform edits not possible in Step Sequencer.

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, select the Session Player or pattern cell you want to convert, then tap it again.
2. Tap Convert in the menu, then tap Convert to MIDI Cell.

Extract loops from audio cells

Logic Pro can analyze the musical and sonic characteristics of a longer audio file in an audio cell and extract the best-sounding loops to empty cells (up to 10) on the same track. You can choose the length of loops you want to extract, or let Logic Pro extract the best loops of any size.

Logic Pro examines only the detected downbeat positions for potential loop start points. However, you can always manually change the resulting loop points, if necessary.

To work effectively, loop extraction requires audio containing repetitions and accurate tempo information.

The loop extraction algorithm looks for loop points that deliver a smooth transition from loop end to loop start. Those loop points may not necessarily coincide with the musical structure of the analyzed audio.

- In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, double-tap an audio cell, then choose any of the following from the Extract Loops submenu:
  - *Set Optimal Full Loop:* Extracts the longest loop within the selected cell.
  - *Extract Best 2-Bar Loops:* Determines the best two-bar loops and copies them to the next empty cells to the right.
  - *Extract Best 4-Bar Loops:* Determines the best four-bar loops and copies them to the next empty cells to the right.
  - *Extract Best 8-Bar Loops:* Determines the best eight-bar loops and copies them to the next empty cells to the right.
  - *Extract Best Loops of Any Size:* Determines the best loops of any size throughout the audio file and copies them to the next empty cells to the right.

Loop extraction is not available if:

- The cell is empty or contains multiple regions.
- The region in the cell is shorter than two bars.
- Flex & Follow in the Cell inspector is turned off.
- The cell contains Apple Loops.
- Multiple cells are selected.

Create new cells

You can create new cells and then edit them in the Cell Editor or record audio and MIDI. Software instrument tracks can contain MIDI, Session Player, and pattern cells.

- In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then do any of the following:
  - *To create an audio cell:* Double-tap an empty cell on an audio track, then choose Create Cell.
  - *To create a MIDI cell:* Double-tap an empty cell on a software instrument track, then choose Create MIDI Cell.
  - *To create a pattern cell:* Double-tap an empty cell on a software instrument track, then choose Create Pattern Cell.
  - *To create a Session Player cell:* Double-tap an empty cell on a software instrument track, then choose Create Session Player Cell.

Copy a cell from the Live Loops grid to the Tracks area

You can copy cells in the Live Loops grid and paste them as regions to the Tracks area.

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, select a cell, tap it again, then choose Copy from the menu.
2. Tap the Tracks View button to view the Tracks area.
3. Drag the playhead to the position where you want the pasted region to start.
4. Tap the track lane of the track where you want to paste the cell, then tap Paste at Playhead.

If a track already contains a region at the position where you paste the cell, it is replaced or overlapped with the resulting new region.

Copy a scene to the Tracks area

1. In the Tracks area in Logic Pro, drag the playhead to the position where you want to paste cells in the scene as regions.
2. Tap the Grid View button to view the Live Loops grid.
3. In the Live Loops grid, tap the Cell Edit button in the Live Loops menu bar, double-tap the scene trigger of the scene you want to copy, then choose one of the following from the menu:
   - *Insert Scene at Playhead:* Shifts the content of all tracks right of the playhead by the length of the inserted scene.
   - *Copy Scene to Playhead:* Copies the scene as regions to the playhead position.

     WARNING: When you copy a scene to the playhead position, any existing regions are overwritten or overlapped.

Extract stems from an audio cell with Stem Splitter

You can split an audio cell containing mixed audio, such as a band recording, into separate stems. You can extract stems for vocals, bass, drums, and other instrumental parts.

Stem Splitter is available on iPads with an M1 or later Apple silicon processor. See Extract vocal and instrumental stems with Stem Splitter.

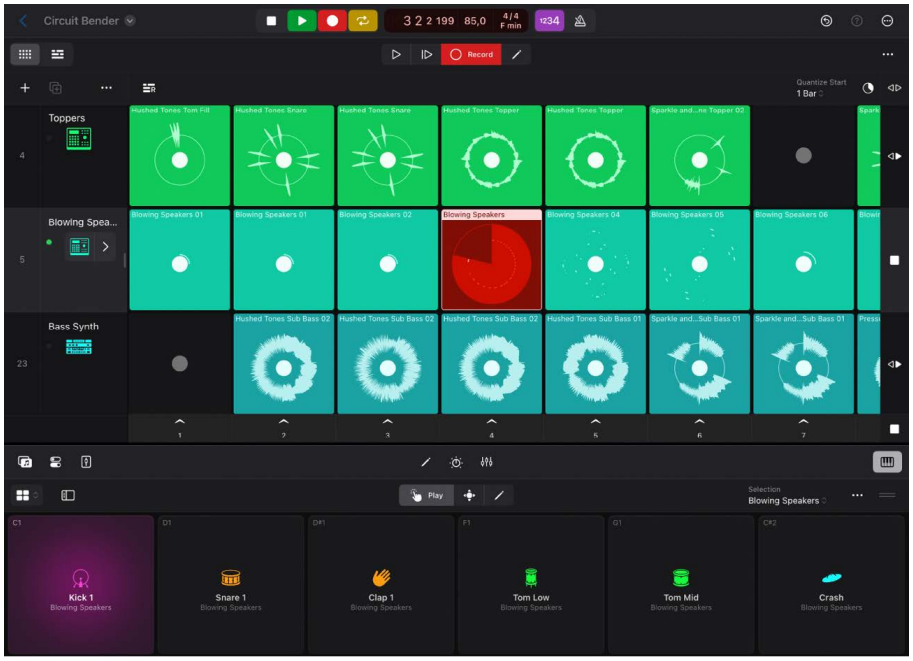
1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, select an audio cell, tap it again, then tap Stem Splitter.
2. In the Stem Splitter window, all four stems (Vocals, Drums, Bass, and Other) are selected by default. Deselect the checkboxes for any stems you do not want to extract.
3. Tap Split.

A summing stack is created below the track with the selected audio cell. The subtracks of the summing stack contain cells with the extracted stems. You can solo individual stems using the Solo buttons in the subtrack headers, and you can move, copy, or edit each part in the same way as any audio cell.

Record to cells

Record to Live Loops cells in Logic Pro for iPad

You can record to an audio or MIDI cell, even while other cells are playing. The settings for audio signal flow, software instruments, and the metronome are the same as when you record regions in the Tracks area.



Recording to cells is done in Cell Record mode. When Cell Record mode is on, Record buttons appear on audio and MIDI cells in the grid. Tapping a cell triggers it to start recording at the next quantize start point. If the quantize start is longer than one bar, recording begins at the next bar.

You can set the length of the recording to a predefined value (determined by the cell length); otherwise the cell length is set to the nearest bar (default) or beat when you trigger the cell to stop recording.

When the end of the recording is reached, you can automatically loop what you just recorded, continue recording multiple takes to the cell, or merge software instrument performances.

There are three main parameters you can use to control cell recording behavior:

- *Recording:* Determines what happens to existing cell content when you record in a cell. You can replace the previous performance with the current one, record new performances to a take folder, or, for software instruments, merge the performances.
- *Rec-Length:* Determines the duration of the recording. You can set it to match the Cell Length value, or manually set it to the next bar or beat while recording.
- *At Rec-End:* Determines what happens when the Record-Length is reached. You can set it to immediately play back what you record, continue recording multiple takes of a performance, or merge multiple software instrument performances, depending on the Recording setting.

Note: You can't record to Session Player or pattern cells.

Turn on Cell Record mode

- In Logic Pro, tap the Cell Record button ◯ in the Live Loops menu bar.

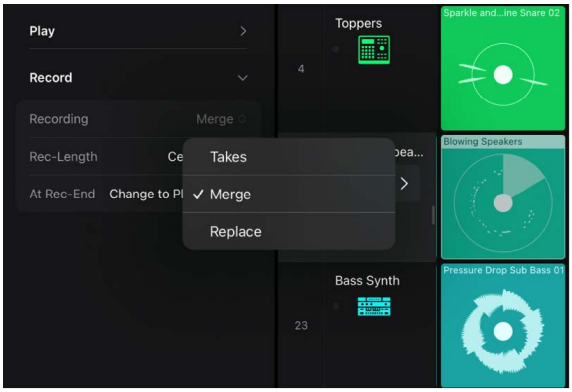
Set the recording mode

The recording mode determines what happens to existing cell content when you record to a cell. You can replace a previous recording or create multiple takes. With MIDI cells, you can also record continuously in a loop, merging each pass in a single cell. This can be useful for creating drum patterns or melodies on the fly. You can choose one of three recording modes:

- *Takes:* Each new recording is added to a take folder in the cell. After recording, you can preview the takes and choose the one you want to use in the cell.
- *Merge:* Each new recording merges with the previous recording.

  This mode is available only when recording to MIDI cells.
- *Replace:* Each new recording replaces the previous recording.

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, select the cell you want to record to, then tap the Inspector button.
2. Tap the Record disclosure arrow, then choose a mode from the Recording pop-up menu.



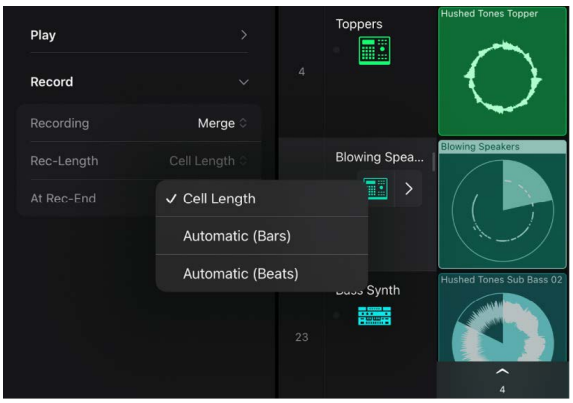
Set the Rec-Length parameter

You can set the length of the cell recording using the Rec-Length parameter. You can choose from the following settings:

- *Cell Length:* The length of the recording is determined by the Cell Length value under the Play settings in the Cell inspector.
- *Automatic (Bars):* The length of the recording is set to the nearest bar when you tap the cell while recording.
- *Automatic (Beats):* The length of the recording is set to the nearest beat when you tap the cell while recording.

1. In Logic Pro, tap the Cell Edit button, select the cell you want to record to, then tap the Inspector button.

2. Tap the Rec-Length setting, then choose another setting from the menu.

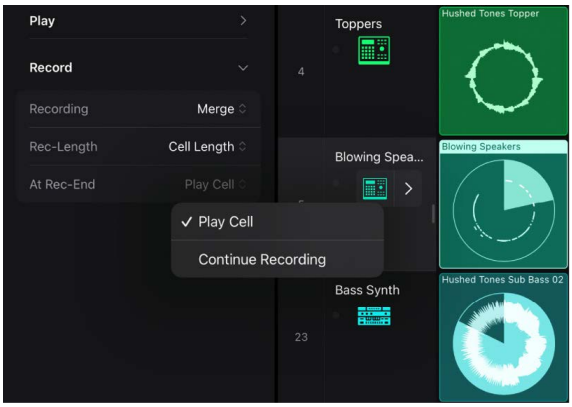


Set the At Rec-End action

The At Rec-End action determines what happens at the end of a recording pass. Depending on how you set this up, it can be useful for recording multiple takes of a performance, or for merging multiple performances when recording a software instrument. You can choose either of the following settings:

- *Change to Play Mode:* At the end of the recording, Live Loops stops recording and the cell immediately begins playing the performance you just recorded.
- *Continue Recording:* At the end of the recording, Live Loops continues recording and overwrites the previous recording, creates takes, or merges each subsequent recording, depending on the recording parameter. When Continue Recording is selected and the Rec-Length parameter is set to Automatic, a Plus button (+) is visible in the middle of the cell while the cell is recording. Tapping the button sets the Rec-Length to the nearest bar or beat and starts the next recording pass.

1. In Logic Pro, tap the Cell Edit button, select the cell you want to record to, then tap the Inspector button.
2. In the Cell inspector, Tap the At Rec-End setting, then choose another setting from the menu.



Record to a cell

1. In Logic Pro, set up your audio or software instrument track for recording.
2. If you are recording a software instrument, open the Play Surface you want to use.
3. Set the metronome and count-in for recording if desired.
4. Tap the Cell Edit button, select the cell you want to record to, and then set the parameters for Recording, Rec-Length, and At Rec-End in the Cell inspector if necessary.
5. Tap the Cell Record button, then tap the cell you want to record to.

   Recording starts. If cells are already playing, recording starts at the next quantize start point.
6. Play, sing, or otherwise create the sound you want to record.

   If Rec-Length is set to Cell-Length and the recording reaches the end of the cell, either the cell starts playing back or the recording loops to the beginning of the cell, depending on the At Rec-End setting.
7. If Rec-Length is set to Automatic (Bars) or Automatic (Beats), tap the cell to set the cell length to the nearest bar or beat.

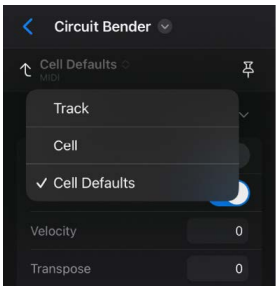
   The cell starts playing back, or the recording loops to the beginning of the cell, depending on the At Rec-End setting.

Tip: If you are in Cell Trigger mode, you can touch and hold the Cell Record button, tap a cell to start recording, and then let go of the Cell Record button to return to Cell Trigger mode. If Rec-Length of the recording cell is set to Automatic (Bars) or Automatic (Beats), you can tap the cell in Cell Trigger mode to trigger the end of cell recording.

Set recording defaults for cells by type

In some cases it can be convenient to set the default parameters for Recording, Rec-Length, and At Rec-End for cells before recording. You can set defaults for all cells of a particular type (audio or MIDI) to suit your workflow.

1. Tap the Cell Edit button, then tap a cell of the type for which you want to set the defaults.
2. Tap the Inspector button, tap the Level menu, then tap Cell Defaults.



3. Set the default values, including default cell length, recording settings, or quantize value for MIDI recordings.

   Note: Some default settings you make in the Cell inspector apply to both newly recorded cells and regions of the specified type.

Record and edit takes in cells in Logic Pro for iPad

When you set the Recording parameter to Takes, each new recording in a cell creates a new take. If a cell contains takes, a take symbol is displayed in the lower-left corner of the cell. You can choose and preview each take individually, even while the cell is playing. You can also rename, delete, flatten, move, and copy takes.



Open the Takes menu

- In Logic Pro, tap the Cell Edit button, tap a cell containing takes to select it, tap it again, then tap Takes in the menu.



Preview takes in a cell

1. In Logic Pro, open the Takes menu, then tap the take you want to hear.
2. Touch and hold the Cell Trigger button ▷ in the Live Loops menu bar to momentarily switch to Cell Trigger mode, then tap the cell to hear the take.
3. Let go of the Cell Trigger button to return to Cell Edit mode.

Rename takes

1. In Logic Pro, open the Takes menu, then choose the take you want to rename.
2. Open the Takes menu again, then tap Rename Take.
3. Enter the new name in the dialog that appears, then tap Rename.

Delete takes

1. In Logic Pro, open the Takes menu, then choose the take you want to delete.
2. Open the Takes menu again, then tap Delete Take.

Copy and move takes

You can copy or move takes to other cells, scenes, or tracks.

1. In Logic Pro, open the Takes menu, then choose the take you want to copy or move.
2. To copy a take, open the Takes menu again, then choose any of the following from the "Copy Take to" submenu:
   - *New Scene:* Copies the currently selected take to a new scene.
   - *Next Empty Cell Right:* Copies the take to the next empty cell to the right.
   - *New Track:* Copies the take to a new track below the current track.
   - *Next Matching Empty Cell Below:* Copies the take to the next empty cell on the same kind of track below.
3. To move a take, open the Takes menu again, then choose any of the following from the "Move Take to" submenu:
   - *New Scene:* Moves the currently selected take to a new scene.
   - *Next Empty Cell Right:* Moves the take to the next empty cell to the right.
   - *New Track:* Moves the take to a new track below the current track.
   - *Next Matching Empty Cell Below:* Moves the take to the next empty cell on the same kind of track below.

Unpack a take folder

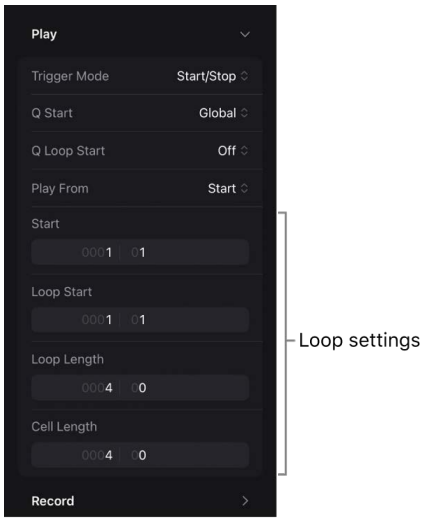
You can unpack a cell take folder to other cells, scenes, or tracks.

- In Logic Pro, open the Takes menu, then choose one of the following from the "Unpack Take Cell to" submenu:
  - *New Scenes:* Unpacks each take to a new scene.
  - *Next Empty Cells Right:* Unpacks each take to the next empty cells to the right.
  - *New Tracks:* Unpacks each take to a new track below the current track.
  - *Next Matching Empty Cells Below:* Unpacks each take to the next empty cell on the same kind of track below.

Change loop settings for cells in Live Loops for Logic Pro for iPad

When you turn on Cell Edit mode and select a cell, you can change the loop settings in the Cell inspector. You can create interesting variations by changing the following settings:

- *Start:* Determines the initial starting position of the cell. By default, this is the same as the Loop Start setting, but you can change it so the cell starts at a different place initially than when it loops. This setting is ignored if the Play From setting is set to a value other than Start, or if the Quantize Loop Start position is set to On.
- *Loop Start:* Determines the position in the cell where the loop starts after the initial start and playback of the cell. For example, if you have a cell containing a four-bar piece of musical material, you can change the Start setting so the loop initially starts at the first bar, then plays from the third bar on each time it loops.
- *Loop Length:* Determines the length of the loop. Changing the Loop Length value can be useful when you want to loop only a particular portion of a cell.
- *Cell Length:* Determines the overall length of the cell. This can be longer than the amount of musical material contained in the cell. When the Loop switch is set to Off, the cell plays to the end of the cell length, then stops.



You can also change these settings graphically for audio and MIDI cells in the Cell Editor. See Work in the Cell Editor.

Open loop settings in the Cell inspector

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, select a cell, then tap the Inspector button.

   The Cell inspector opens.

2. In the Cell inspector, tap the disclosure arrow next to Play.

Change the start position of a cell

1. In Logic Pro, open the loop settings in the Cell inspector, then do one of the following:
    - Tap the start position, then enter a new value. Tap Done when you're finished.
    - Drag the specific position unit vertically.

Change the loop start position of a cell

- In Logic Pro, open the loop settings in the Cell inspector, then do one of the following:
    - Tap the loop start position, then enter a new value. Tap Done when you're finished.
    - Drag the specific position unit vertically.

Change the loop length of a cell

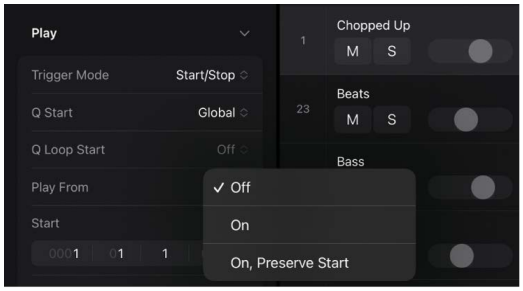
- In Logic Pro, open the loop settings in the Cell inspector, then do one of the following:
    - Tap the Loop Length setting, then enter a new value. Tap Done when you're finished.
    - Drag the specific position unit vertically.

Change the cell length

- In Logic Pro, open the loop settings in the Cell inspector, then do one of the following:
    - Tap the Cell Length setting, then enter a new value. Tap Done when you're finished.
    - Drag the specific position unit vertically.

Set the Quantize Loop Start position

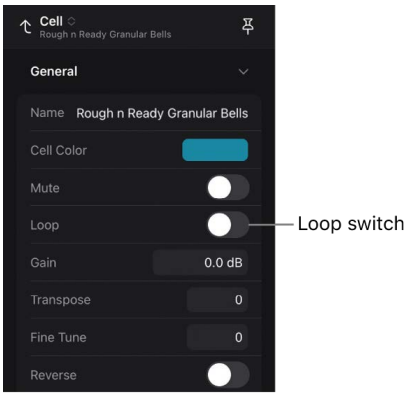
If the start and loop start positions are different, you can choose which position should hit an upcoming quantize start point when you trigger a cell. This can be useful if the start position is set to an upbeat position, for example.



- In Logic Pro, select one or more cells, tap the disclosure arrow next to Play in the Cell inspector, tap the Q Loop Start pop-up menu, then choose one of the following settings:
    - *Off:* The cell starts playing from the start position when the upcoming quantize start point is reached.
    - *On:* The cell starts playing as soon as possible, so that the loop start position is reached at the next upcoming quantize start position. Some content after the start position may be skipped.
    - *On, Preserve Start:* The cell always starts playing from the start position, so that the loop start position is reached at the upcoming or any following quantize start position. The cell may start later but plays all content between the start and loop start positions.

Turn off cell looping

- In Logic Pro, select one or more cells, open the Cell inspector, then tap the Loop switch.

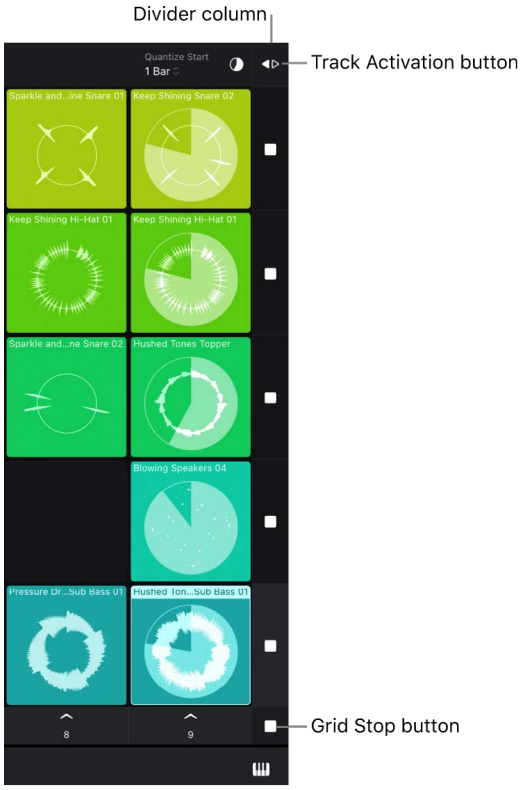


  The circular waveform in the cell changes to a linear shape. When the cell starts, it plays once to the end of the cell length, then stops (one-shot).

How the Live Loops grid and Tracks area interact in Logic Pro for iPad

On each track in Logic Pro for iPad, you can listen to either a cell in the Live Loops grid or a region in the Tracks area—never both simultaneously. When you start a cell, any regions on the same track become inactive. When you stop a cell, the regions are not immediately reactivated; you need to tap buttons in the Divider column to do this.

You can also pause cells and activate regions on the same track simultaneously. The Divider column shows stop buttons next to tracks where cells are playing. When cells are stopped, the Track Activation buttons in the Divider column indicate with a solid arrow whether the cells or regions are activated. If you have a combination of tracks with activated cells and regions, both arrows of the Track Activation button at the top of the Divider column are hollow.



When you trigger cells while the project is stopped, the playhead starts. If the playhead starts from a quantize start point, the cells start playing immediately; otherwise, they start when the playhead reaches the next quantize start point.

If the playhead reaches the Project End marker while cells are playing, the playhead stops and the cells continue playing.

If you are only using Live Loops in your project, it is recommended to turn on Cycle mode. However, it is important to turn it off when you record a Live Loops performance.

Activate regions on an individual track

In Logic Pro, do the following:

- If a cell is not playing on the track, tap the Track Activation button ◀▷ for the track in the Divider column.

  If the project is playing, the region on the track is immediately audible. Otherwise, you hear the region on the track when you start project playback. To reactivate the cell, tap the Track Activation button ◁▶ again in the Divider column or play the cell.

- If a cell is playing on the track, tap the circular indicator in the Divider column for that track to stop the cell, then tap the Track Activation button ◀▷.

- If a cell is playing on the track and you are in Cell Queue mode, tap the Pause button ▌▌ in the Divider column for that track.

  At the next quantize start point, the cell pauses and the regions on the track are audible. To restart the cell, tap the Resume button ▌▶ in the Divider column for that track, or tap the queued cell.

Activate regions on all tracks

- In Logic Pro, do the following:
  - If multiple cells are playing, tap the Grid Stop button at the bottom of the Divider column, then tap the Track Activation button ◀▷ at the top of the Divider column.
  - If no cells are playing, tap the Track Activation button ◀▷ at the top of the Divider column.

    If the project is playing, any regions in the Tracks area are immediately audible. To reactivate the cells, tap the Track Activation button ◁▶ again in the Divider column.
  - If multiple cells are playing while in Cell Queue mode, tap the Pause button ▌▌ at the bottom of the Divider column.

    At the next quantize start point, the cells queue and the regions are audible. To restart the queued cells, tap the Resume button ▌▶ at the bottom of the Divider column, or tap the button in the Divider column on any track.

Edit Live Loops cells in Logic Pro for iPad

You can arrange and edit cells in the Live Loops grid in a variety of ways. When you turn on Cell Edit mode, you can select, cut, copy, and paste cells; move cells; delete cells; and change cell settings. If you use an external computer keyboard with your iPad, you can use keyboard shortcuts to perform many of these editing functions. See Keyboard shortcuts overview.

If you use a trackpad with your iPad, you can click a cell with two fingers to access and edit various parameters, regardless of which editing mode you are in. See Trackpad.



In Cell Edit mode, you can't start or stop playback of cells, but you can edit cells that are already playing. You can change most settings for selected cells in the Cell inspector. When you select a single cell, the name of the cell is visible near the top of the Cell inspector; when you select multiple cells, the number of selected cells is visible.

You can use the Cell Editor to view and edit the regions in cells, similar to how you edit regions in the Piano Roll Editor, Audio Editor, Step Sequencer, and Session Player Editor.

Turn on Cell Edit mode

- Tap the Cell Edit button in the Live Loops menu bar.

Select cells in the Live Loops grid

- In Logic Pro, turn on Cell Edit mode, and do either of the following:
  - *Select a single cell:* Tap a cell.
  - *Select multiple cells:* Do any of the following:
    - Tap the Multiple Select button, then tap cells to select them.

      In order to edit the cells you selected, tap the Multiple Select button again when you are done with your selection.
    - Touch and hold any empty cell, then drag over cells to select them.
  - *Select all cells:* Double-tap a cell, then choose Select > All Cells from the menu.
  - *Select all following cells:* Double-tap a cell, then choose Select > All Following Cells from the menu.

    All cells in the same scene, and all other cells to the right, are selected.
  - *Select all following cells on the same track:* Select one or more cells, tap one of the selected cells, then choose Select > All Following Cells of Same Track from the menu.

    All of the cells to the right of, and on the same track as, the selected cells are selected.
  - *Select all cells on the same track:* Select one or more cells, tap one of the selected cells, then choose Select > All Cells of Same Track from the menu.
  - *Select all cells in the same scene:* Select one or more cells, tap one of the selected cells, then choose Select > All Cells of Same Scene from the menu.
  - *Select all cells of the same color:* Select one or more cells, tap one of the selected cells, then choose Select > Same-Colored Cells from the menu.
  - *Invert selection:* Select one or more cells, tap one of the selected cells, then choose Select > Invert Selection from the menu.

Copy and paste cells

1. In Logic Pro, turn on Cell Edit mode, then select one or more cells.
2. Tap any selected cell, then tap Copy.

   Note: If you want to remove the cell from its original location, tap Cut instead.
3. Double-tap where want to paste the cell, then tap Paste.

   If you paste cells to cells that already contain content, the new content replaces the existing content.

Move a cell

You can move cells to an empty or filled cell in the same row, or to another row of the same type. For example, you can move an audio cell to another row with audio cells, but not to a row with software instrument cells, and vice versa. If you move cells to cells that already contain content, the new content replaces the existing content.

1. In Logic Pro, turn on Cell Edit mode, then select one or more cells.
2. Touch and hold one of the selected cells, then drag it to the cell you want to move it to.

Rename a cell

1. In Logic Pro, turn on Cell Edit mode, then select the cell you want to rename.
2. Tap the Inspector button to open the Cell inspector.
3. Tap the name of the cell, enter a new name, then tap Return.

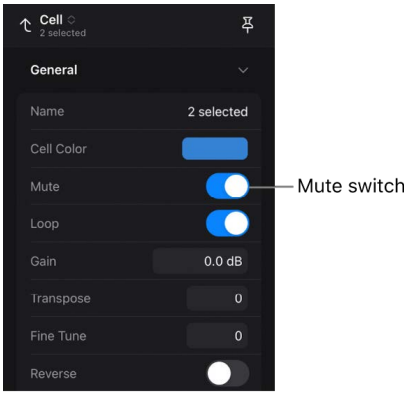
Delete a cell

1. In Logic Pro, turn on Cell Edit mode, then select one or more cells.
2. Tap one of the selected cells, then tap Delete in the menu.

Mute a cell

When you mute a cell, it stops playing. To hear the cell again, you must unmute it and then restart it.

1. In Logic Pro, turn on Cell Edit mode, then select one or more cells.
2. Tap the Inspector button to open the Cell inspector.
3. Under General settings, tap the Mute switch.



Set an audio cell to ignore project tempo

In some cases you might want an audio cell to ignore the project tempo and play at its original tempo. This can be useful if you have cells containing spoken word, a one-shot, or nonlooping sound effects, for example.

1. In Logic Pro, turn on Cell Edit mode, then select one or more audio cells.
2. Tap the Inspector button to open the Cell inspector.
3. Under General settings, tap the value for Flex & Follow, then tap Off.

Change the playback speed of a cell

1. In Logic Pro, turn on Cell Edit mode, then select one or more cells.
2. Tap the Inspector button to open the Cell inspector.
3. Under General settings, tap the value for Speed, then choose a value.

The Speed parameter is not available for cells containing recorded audio that have Flex & Follow turned on in the Cell inspector.

Reverse cell playback

1. In Logic Pro, turn on Cell Edit mode, then select one or more cells.
2. Tap the Inspector button to open the Cell inspector.
3. Under General settings, tap the Reverse switch.

The Reverse setting is not available for cells containing recorded audio that have Flex & Follow turned on in the Cell inspector.

Normalize the gain of audio cells in the Live Loops grid

1. In the Logic Pro Live Loops grid, turn on Cell Edit mode, then select one or more cells.
2. Tap one of the selected cells, then tap Normalize Cell Gain.
3. In the Normalize Gain dialog, do the following:
   - In the Process pop-up menu, choose whether all cells are processed equally, cells are processed equally per track, or cells are processed individually.
   - In the Method pop-up menu, choose the normalization algorithm used for processing (Peak or Loudness).
   - Use the Target Level value slider to set the level of normalization in decibels (Peak) or in LUFS (Loudness).
4. Tap Apply.

Edit Live Loops scenes in Logic Pro for iPad

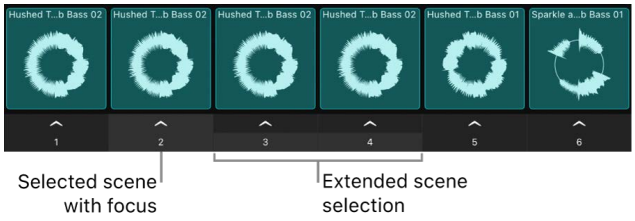
In addition to playing cells individually, you can play cells in a scene together, like a section in a musical arrangement. You can select, duplicate, rename, move, and delete scenes. You can also change the Quantize Start value and trigger mode for each scene. When you trigger a scene, all cells in the scene use that scene's Quantize Start value and trigger mode. When you start or stop individual cells in a scene, each cell uses its own Quantize Start value and trigger mode. You can add currently playing cells from different scenes to an empty scene or to a scene already containing cells.

If you use a trackpad with your iPad, you can click a scene trigger with two fingers to access and edit various parameters, regardless of which editing mode you are in. See Trackpad.

Scene selection and focus

Scenes are similar to tracks regarding focus and selection: when you select multiple scenes, the first selected scene is the focused scene.

When multiple scenes are selected, the area around the trigger of the focused scene appears gray, unlike the other selected scenes.



Select scenes

- In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then do one of the following:
  - *Select single scene:* Tap the scene number (or name) directly below the scene trigger.
  - *Select multiple scenes:* Tap the Multiple Select button, then tap the scene number (or name) to add that scene to the selection.

Copy currently playing cells to a scene

You can copy playing cells to a single scene. This is useful if you want to combine cells from different scenes into a new scene. If you copy playing cells to a scene that already contains cells, the copied cells replace any existing cells on the same track in the scene.

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar.
2. Tap a scene trigger, then tap Copy Playing Cells Here in the menu.

Reorder scenes

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar.
2. Touch and hold the area below the scene trigger, then drag the scene left or right.

Duplicate scenes

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar.
2. Select one or more scenes, tap one of the selected scenes, then tap Duplicate in the menu.

Insert an empty scene

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar.
2. Tap a scene, then tap Insert Empty Scene in the menu.

A new empty scene is created, and the following scenes move to the right.

Rename a scene

New scenes are numbered by default. You can rename them to help organize and arrange your Live Loops grid.

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then tap a scene to select it.
2. Tap the Inspector button to open the Scene inspector.
3. Tap the name of the scene, enter a new name, then tap Return.

Tip: If you add "##" to the new scene name, the number of the scene is added to the new name. For example, if you rename scene 5 to "Bridge ##", the new scene name will be Bridge 5.

Delete a scene

1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then select one or more scenes.
2. Tap one of the selected scenes, then tap Delete in the menu.

Change the trigger mode for a scene

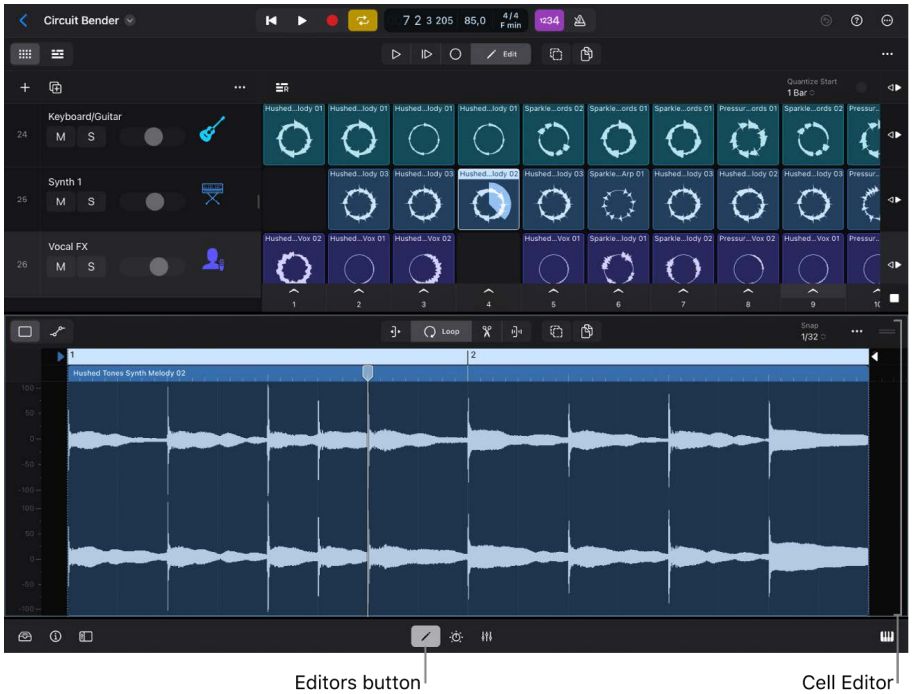
1. In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then tap a scene to select it.
2. Tap the Inspector button to open the Scene inspector.
3. Tap the Trigger Mode value, then choose any of the following from the menu:
   - *Start/Stop:* Scenes start and stop playing when you tap them in Cell Trigger mode.
   - *Momentary:* Scenes start playing at the next quantize start point when you touch and hold the scene triggers, and stop playing when you let go.
   - *Retrigger:* If a scene is playing and you trigger it again, it starts playing from the beginning at the next quantize start point.

Change the Quantize Start value for a scene

- In Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then tap a scene to select it.
- Tap the Inspector button to open the Scene inspector.
- Tap the Q Start value, then choose another mode from the menu.

Work in the Cell Editor in Logic Pro for iPad

You can use the Cell Editor to view and edit the regions in cells, similar to the way you edit regions in the Piano Roll Editor, Audio Editor, Session Player Editor, and Step Sequencer. You can graphically change loop settings for audio and MIDI cells. You can also edit region automation for individual cells. See Automate cells in Live Loops and Show region automation.



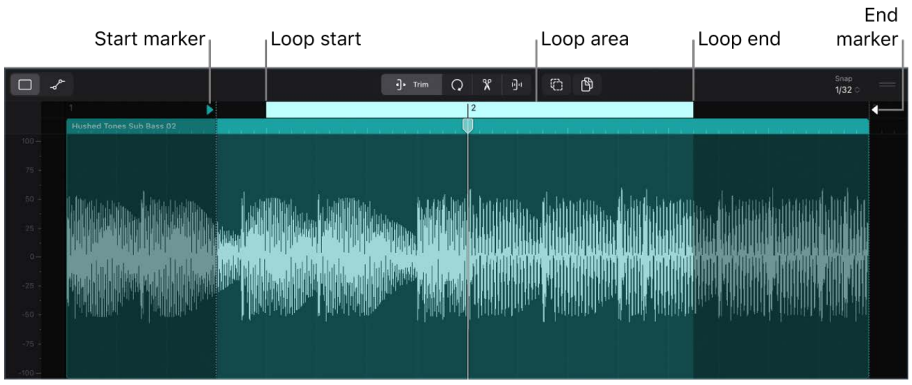
Open the Cell Editor

- In Live Loops, select a cell, then tap the Editors button in the middle area of the view control bar.

  The Cell Editor opens below the Live Loops grid. Audio cells show the Audio Editor, MIDI cells show the Piano Roll Editor, Session Player cells show the Session Player Editor, and pattern cells show the Step Sequencer.

Change loop settings for audio and MIDI cells

While you can change the loop settings for all cells numerically in the Cell inspector, you can also change them graphically for audio and MIDI cells in the Cell Editor.

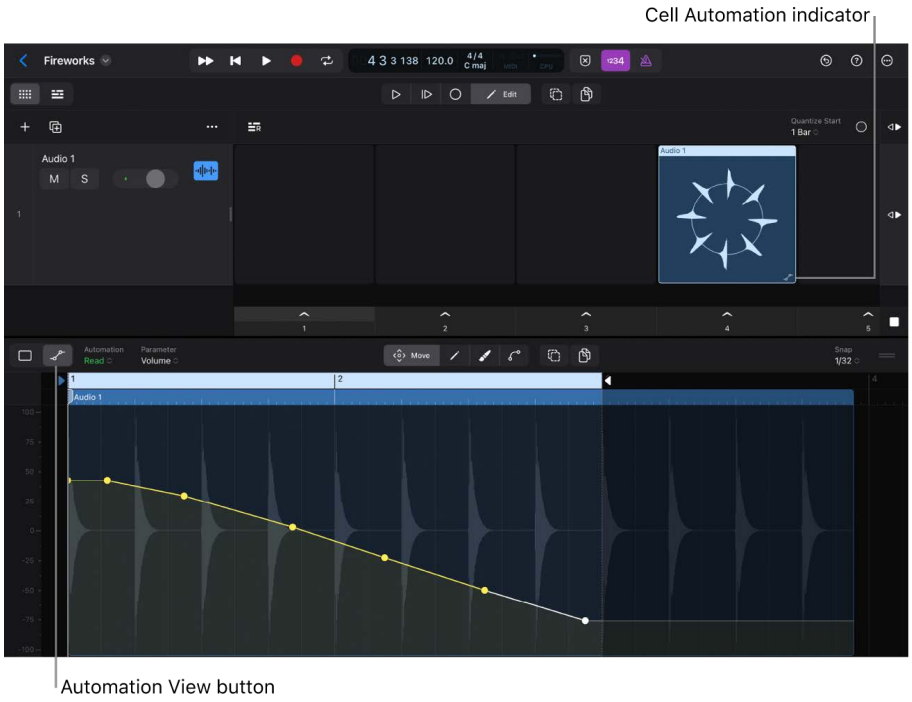


In Logic Pro, open the Cell Editor and do any of the following:

- *Move the start position:* Drag the start marker to the desired position.
- *Move the loop start position:* Drag the loop start to the desired position.
- *Move the loop end position:* Drag the loop end to the desired position.
- *Move the end position:* Drag the end marker to the desired position.
- *Move the loop area:* Drag the area between the loop start and loop end horizontally.
- *Turn off cell looping:* Tap the loop area.

Show and edit automation curves for a cell

Each region within a cell can have its own set of automation curves that you can view and edit in the Cell Editor. You can add and adjust automation points, similar to the way you edit automation in the Audio Editor and edit automation and MIDI parameters in the Piano Roll Editor. When a cell contains automation curves, an Cell Automation indicator appears in the lower-right corner of the cell in the Live Loops grid.



1. In Live Loops in Logic Pro, tap the Automation View button in the Cell Editor menu bar.
2. Choose an automation or MIDI parameter from the menu.

Bounce Live Loops cells in Logic Pro for iPad

You can bounce audio or MIDI cells into a new audio cell, similar to the way you bounce regions in place in the Tracks area.

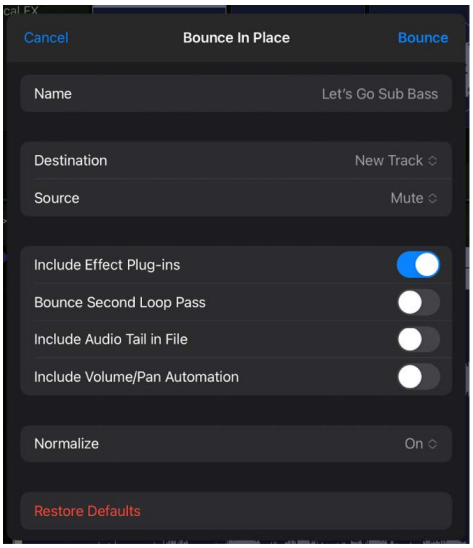
If you bounce a cell that has different start and loop start positions, the resulting bounce cell consists of a pass from the start position to the loop end position, and a pass from the loop start position to the loop end position (*loop range*). If cell looping is turned off, the bounce range extends from the start position to the end of the source cell.

You can choose to include an extra bounce of the loop range in the bounce cell. This is particularly useful if you want to ensure that any instrument release or effect tails (reverb, delay, and so on) at the end of the source cell's loop range will be audible at the start of the bounce cell's loop range.

If you bounce multiple cells together, the bounce range begins where the source cells start playing and ends when they all reach their loop end positions simultaneously.

Bounce one or more cells in place

1. In Live Loops in Logic Pro, tap the Cell Edit button in the Live Loops menu bar, then select one or more cells on an audio or software instrument track.
2. Tap one of the selected cells, then tap Bounce Cells in Place.
3. In the Bounce Cells in Place dialog, define the following parameters:



- *Name:* Enter a name for the bounce cell in the field.
- *Destination:* Indicate the type of track on which the bounce cell is placed. You have two options:
  - *New Track:* Creates a new audio track below the selected track and places the bounce cell on that track.
  - *Selected Track:* Places the bounce cell on the selected track. This option is available only if an audio track is selected.
- *Source:* Define what happens to the source cells after bouncing. You have three options:
  - *Mute:* Mutes the source cells after processing the bounce cell.
  - *Delete:* Deletes the source cells from the original tracks after processing the bounce cell.
  - *Leave:* Leaves the source cells unaltered after processing the bounce cell.
- *Include Effect Plug-ins:* Turn off to bypass all plug-ins on the source track during the bounce process.
- *Bounce Second Loop Pass:* Turn on to include an extra bounce of the loop range in the bounce cell.
- *Include Audio Tail in File:* Turn on to continue the bounce process after the end of the bounce range, including any instrument release and potential effect tail (reverb, delay, and so on), until there is no longer a signal. Otherwise, only the bounce range is bounced.
- *Include Audio Tail in Region:* Turn on to include the entire bounce file in the bounce cell. Otherwise, the bounce cell includes only the bounce range. This switch is visible only when the Include Audio Tail in File switch is on.

- *Include Volume/Pan Automation:* Turn on to have volume and pan automation performed during the bounce process, with their result influencing the bounce file. Otherwise, the volume and pan automation curves are simply copied to the bounce cell.
- *Normalize:* Choose between three states of normalization from the menu:
  - *On:* Normalization is on.
  - *Off:* Normalization is off.
  - *Overload Protection Only:* Allows downward normalization in case of overloads—levels above 0 dB, which would lead to clipping—but no normalization in case of lower levels.
- *Restore Defaults:* Tap to set all parameters to their default settings.

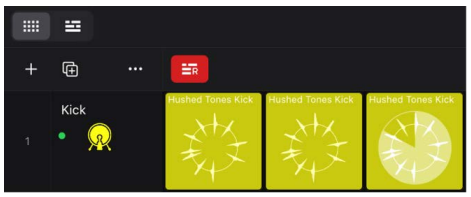
4. Tap Bounce to create an in-place bounce of the selected cells.

   Note: When you tap Bounce, the settings you have chosen are recalled the next time you use Bounce Cells in Place.

Record a Live Loops performance in Logic Pro for iPad

When you record a Live Loops performance, the cells that you play as part of the performance appear as regions in the Tracks area. After you are done recording your performance, you can play it back in the Tracks area, edit the regions, and finalize the mix just as you would with any other Logic Pro project.

You cannot record to a cell while recording a Live Loops performance. However, you can record to an audio or software instrument track. This lets you record a vocal or instrument performance, for example, along with the Live Loops performance.



Record a Live Loops performance

1. In Logic Pro, tap the Enable Performance Recording button in the upper-left corner of the Live Loops grid.
2. Make sure that Cycle mode is turned off (tap the Cycle button in the control bar) and the project playhead in the Tracks area is positioned where you want to start recording your Live Loops performance.
3. Tap the Record button in the control bar to start recording.
4. Start playing scenes, cells, or a combination of both. If you queue cells or scenes before you start recording, they start playing when recording starts.

   The cells that you play as part of the performance are recorded as regions in the Tracks area.

   Note: If you play Session Player cells when recording a Live Loops performance, they are recorded to the Tracks area as MIDI Regions.

5. To stop recording, do either of the following:

   - Tap the Stop button ■ in the control bar.

     The Live Loops performance stops recording, and the cells that were playing are now queued.

   - Tap the Play button ▶ in the control bar.

     The Live Loops performance stops recording, but the project continues to play.

When you record a Live Loops performance, you can also record changes to track controls and effect parameters using automation. See Intro to automation.

Edit regions and cells

Intro to editing regions and cells in Logic Pro for iPad

The main area in Logic Pro for iPad for editing regions is the Tracks area; for editing cells, it's the Live Loops grid. Most of those tasks are for arranging regions and cells in your project. In the Editors area, which you show or hide by tapping the Editors button in the view control bar, you edit the content of a region and cell. In the inspector, you can view and edit the parameters of elements you select in the Tracks area, Live Loops grid, or Editors area.



Editors area

The Editors area in Logic Pro can display any of the five editors, depending on the type of region, cell, or track you select. For example, selecting an audio region displays the Audio Editor, and selecting a Session Player region displays the Session Player Editor. Each editor has a different interface and provides editing tasks specific to the cell or region type.

- *Audio Editor:* Shows the track lane of an audio track with all the audio regions on that track. See Overview of the Audio Editor.
- *Piano Roll Editor:* Shows the track lane of a software instrument track with all the MIDI regions on that track, where you edit the MIDI notes inside the MIDI regions. See Overview of the Piano Roll Editor.
- *Session Player Editor:* Shows controls and settings of the currently selected Session Player region. If no region is selected, it shows the button Create Region at Playhead to create a new Session Player region at the playhead position on that track. See The Session Player Editor.
- *Step Sequencer:* Shows the Step Sequencer pattern of the currently selected pattern region. If no region is selected, Step Sequencer is empty, and tapping a step creates a new pattern region at the playhead position on that track. See Intro to Step Sequencer.
- *Cell Editor:* Shows the content of the selected cell. Depending on the region type in the cell, it displays one of the four editors. See Work in the Cell Editor.

If no region is selected, the Editors area shows the corresponding editor based on the region type of the selected track. See Create tracks.

Note: In the Track inspector, you can change the Default Region Type parameter of a software instrument track to MIDI, Pattern, or Session Player.

Region automation

The Editors area is the only place to view and edit region automation. See Show region automation.

Open and close the Editors area

- Tap the Editors button in the middle of the view control bar.

  You can also tap a selected region to open its menu and choose Edit > Show in Editor.

Show an editor in the Editors area

1. Tap the Editors button in the view control bar to show the Editors area.
2. Do any of the following:
   - In the Tracks area, tap a region to select it to show its corresponding editor.
   - In the Live Loops menu bar, tap the Cell Edit button, then tap a cell to select it to show the Cell Editor.
   - Tap a track icon to select that track and automatically select all the regions on that track.

     Note: Select Regions on Track Selection has to be turned on in the General settings.

Choose a Catch Playhead option

The ruler in the Audio Editor, Piano Roll Editor, Session Player Editor, and Cell Editor automatically scrolls to always show the playhead. You can turn off that default behavior to concentrate on a section regardless of the playhead position.

- Tap the More button ••• on the right side of the Editors area menu bar, tap Catch Playhead, and then choose one of the following options:
  - *Off:* The playhead position does not scroll the working area.
  - *Automatic:* The working area automatically scrolls to always keep the playhead visible.
  - *Catch Now:* This option is only available if the playhead is not visible in the working area. Tap to scroll the working area to the playhead position. This action doesn't affect the selection of Off or Automatic.

Note: Selecting Off or Automatic in one editor applies that behavior to other editors, including the Session Player Editor, which doesn't have the Catch Playhead submenu in its More menu.

Tip: Tap the More button ••• on the right side of the Tracks area menu bar, then choose Catch Playhead to set the option independently from the Editors area.

Edit audio regions or cells

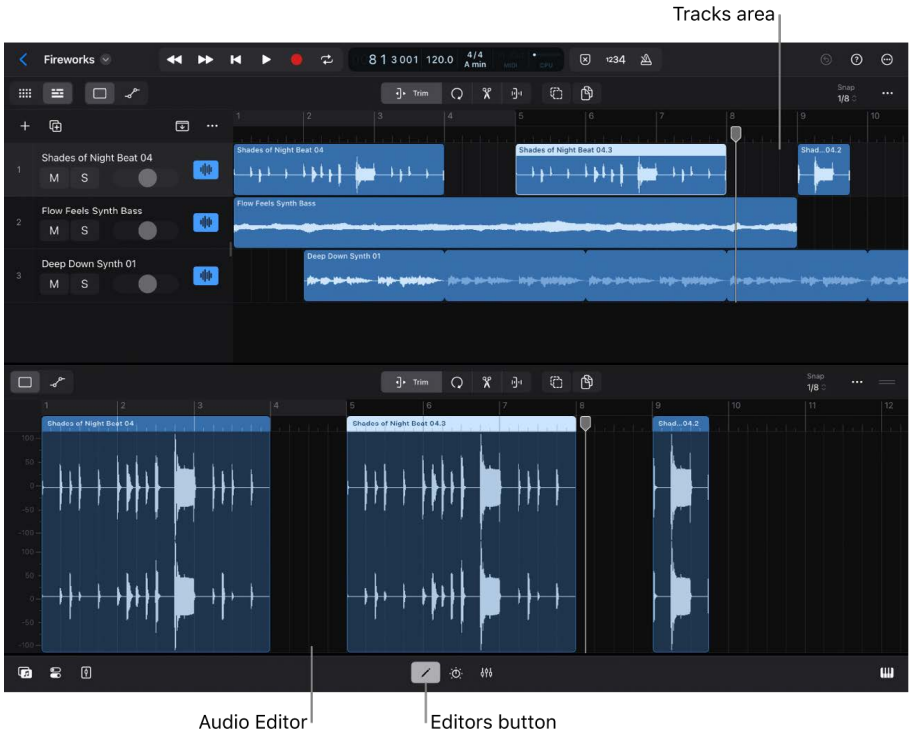
Intro to the Audio Editor in Logic Pro for iPad

The Audio Editor in Logic Pro for iPad is displayed in the Editors area below the Tracks area, showing the audio track currently selected in the Tracks area with all its audio regions. The Audio Editor provides the same tools and functionality for editing audio regions as the Tracks area, but with the option to zoom in on the waveform for more precise edits.

The Audio Editor menu bar contains the same function buttons and other controls available in the Tracks area. The playheads in the Tracks area and the Audio Editor are linked, showing the same playhead position.

Edits are non-destructive, so you can always return to your original recordings.

WARNING: If the audio track visible in the Audio Editor is part of a Mixer group, then an edit in the Audio Editor can affect audio regions on other audio tracks that are members of that Mixer group. See Create Mixer groups.



General region editing tasks

In the Audio Editor, you can perform the same editing tasks that are available in the Tracks area for all region types:

- Name and color regions
- Move regions
- Delay regions
- Copy regions
- Repeat regions
- Loop regions
- Trim regions
- Split regions
- Join regions
- Mute regions
- Delete regions
- Lock regions
- Control transposition of regions
- Work with chords

Audio region–specific editing tasks

The following are editing tasks in the Tracks area and the Audio Editor that are specific to audio regions:

- Reverse
- Speed
- Flex & Follow (Follow Tempo)
- Original tempo
- Time stretch
- Quantize
- Fade in/out
- Transpose and fine tune
- Smart Tempo

In addition to audio editing tasks, you can switch to Automation view in the Audio Editor to view and edit region automation. For more information, see Show region automation.

Reverse audio regions in Logic Pro for iPad

By reversing audio regions, you can create interesting and unusual rhythmic, melodic, or other results. You can reverse one or more audio regions using the Reverse switch in the Region inspector.

Note: The Reverse parameter is not available if both Flex & Follow is turned on in the Region inspector and flex is turned on in the Track inspector.

Reverse audio regions

1. Tap an audio region to select it, or select multiple regions.
2. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
3. Tap the General disclosure arrow to show the General parameters.
4. Tap the Reverse switch.

Edit the timing of audio

Intro to Flex Time in Logic Pro for iPad

Flex Time simplifies the process of editing the timing of notes, beats, and other events in audio regions. You can compress or expand the time between specified events in an audio region without the need for trimming, moving, nudging, or crossfading.

When you choose a Flex Time algorithm, the contents of the audio track are analyzed for transients, or significant peaks, and any detected transients are marked in the audio regions. Editing the timing of notes and beats in audio regions relies on those markers.

Note: Flex Time is also integrated into the Smart Tempo feature. To learn more about Smart Tempo and how it interacts with Flex Time, see Intro to Smart Tempo.

Importing Logic Pro projects with Flex Time and Flex Pitch

You can import Logic Pro for Mac projects that contain Flex Time and Flex Pitch edits. Logic Pro for iPad will play back those edits, but you can't edit the flex markers. However, in the Track inspector, you can choose different Flex Time parameters that might improve the sonic results.

Turn on flex in the Track inspector

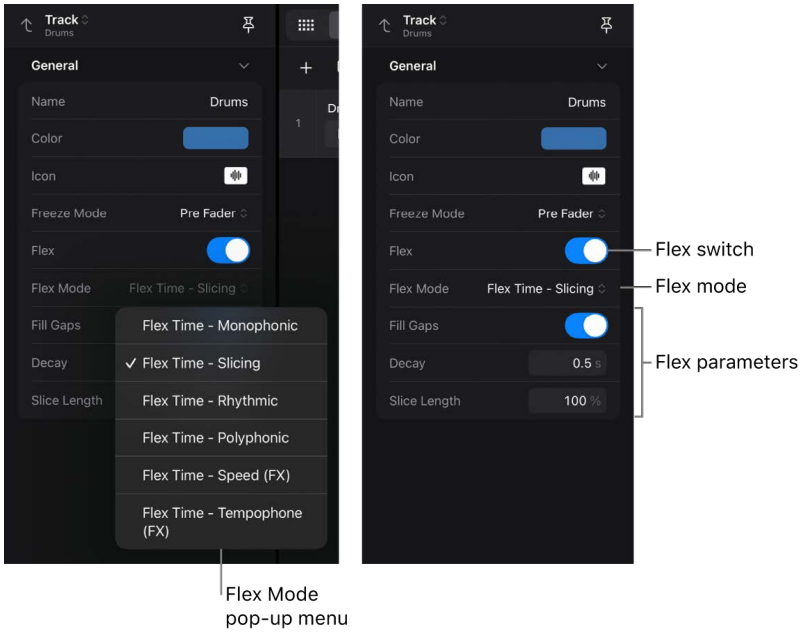
1. Select an audio track.
2. Tap the Inspector button, then choose Track in the Level pop-up menu on top.
3. Tap the General disclosure arrow to show the General parameters.
4. Tap the Flex switch to turn on flex for the track.

   Depending on the chosen algorithm, up to four flex-related parameters appear in the Track inspector that let you optimize the results.

For audio regions to adjust to the project tempo or use any time quantization, you have to turn on flex for their track. Apple Loops, however, can follow the project tempo without flex being turned on.

Flex Time algorithms and parameters in Logic Pro for iPad

Flex Time algorithms are track-based settings that determine how the timing or pitch of your audio material can be altered—using time compression or expansion, manipulating invisibly sliced segments, or speeding up or slowing down the material. You can choose an algorithm based on the type of audio material you're working with. Each algorithm comes with its own individual parameters, located in the Track inspector below the Flex Mode parameter.



Choose and adjust a Flex Time algorithm

1. Tap the track icon of the audio track you want to edit.
2. Tap the Inspector button in the view control bar or press I on your external keyboard to open the Track inspector.
3. In the inspector, tap the Level pop-up menu at the top and choose Track.
4. Tap the Flex switch to turn on flex for the track.

   The Flex Mode parameter and any additional settings are only displayed when the Flex switch is turned on.
5. Tap the Flex Mode pop-up menu and choose an option.
6. Adjust any of the additional flex parameters if necessary.

Note: Any audio region on that track that has its Flex & Follow parameter set to Off in the Region inspector automatically changes to On when you turn on flex.

Use the Monophonic algorithm

- In the Track inspector, tap the Flex switch to turn on flex, then tap the Flex Mode pop-up menu and choose Flex Time - Monophonic.

  Monophonic is designed to be used on melodic instruments only playing a single note at a time, and is therefore good for solo vocals and monophonic solo instruments—melody and bass lines, for example. When you use this flex algorithm, your recording should be relatively dry, without audible reverberation. Otherwise, you may want to try using Polyphonic. Monophonic comes with a single parameter:

  - *Percussive:* Preserves the area around transient markers to protect the percussive part of the sound. If selected, it allows better timing for all kinds of percussive monophonic tonal material, such as plucked strings (guitar, bass) or tonal percussion. If unselected, it prevents glitches on transient markers in nonpercussive tonal material, such as bowed strings or wind instruments.

Use the Slicing flex algorithm

- In the Track inspector, tap the Flex switch to turn on flex, then tap the Flex Mode pop-up menu and choose Flex Time - Slicing.

  Slicing cuts the audio material at transient markers, then shifts the audio while playing each slice at its original speed. No time compression or expansion is applied to the shifted audio. Any gaps that occur as a result of shifting the audio can be filled using the decay function. Slicing is a good choice for drums and percussion and comes with the following parameters:

  - *Fill Gaps:* Turns the decay function on or off, allowing you to fill any gaps that occur between sounds as a result of shifting the audio.
  - *Decay:* Sets the decay time between sounds because no time stretching takes place to compensate for the gaps.
  - *Slice Length:* Shortens each slice by a percentage value. Shortening slices can be helpful for removing unwanted pre-attack sounds from the following slice, or to create a gated effect.

Use the Rhythmic flex algorithm

- In the Track inspector, tap the Flex switch to turn on flex, then tap the Flex Mode pop-up menu and choose Flex Time - Rhythmic.

  Rhythmic time stretches the material, looping audio between slices in order to fill any gaps. This algorithm is most suitable for material such as rhythmic guitars, keyboard parts, and Apple Loops. Rhythmic comes with the following parameters:

  - *Loop Length:* Sets the length of the looped section at the end of a slice that is used for time expansion.
  - *Decay:* Defines a decay value for the looped area.
  - *Loop Offset:* Allows you to move the looped area up to 100 ms to the left, preventing pre-attack sounds from the following transient from appearing in the looped and crossfaded area.

Use the Polyphonic flex algorithm

- In the Track inspector, tap the Flex switch to turn on flex, then tap the Flex Mode pop-up menu and choose Flex Time - Polyphonic.

  Polyphonic time stretches material based on a process called *phase vocoding*—a process that uses phase information to time stretch an audio signal without touching its pitch. It is the most processor intensive of all the flex algorithms, but it delivers high sonic quality with suitable polyphonic material. It's recommended for complex polyphonic material and is good for all kinds of chords—such as guitar, piano, and choir—and also complex mixes. Polyphonic comes with a single parameter:

  - *Complex:* Activates more internal transients in the audio material.

Use the Speed (FX) flex algorithm

- In the Track inspector, tap the Flex switch to turn on flex, then tap the Flex Mode pop-up menu and choose Flex Time - Speed (FX).

  Speed time stretches material by playing the source material faster or slower, including pitch change. Because of the pitch shifting, this flex algorithm is mainly useful for percussive material, but it can be used on all material for interesting creative effects.

Use the Tempophone (FX) flex algorithm

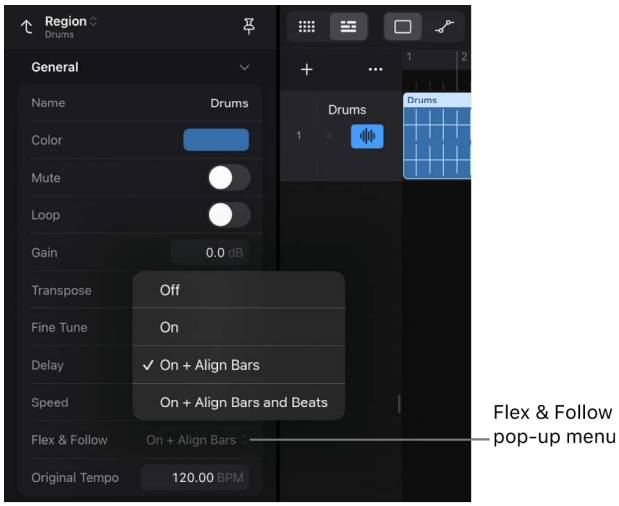
- In the Track inspector, tap the Flex switch to turn on flex, then tap the Flex Mode pop-up menu and choose Flex Time - Tempophone (FX).

  Tempophone emulates the effect of a historical tape-based time-stretching device known as a tempophone, and results in a mechanical sound with many artifacts similar to those produced with granular synthesis techniques. Tempophone is intended to be used creatively for special effects and comes with the following parameters:

  - *Grain Size:* Sets the size of the grains that are played or repeated in their original speed and crossfaded to create time compression or expansion.
  - *Crossfade:* Adjusts the crossfade length from 0.00, which produces hard artifacts, to the full grain length of 1.00, which tends to sound softer.

Set Flex & Follow for audio regions in Logic Pro for iPad

Use the Flex & Follow setting in the Region inspector to turn on Flex Time for an audio region on a track that has flex turned on in the Track inspector. The audio region can then follow the project tempo and use Smart Tempo beat markers for quantize commands. See Smart Tempo.

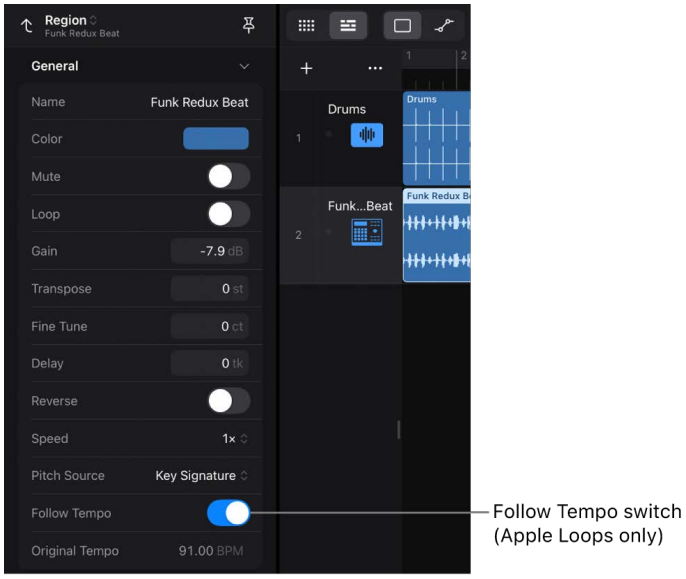


Flex & Follow is a region parameter, which means you can set each audio region individually. You can choose from four options that determine how Flex Time shifts the audio material to a time grid.

- *Off:* The region has flex turned off and doesn't follow changes to the project tempo.
- *On:* The region has flex turned on, so it follows any manual flex edits. It also follows any changes to the project tempo.

  Note: Audio regions in imported projects that have been created in Logic Pro for Mac can contain manual flex edits, but these edits are not visible in Logic Pro for iPad.
- *On + Align Bars:* The region has flex turned on, and Smart Tempo beat markers are used to conform the region to the project tempo at every downbeat (bar).
- *On + Align Bars and Beats:* The region has flex turned on, and Smart Tempo beat markers are used to conform the region to the project tempo at every beat.

Important: For a selected audio Apple Loop, the Region inspector shows the Follow Tempo switch instead of the Flex & Follow pop-up menu if the corresponding track has flex turned off in the Track inspector.



Choose a Flex & Follow option for an audio region

1. Tap an audio region to select it, or select multiple audio regions.
2. Tap the Inspector button in the view control bar or press I on your external keyboard to open the Region inspector.
3. Tap the General disclosure arrow to show those parameters.
4. Tap the Flex & Follow pop-up menu and select one of the four options.

Quantize audio regions or cells in Logic Pro for iPad

When quantizing a MIDI region, Logic Pro for iPad moves the individual notes to the chosen quantize grid. An audio region, however, represents a waveform, a continuous flow of alternating values. To use a quantize command on an audio region, Logic Pro first performs the Smart Tempo analysis to detect transients (sudden level changes) in the audio signal and marks those positions with transient markers. The quantize command then moves those transient markers (and that portion of the underlying waveform) to the quantize grid, and as a result, stretches sections of the audio signal so that it appears to be quantized based on the settings.

The Region inspector provides four Quantize parameters for audio regions: Quantize, Q-Swing, Q-Strength, and Q-Range.

In addition to the Flex & Follow parameter that has to be turned on, the Flex parameter in the Track inspector has to be turned on for the corresponding track. The various Flex mode algorithms affect the sonic quality of the quantization results. See Intro to Flex Time.

Quantize audio regions

1. Tap an audio region to select it, or select multiple audio regions.
2. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
3. Tap the Quantize disclosure arrow to show the Quantize parameters.
4. Tap the Quantize pop-up menu to choose a quantize grid.

   The audio region will be tempo analyzed, and the Flex & Follow parameter in the Region inspector will automatically be set to On (if it hasn't been done yet).
5. Adjust the values for the Q-Swing, Q-Strength, and Q-Range parameters as needed.

Tip: Tap the Level Up button at the top of the Region inspector to show the Track inspector, where you can adjust the Flex Time parameters displayed below the Flex switch.

Change the playback speed of Apple Loops in Logic Pro for iPad

You can quickly change the tempo of an audio Apple Loop by a multiple using the Speed parameter in the Region inspector.

Note: The Speed parameter is inactive when an audio region is selected.

Change the playback speed of an audio Apple Loop

1. In the Audio Editor menu bar, tap the Trim button.
2. Tap an audio Apple Loop to select it, or select multiple audio Apple Loops.
3. Tap the Inspector button on the left side of the view control bar or press I on your external keyboard to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Tap the Speed pop-up menu and choose a multiple.

The length of the audio region changes accordingly. For example, a value of 2x time compresses the region so that it is half the length, and with a value of ½x, the region is time stretched so that it appears twice as long.

Change the original tempo of audio regions in Logic Pro for iPad

The Original Tempo field in the Region inspector shows the tempo the audio file was recorded in. This is a read-only value that can't be changed for audio Apple Loops. For a standard audio file, you can set the parameter to a different value to change the playback speed of the audio file. However, the change is only applied when the audio file has Flex & Follow turned on in the Region inspector, and Flex is turned on in the Track inspector.

For example, if the project tempo is set to 120 bpm and you record an audio file, it shows 120 as the Original Tempo value. Changing the project tempo to 60 bpm causes the audio file to play back at half the speed (if the Flex parameter in the Track inspector and the Flex & Follow parameter in the Region inspector are turned on). Now, when you change the Original Tempo parameter from 120 to 60, the audio file plays at its original speed.

Set the Original Tempo value for audio regions

1. Select one or multiple audio regions in the Tracks area or the Audio Editor.
2. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
3. Tap the General disclosure arrow to show the General parameters.
4. Tap the Original Tempo field to open the numeric input dialog and enter a numeric value.

Note: The edited tempo change is only applied when the audio file has Flex & Follow turned on in the Region inspector, and Flex is turned on in the Track inspector.

Play Apple Loops at their original tempo in Logic Pro for iPad

Audio Apple Loops with tempo information automatically adapt to the project tempo. If you want such Apple Loops to play at their original recorded tempo, you can turn off their Follow Tempo parameter in the Region inspector.

Play Apple Loops at their original tempo

1. Select one or multiple audio Apple Loops in the Tracks area or the Audio Editor.
2. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
3. Tap the General disclosure arrow to show the General parameters.
4. Tap the Follow Tempo switch to turn it off.

Note: The Follow Tempo parameter is only displayed if the audio region is an Apple Loop and the Flex parameter is turned off in the corresponding Track inspector.

Transpose and fine-tune audio regions in Logic Pro for iPad

You can transpose audio regions by semitones (12 semitones = 1 octave) and cents (100 cents = 1 semitone).

Transpose and fine-tune audio regions

1. In the Audio Editor menu bar, tap the Trim button.
2. Tap a region to select it, or select multiple regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Do any of the following:
   - Drag the Transpose value up or down, or tap the Transpose field to open the numeric input dialog and enter a numeric value.

     The value ranges from –36 to +36 semitones (±3 octaves).
   - Drag the Fine Tune value up or down, or tap the Fine Tune field to open the numeric input dialog and enter a numeric value.

     The value ranges from –50 to +50 cents (±½ semitone).

Edit MIDI regions in the Piano Roll Editor

Effect of Tracks area edits on the Piano Roll Editor

Overview of MIDI region editing in the Tracks area in Logic Pro for iPad

The parameters you change when editing MIDI regions in the Tracks area are playback parameters. That means the MIDI notes inside the regions are not altered, and only an offset value is applied while playing back the region.

Basic editing tasks for MIDI regions

The basic editing tasks for regions in the Tracks area also apply to MIDI regions:

- Add regions
- Name and color regions
- Move regions
- Delay regions
- Copy regions
- Repeat regions
- Loop regions
- Trim regions
- Split regions
- Join regions
- Mute regions
- Delete regions
- Lock region time position
- Region automation
- Pitch Source
- Chords

MIDI region–specific editing tasks

The basic region editing tasks performed in the Tracks area only affect the region (that contains the data), and the editing tasks performed in the Piano Roll Editor affect the "content," the MIDI data inside the region. However, the following parameters (available in the Region inspector when you select a MIDI region in the Tracks area) change the data inside the MIDI region, the MIDI notes. The Transpose parameter, for example, will not change the pitch of the note events and only applies a pitch offset during playback, but other parameters in the Region inspector, such as Quantize, will overwrite any edits you have made in the Piano Roll Editor.

- Transpose
- Velocity Offset
- Dynamics
- Gate time
- Clip Length
- Quantize
- Time stretch

Transpose MIDI regions in the Tracks area in Logic Pro for iPad

The Transpose parameter in the Region inspector transposes all note events in the selected regions up or down in semitones during playback. Even complete folders can be instantly transposed in this way. If several individual MIDI regions within the folder have already been transposed, the relative differences between them are retained.

To guard against drum notes and so on being transposed, turn on the No Transpose switch in the More category of the Track inspector. When turned on, Logic Pro for iPad ignores the Transpose parameter in all MIDI regions on that track.

Note: The MIDI notes in the Piano Roll Editor are not changed, meaning that the note pitch you see in the Piano Roll Editor doesn't reflect the note pitch you hear.

Transpose MIDI regions

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Drag the Transpose value up or down, or tap the Transpose field to open the numeric input dialog and enter a numeric value.

   The value range is ±96 semitones, which equals ±8 octaves.

Set a velocity offset for MIDI regions in the Tracks area in Logic Pro for iPad

The Velocity Offset parameter in the Region inspector offsets all MIDI note velocities in the selected MIDI regions during playback. Positive values add to the current velocity, and negative ones subtract from it. If you select a velocity offset that exceeds the maximum or minimum possible value for a particular note (0–127), that note will play at the extreme possible range. For example, a setting of +20 will cause a note with a velocity of 120 to play at 127.

Note: The MIDI note velocities displayed in the Piano Roll Editor are different from what you hear because they are not changed visually by the Region inspector Velocity Offset value.

Apply a velocity offset in MIDI regions

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Drag the Velocity Offset value up or down, or tap the Velocity Offset field to open the numeric input dialog and enter a numeric value.

   The value range is ±99.

Change the Dynamics value in MIDI regions in the Tracks area in Logic Pro for iPad

The Dynamics parameter in the Region inspector affects the velocity values of notes during playback, but instead of adding or subtracting a fixed amount, the differences between soft and loud notes (the dynamics) are increased or decreased by a percentage value. This works in a similar way to an audio compressor or expander.

- Values above 100% expand the dynamics, thereby increasing the difference between high and low velocity values.
- Values below 100% compress the dynamics, reducing the differences between high and low velocity values.
- The Fixed setting causes all notes to play with the same velocity value. This works in conjunction with the Velocity Offset parameter in the Region inspector. If it is set to 0, then the fixed velocity will be 64, and if the Velocity Offset parameter is set to any other value, then all notes in the selected region will play with that Velocity value.

Note: The MIDI note velocities displayed in the Piano Roll Editor are different from what you hear because they are not changed visually by the Region inspector Dynamics value.

Change the Dynamics in MIDI regions

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Tap the Dynamics pop-up menu and choose a value.

Change the gate time for MIDI regions in the Tracks area in Logic Pro for iPad

The term *gate time* stems from analog synthesizers and refers to the time between pressing and releasing a key. This parameter in the Region inspector affects the absolute note duration or length, which can be different from the actual note length displayed in the Piano Roll Editor. The practical effect is to make notes in the region more staccato or legato. The parameter range is related to the original note lengths.

- *Fixed* plays all notes staccato (as very short notes).
- Values below 100% shorten the notes.
- Values above 100% lengthen the notes.
- *Legato* plays all notes legato. That means each note ends precisely at the beginning of the following note in the selected region.

Change the Gate Time value in MIDI regions

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Tap the Gate Time pop-up menu and choose a value.

Set Clip Length for MIDI regions in the Tracks area in Logic Pro for iPad

This function lets you alter the length of the last notes in a region directly from the Tracks area, by adjusting the length of the MIDI region.

- *Off:* Notes are played to their normal end point, even if they end after the right border of the region.
- *On:* Any note with their end point after the right region border stops playing exactly at the right region border.

Turn on Clip Length in MIDI regions

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the General disclosure arrow to show the General parameters.
5. Tap the Clip Length switch to turn it on or off.

Choose a quantize algorithm for MIDI regions in the Tracks area in Logic Pro for iPad

The Q-Algorithm parameter in the Region inspector lets you choose from two quantization types for MIDI regions: Classic Quantize and Smart Quantize. Whatever type you choose is also displayed for the Algorithm parameter in the Note inspector and used when quantizing notes in the Piano Roll Editor.

- *Classic Quantize* quantizes MIDI notes to the nearest grid using the current Quantize settings and any advanced Quantize parameters.
- *Smart Quantize* works similarly to quantize for audio regions. MIDI events near grid positions (defined by the Q-Range setting) are analyzed. Based on a combined weighting of proximity to the target grid position and velocity, a reference point (“center of gravity”) is set for each group and moved to the target grid positions. All (nearby) MIDI events move proportionally to the reference point. How far each event moves is determined by the Q-Strength setting. Unlike Classic Quantize, all MIDI events keep their original order, similar to an audio region edited using Flex Time. This includes not only notes but all MIDI data types (such as Pitch Bend and Control Change events).

In many cases, Smart Quantize can produce more natural-sounding results than Classic quantization. For example, in a MIDI piano performance, the notes of quickly arpeggiated chords keep their relative positions, as do sustain pedal (on/off) events. Another useful situation is in MIDI drum performances that need some quantizing but where Classic quantization would distort rolls, flams, and other notes not played strictly on the beat (and also possibly the relative position of hi-hat on/off events). In both cases, Smart Quantize keeps the relative position of note on, note off, and CC events.

Choose the MIDI quantization type

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the Quantize disclosure arrow to show the Quantize parameters.
5. Tap the Q-Algorithm pop-up menu and choose Classic Quantize or Smart Quantize.

Quantize parameters for MIDI regions in the Tracks area in Logic Pro for iPad

The Quantize parameters in the Region inspector move the position of the MIDI notes inside the MIDI region. You can see those changes when viewing the region in the Piano Roll Editor. However, the Quantization parameters are non-destructive, and you can move the notes back to their original position at any time by setting the Quantize parameter to Off. In addition to the parameter that sets the quantization grid, you have six advanced parameters to further adjust the quantization, plus two quantize algorithms to choose from.

Quantize parameters

- *Quantize:* All note events in the MIDI region are time corrected to the (quantize) grid format chosen in the pop-up menu. There are two types of region quantization: Classic Quantize and Smart Quantize. You select the type by tapping the Q-Algorithm menu in the Region inspector. For information, see MIDI quantization types.
- *Q-Swing:* This percentage value alters the position of every second point in the current quantization grid. Values over 50% delay the beats, and values under 50% pre-delay them. The most practical settings fall between 50% and 75%, imparting a swing feel to strictly quantized (or tightly played) audio or MIDI regions.
- *Q-Strength:* This percentage value determines how far a note is shifted toward the nearest grid position. 100% results in full quantization; 0% leaves the note at its recorded position.
- *Q-Range:* Defines which notes are quantized based on their proximity to quantization grid positions. At the default value of 0, every note is quantized. At positive Q-Range values, only notes outside the set range (that is, farther away from the grid position) are quantized, and notes in the range keep their original position. At negative Q-Range values, only notes in the set range are quantized, and notes outside the range remain unchanged. The amount by which notes shift toward the grid positions depends on the Q-Strength setting.

  For example, with Q-Range set to 20 ticks and Q-Strength to 50%, only notes that are more than 20 ticks off are quantized. Those notes are quantized by 50%, which improves the timing without making the performance sound mechanical.

- *Q-Flam:* Notes with the same time position (chords) are spread out by this parameter. Positive values produce an ascending (upward) arpeggio; negative values a descending (downward) arpeggio. The position of the first note (either the bottom or top note, assuming all notes start at the same position) in the arpeggio is unaltered.
- *Q-Velocity:* When used with a groove template, this parameter (expressed as a percentage) determines the amount that the velocity values of quantized notes are affected by the velocity values of a template MIDI region. At a value of 0%, the notes retain their original velocity. At 100%, they adopt the velocity values of the template. Negative values alter the velocity, making the deviation from the template even greater.
- *Q-Length:* When used with a groove template, this parameter (also expressed as a percentage value) determines how the lengths of quantized notes are affected by the equivalent note lengths (notes at the same position) of a template MIDI region. A value of 0% has no effect, while at 100%, the notes adopt the exact note lengths of the template region. Negative values alter note lengths further, resulting in a more significant deviation from the template.

Quantization grids

The values of the Quantize parameter in the Region inspector are grouped in the following categories:

- *No quantization:* The Off setting plays the notes at the finest possible timing resolution: 1/3840 note, which is unquantized playback, for practical purposes.
- *Normal quantization:* The 1/1-Note, 1/2-Note, 1/4-Note, 1/8-Note, 1/16-Note, 1/32-Note, and 1/64-Note settings quantize the MIDI region to the equivalent note value.
- *Triplet quantization:* The Triplet settings quantize the MIDI region to triplet note values. The equivalent values are shown in parentheses.
- *Swing quantization:* The 1/16 Swing A-F settings delay the position of every second point in the quantization grid by a fixed percentage. You can also manually alter the swing factor of any Quantize value.
- *Odd quantization:* The 5-Tuplet/4 setting is quarter quintuplets (1 bar = 5 beats), 5-Tuplet/8 is eighth quintuplets (1 bar = 10 beats), 7-Tuplet is septuplets (1 bar = 7 beats), and 9-Tuplet setting denotes novetuplets (1 bar = 9 beats).
- *Mixed quantization:* These combine “straight” and tuplet values of 1/16 and 1/8. Mixed quantization always applies to both note values and requires greater playing precision when recording.

Quantize setting	Swing percentage
Swing F	71%
Swing E	66%
Swing D	62%
Swing C	58%
Swing B	54%
Swing A	50%

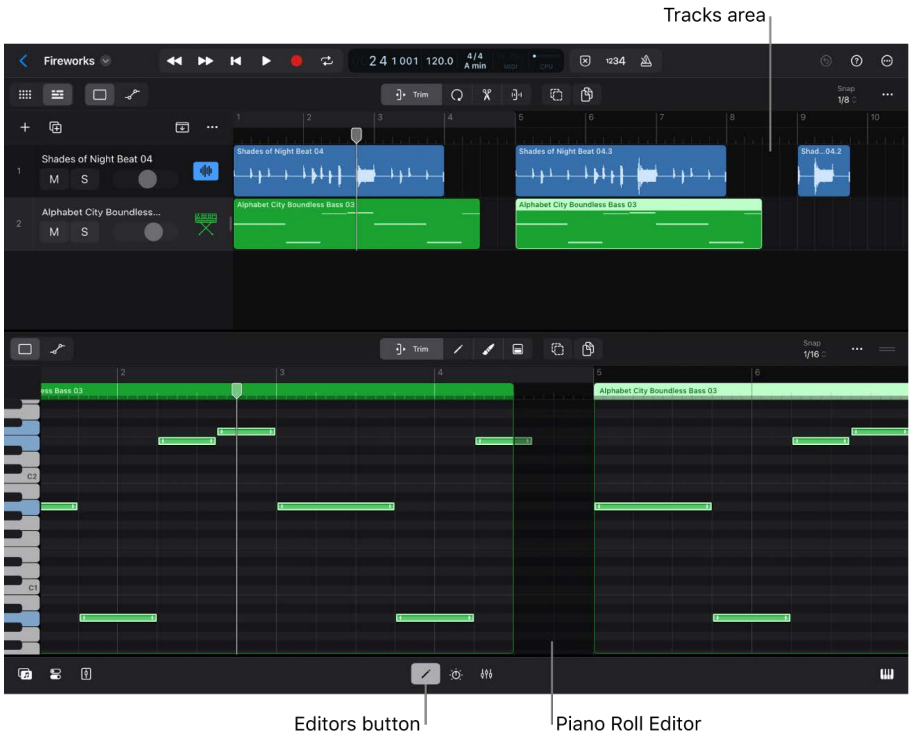
Quantize MIDI regions

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region to select it, or select multiple MIDI regions.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Region inspector.
4. Tap the Quantize disclosure arrow to show the Quantize parameters.
5. Tap the Quantize pop-up menu and choose a quantize grid.
6. To further adjust that quantization, set any of the advanced quantize parameters: Q-Swing, Q-Strength, Q-Range, Q-Flam, A-Velocity, Q-Length, and Q-Algorithm.

Edit MIDI data in the Piano Roll Editor

Overview of the Piano Roll Editor in Logic Pro for iPad

The main tasks in the Piano Roll Editor are viewing and editing the content of a MIDI region, which are MIDI events and region automation. It provides a close-up view of the software instrument track selected in the Tracks area, showing all its MIDI regions on that single track lane (the working area of the Piano Roll Editor). The MIDI notes, displayed as horizontal bars in a time grid and a specific color code, can be edited with various tools. The vertical lines in the working area (extending to the ruler on top) show the time position, while horizontal lines indicate pitch referenced to a vertical keyboard along the left edge. The Piano Roll Editor displays its own playhead, ruler, and cycle area linked to the Tracks area.



The main controls in the Piano Roll Editor are located in its menu bar above the working area.

- *View buttons:* You can choose the Default View button (for editing notes) or the Automation View button (for editing region automation).
- *Function buttons:* The function buttons in the center let you choose the edit modes. They change the functionality of gestures like tap, drag, touch and hold, and so on.
  - *Trim button:* Use the Trim button to trim and move or copy notes. This is the default mode that also lets you select individual notes or open their shortcut menus. In this mode you also open the shortcut menu of the working area.
  - *Pencil button:* Use the Pencil button to add and delete notes. It also lets you trim notes and copy notes.
  - *Brush button:* Use the Brush button to add a series of notes. It also lets you delete a note when you touch and hold it.
  - *Velocity button:* Use the Velocity button to edit note velocities.
- *Modifier buttons:* Next to the function buttons are up to two additional buttons that modify the functionality of the current edit mode.
  - *Multiple Select button:* The Multiple Select button lets you select multiple notes or automation points. When selected, it temporarily deselects the current function button.

    To momentarily turn on Multiple Select mode, touch and hold the Multiple Select button (or press and hold the Shift key on your external keyboard), then tap the notes you want to select. Release the button or Shift key to turn off Multiple Select mode.
  - *Copy Mode button:* When the Copy Mode button is selected, dragging any note copies the note instead of moving it.

    To momentarily turn on Copy mode, touch and hold the Copy Mode button (or press and hold the Option key on your external keyboard), then drag the notes you want to copy. Release the button or Option key to turn off Copy mode.
- *Additional controls:* On the right side of the menu bar is the Snap pop-up menu to set the Snap value, the More button ••• to set various view settings, and the resize handle to resize the Editors area vertically.

Auto zoom and auto scroll

When you select one or more MIDI regions in the Tracks area and open the Piano Roll Editor, its working area auto zooms and auto scrolls to show the notes of the selected regions. With a single region selected, the working area ranges from the left border to the right border of the selected region. With multiple regions selected, the working area ranges from the left border of the first selected region to the right border of the last selected region.

With the Piano Roll Editor open, you can manually scroll and zoom the working area horizontally and vertically.

Show or hide the Piano Roll Editor

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a MIDI region.
3. Tap the Editors button in the middle of the view control bar.

   The Piano Roll Editor opens below the Tracks area.
4. To hide the Piano Roll Editor, do any of the following:
   - Tap the Editors button.
   - Double-tap the view control bar.

     This gesture closes all areas except the Tracks area.

Resize the Piano Roll Editor vertically

- Do any of the following:
  - On the right side of the Piano Roll Editor menu bar, drag the resize handle (or the menu bar) up or down.

    Dragging it all the way down closes the Piano Roll Editor.
  - Tap the resize handle to increase the view of the Piano Roll Editor to its maximum position (which minimizes the Tracks area to show only a single mini track).

    Tap the handle again to return the editor to its previous size.

Note: To hide the Tracks area completely, drag the resize handle all the way up.

Show note labels in the Piano Roll Editor

- Tap the More button ••• on the right side of the Piano Roll Editor menu bar, then choose Show Note Labels.

When this option is selected, the horizontal note bars in the working area show their note pitch and note velocity (if the working area is zoomed in far enough).

Set note colors in the Piano Roll Editor

- Tap the More button ••• on the right side of the Piano Roll Editor menu bar, then tap Set Note Color in the menu and choose one of three options:
  - *By Region Color:* Colors notes to correspond with the color of the MIDI region.
  - *By Velocity:* Colors notes to show their MIDI note velocity.

    The increasing velocity value from 1 to 127 is reflected by gradually changing colors from purple to blue, to green, to red.
  - *By MIDI Channel:* Colors notes to correspond with the MIDI channel value embedded in the note event.

    Each MIDI channel has a dedicated color.

Preview notes in the Piano Roll Editor

- In the Piano Roll Editor menu bar, tap the Trim button or Velocity button, then touch and hold a note bar.

  To preview the note again, you have to tap outside to deselect it first, and then tap the note again.

The vertical keyboard on the left highlights the corresponding key of the selected note. You can also tap this keyboard to play notes.

Choose an edit mode in the Piano Roll Editor

- In the Piano Roll Editor menu bar, tap any of the four function buttons: Trim, Pencil, Brush, or Velocity.

  Each button, when selected, shows on the right side up to two modifier buttons, the Multiple Select button and the Copy Mode button.

Important: Tapping the Multiple Select button to turn on Multiple Select deselects the current function button until you deselect the Multiple Select button.

Set a Snap value in the Piano Roll Editor

- In the Piano Roll Editor menu bar, tap the Snap pop-up menu and choose a Snap value.

The Snap value in the Piano Roll Editor is independent of the Snap value set in Tracks view or Automation view.

Select notes in the Piano Roll Editor in Logic Pro for iPad

Selecting notes in the Piano Roll Editor is similar to selecting other items in Logic Pro for iPad.

Select a single note

1. In the Piano Roll Editor menu bar, tap the Trim button or Velocity button, then tap a note bar to select it.

   The vertical keyboard on the left highlights the corresponding key to show the note pitch.

2. Tap the working area to deselect any selected notes.

Select multiple notes

You can apply most of the editing tasks to a group of notes at once and change the parameter value of those notes to a specific value (absolute) or apply a value offset to all notes (relative).

1. In the Piano Roll Editor menu bar, tap the Trim button or Velocity button, then tap the Multiple Select button.

   The current function button is deselected automatically.

2. Tap individual notes to select or deselect them.

3. Once you've selected the group of notes, tap the Multiple Select button to deselect it.

   The previous function button is selected again, and you can perform the edit, which applies to all selected notes.

To select multiple adjacent notes, you can also touch and hold the working area next to the first note you want to select, then drag across multiple notes.

Select multiple notes using momentary mode

You can apply most of the editing tasks to a group of notes all at once and change the parameter value of those notes to a specific value (absolute) or apply a value offset to all notes (relative).

1. In the Piano Roll Editor menu bar, tap the Trim button or Velocity button.
2. Touch and hold the Multiple Select button or press and hold the Shift key on an external keyboard.

   The current function button is deselected momentarily.
3. While still holding the button (or pressing the Shift key), tap individual notes to select or deselect them.
4. Once you've selected the group of notes, release the Multiple Select button (or release the Shift key).

   The previous function button is selected again, and you can perform the edit, which applies to all selected notes.

Note: The Multiple Select button remains selected if you don't tap any item before releasing it.

Select all notes in the Piano Roll Editor

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap the working area to deselect any selected notes, then tap again to open its menu and choose Select All.

Select notes on conditions in the Piano Roll Editor

You can select notes based on various conditions in reference to a selected note.

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, then tap again to open its menu, tap Select, and choose one of the following options:
   - *Invert Selection:* Selects all unselected notes and unselects all selected notes in all MIDI regions on that track.
   - *Select All Following:* Selects all notes starting from the selected to the end of the track.
   - *Select Same Subposition:* For example, if the selected note is positioned on the third beat of bar 5, then all notes that are on the 3rd beat of any bar on that track are selected.
   - *Select Same Articulation:* Selects all notes with the same Articulation value on the track. See Set articulation numbers.
   - *Select Same Pitch:* Selects all notes with the same pitch on the track.
3. You can also tap the working area, then tap again to open its menu and choose one of those options:
   - *Select All:* Selects all notes on that track.
   - *Select Overlapped Notes:* Selects all notes that overlap to a note with the same pitch.

     See Shorten overlapping notes in the Piano Roll Editor.
   - *Select Muted Notes:* Selects all muted notes on that track (indicated by a gray color).

     See Mute notes in the Piano Roll Editor.

Invert note selection in the Piano Roll Editor

This task is useful in combination with any of the conditional selections. You could select all notes with a certain pitch (for example, C1, assigned to the kick drum), then invert the selection and apply the Delete command. As a result, all notes except the kick drums are deleted.

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, then tap again to open its menu, tap Select, and choose Invert Selection.

Add notes in the Piano Roll Editor in Logic Pro for iPad

In addition to recording MIDI notes using Play Surfaces or your external MIDI controller, you can add notes manually in the Piano Roll Editor. Using Apple Pencil allows for higher precision with timing position and pitch of the new MIDI notes.

Add a single note in the Piano Roll Editor

You can tap anywhere in the working area of the Piano Roll Editor to add a new MIDI note event. The horizontal tap position determines the start time, the vertical position determines the pitch, and the note length is 1/16 by default. If you change the length of an existing note, then that is the new default length for any newly added note.

1. In the Piano Roll Editor menu bar, tap the Pencil button.
2. Do one of the following:
   - Tap anywhere in the working area.

     A new note (Velocity value 80) will be added at the tap position that defines the time position and pitch.
   - Touch and hold anywhere in the working area, then drag vertically (to determine the note pitch) and horizontally (to determine the time position).

     The horizontal movement is restricted by the boundaries of the region.

The Snap value you set in the Snap pop-menu in the Piano Roll Editor menu bar applies to placing and moving the note event horizontally.

Add a series of notes in the Piano Roll Editor

1. In the Piano Roll Editor menu bar, tap the Brush button.
2. Touch and hold at a point in the working area that determines the timing position and pitch of the first note, then drag right or left.

   The repetition rate of added notes is based on the current Snap value set in the Snap pop-up menu of the Piano Roll Editor menu bar. The pitch of each note is determined by the vertical position of your movement, and their Velocity values are 80.
3. Release your finger to stop creating the note sequence.

Note: If a MIDI region exists at the tap position, the new note is added to that region. If there is no MIDI region present in the working area within two bars of the last region, a new one-bar region is created for that note.

Delete notes in the Piano Roll Editor in Logic Pro for iPad

You can delete individual notes from MIDI regions or apply certain criteria when selecting a group of notes (for example, delete all notes of a certain pitch).

Delete notes

- In the Piano Roll Editor menu bar, do any of the following:
  - Tap the Trim button, tap the note to select it, tap it again to open its menu, then choose Delete.
  - Tap the Pencil button, then tap the note.
  - Tap the Brush button, then touch and hold the note.
  - Select multiple notes, tap one of the selected notes to open its menu, then choose Delete.

Mute notes in the Piano Roll Editor in Logic Pro for iPad

You can mute individual notes in the Piano Roll Editor, letting you experiment with different note choices in a melody, or different chord voicings, for example.

Mute or unmute notes

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap the note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters, and then tap the Mute switch to mute or unmute the selected notes.

   Muted notes turn gray.

Unmute all muted notes on a track

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap the background of a region to deselect any selected notes, then tap again and choose Select Muted Notes from the menu.
3. In the Notes inspector, tap the Mute switch.

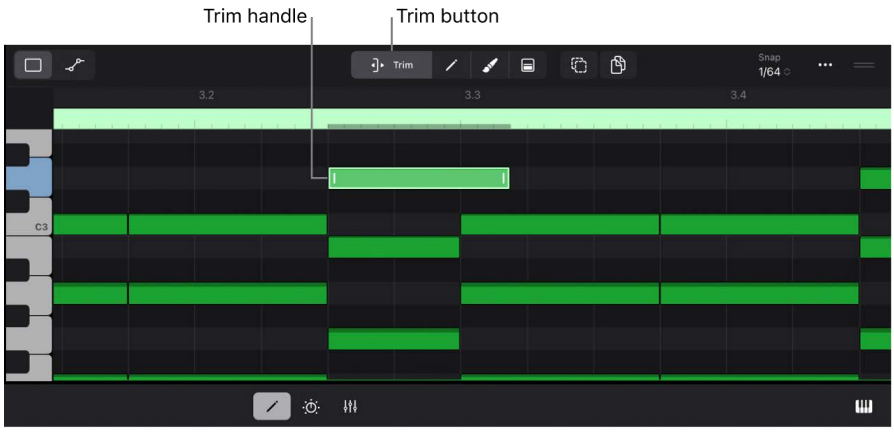
Delete all muted notes on a track

You can quickly delete all muted notes if you decide you don't need those notes in your arrangement.

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap the background of a region to deselect any selected notes, then tap again and choose Select Muted Notes from the menu.
3. Tap a selected note and choose Delete from the menu.

Trim notes in the Piano Roll Editor in Logic Pro for iPad

You can trim notes in the Piano Roll Editor to change their length (duration). Notes can be resized from either their start or their end point. You can trim individual notes or a group of notes together.



Trim notes by dragging

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.

   Trim handles at the start and end of the note will appear. Depending on the note length, you might need to zoom in to the working area to make the handles visible.
3. Touch and hold one of the handles and drag it left or right.

   Dragging the left handle will change the start position of the note and its length. Dragging the right handle will change the length of the note without changing its start position.

With the Pencil button selected, you can drag the left or right edge of a note to trim it even though there are no trim handles visible.

Tip: When you wait for a second after you touch and hold the note, the working area zooms in horizontally to let you adjust the start or end point more precisely.

Trim notes in the inspector

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.
5. Drag one of the four Length values up or down, or tap a Length field to open the numeric input dialog and enter a numeric value.

   With multiple notes selected, dragging the value up or down will change their length proportionally, and entering a value in the numeric input dialog will set all notes to that same length.

Move notes in the Piano Roll Editor in Logic Pro for iPad

You can move notes horizontally in the Piano Roll Editor to change their time position.

Move notes by dragging

When moving notes by dragging, it might be necessary to zoom in to the working area to better position the notes.

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it or select multiple notes to move them as a group.

   The notes can only move according to the current Snap value set in the Snap pop-up menu of the Piano Roll Editor menu bar.
3. Touch and hold the center of a selected note and drag it left or right.

   When you wait for a second after you touch and hold the note, the working area zooms in horizontally to let you move the note more precisely.

Move notes in the inspector

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button in the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.
5. Drag one of the four Position values up or down, or tap a Position field to open the numeric input dialog and enter a numeric value.

   With multiple notes selected, dragging the value up or down will change their position proportionally, and entering a value in the numeric input dialog will set all notes to that same position.

Move notes with cut and paste

You can use cut and paste to move notes on the same track or to different MIDI tracks.

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, then tap again to open its menu and choose Cut (or press Command-X on your external keyboard).

   The note is moved to the clipboard.
3. Tap the ruler to move the playhead to the time position where you want to move the note.
4. Tap anywhere in the working area to open its menu, then choose Paste (or press Command-V on your external keyboard).

   The note is placed at the playhead position and remains selected, and the playhead moves to the end of the note.

You can move multiple notes as a group by selecting them first, and then choosing the Cut and Paste commands.

Copy notes in the Piano Roll Editor in Logic Pro for iPad

Copy notes with copy and paste

You can copy notes on the same track or to different tracks.

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, then tap again to open its menu and choose Copy (or press Command-C on your external keyboard).
3. Tap the ruler to move the playhead to the position where you want to paste the note.
4. Tap anywhere in the working area to open the menu and choose Paste (or press Command-V on your external keyboard).

   The note is placed at the playhead position and remains selected, and the playhead moves to the end of the note.

You can copy multiple notes as a group by selecting them first, and then choose the Copy and Paste commands.

Copy notes in Copy mode

1. In the Piano Roll Editor menu bar, tap the Trim button, then tap the Copy Mode button to turn on Copy mode.
2. Tap the note to select it, then touch and hold the note and drag it horizontally to a new time position (the Snap value applies) or vertically to change the note pitch.

   When you wait for a second after you touch and hold the note, the working area zooms in horizontally to position the note more precisely.
3. Tap the Copy Mode button to turn off Copy mode.

With an external keyboard, you can press and hold the Option key (which selects the Copy Mode button), drag the notes you want to copy, and release the Option key (the Copy Mode button is deselected).

Copy notes using momentary mode

1. In the Piano Roll Editor menu bar, tap the Trim button, then select the notes you want to copy.
2. Touch and hold the Copy Mode button or press and hold the Option key on your external keyboard.
3. While still holding the button (or pressing the Option key), drag individual notes to copy them.
4. Once you've copied the notes, release the Copy Mode button (or release the Option key).

Note: The Copy Mode button remains selected if you don't tap any notes before releasing it.

Shorten overlapping notes in the Piano Roll Editor in Logic Pro for iPad

When editing MIDI notes, you may end up with two notes of the same pitch, where the second note starts before the first has ended. During playback, the first note stops playing when it receives the Note Off command of the second note. Those same-note overlaps, which are sometimes hard to see in the Piano Roll Editor, can be fixed with the command Remove Overlaps.

The Remove Overlaps command can also be used when notes of different pitch overlap, for example, a melody line. This creates a legato playing style where each note ends when the following note begins.

Remove overlapping notes

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap the working area to deselect any selected notes, then touch and hold next to the overlapping notes and drag over to select both notes.

   You can also drag over a section of multiple notes to fix any occurring overlaps.
3. Tap one of the selected notes to open its menu and choose Remove Overlaps.

   Any overlapping note will be shortened to end eight ticks before the following note.

When you use the command on multiple selected notes that appear to be part of a chord, a menu opens with three options:

- *Keep:* All notes are kept.
- *Delete:* Overlapping chord notes are deleted to keep a monophonic line.
- *Shorten:* All overlapping chord notes are shortened to the beginning of the following note.

Force legato notes in the Piano Roll Editor in Logic Pro for iPad

Legato is a playing style where you perform a sequence of single notes without gaps in between.

In Logic Pro for iPad, when you have a series of notes in the Piano Roll Editor that are not played legato, you can select those notes and use the Force Legato command, which adjusts the length of each note to end at the start of the following note. You can also set the Gate Time parameter in the Region inspector together with the Force Legato parameter to produce specific playing styles.

Change notes to play legato

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap one of the selected notes to open its menu and choose Force Legato.

   Any selected note has its length adjusted so that it ends eight ticks before the start of the following note. If a selected note is the last note in a region, it is extended to the end of the region.

Lock the note position in the Piano Roll Editor in Logic Pro for iPad

You can lock the position of individual notes in Logic Pro for iPad to make sure you are not moving them by accident.

Lock the note position

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button in the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters, then tap the Lock Time Position switch.

Note: The Piano Roll Editor has no indication whether a note is locked. However, when you try to drag a locked note, it jumps back to its original position. Dragging a note vertically to change its pitch is still possible.

Change the note pitch in the Piano Roll Editor in Logic Pro for iPad

You can change the pitch of a single note or group of notes in Logic Pro for iPad by dragging them vertically in the Piano Roll Editor or changing them numerically in the inspector.

You can also change the pitch of notes according to a selected scale. See Quantize the note pitch in the Piano Roll Editor.

Change note pitch in a region

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Drag a single note up or down, or select multiple notes first, and then drag one of the selected notes up or down.

Change note pitch in the inspector

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.
5. Drag the Note value up or down, or tap the Note field and choose a pitch.

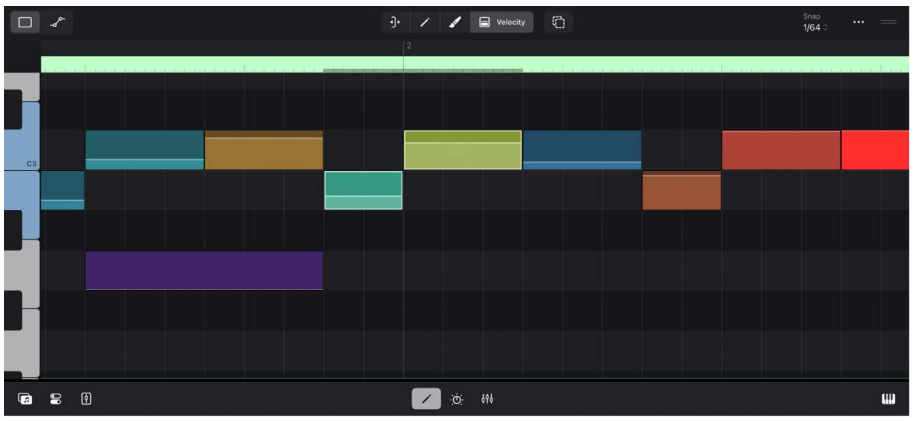
Change the note pitch by octaves

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap one of the selected notes to open its menu, and from the Transpose submenu choose Transpose Octave Up or Transpose Octave Down.

Change the note velocity in the Piano Roll Editor in Logic Pro for iPad

Velocity indicates how hard a key or a pad was struck when the note was played on a physical controller, which usually corresponds to the note's loudness (the MIDI velocity range is 1–127, with 127 being the loudest). Velocity can also control other synthesizer parameters, such as filter resonance or cutoff, alone or in conjunction with volume level.

In Logic Pro for iPad, inside the horizontal note bar that represents the MIDI note in the Piano Roll Editor is a horizontal line (visible if you zoom in close enough). The vertical position of the line relative to the overall height of the note bar shows the note's velocity. You can also display velocity using different colors, by choosing Set Note Color > By Velocity from the More menu ••• in the Piano Roll Editor menu bar. Colors gradually change from purple to green to red.



Color coding makes it easy to see the velocity of individual notes and the overall range of velocities in a MIDI region. As you change the velocity of the notes, their color changes in real time.

Note: Note velocities can be offset during playback by the Velocity Offset parameter and Dynamics parameter in the Region inspector.

Change note velocity graphically

1. In the Piano Roll Editor menu bar, tap the Velocity button.
2. Tap a note to select it, or select multiple notes.
3. Drag one of the selected notes up or down.

   The vertical line in the note bar moves up or down accordingly, and a help tag appears, showing the velocity value.

When you edit the velocity of multiple notes, the relative differences in their velocity values are retained. If the velocity value of any of the selected notes reaches the minimum or maximum value (1 or 127), none of the notes can be adjusted further.

Change note velocity in the Note inspector

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button in the view control bar to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.
5. Drag the Velocity value up or down, or tap the Velocity field to open the numeric input dialog and enter a numeric value.

Note: You can change the display of the Velocity field to show values in higher MIDI 2.0 resolution. See View settings.

Change the release velocity in the Piano Roll Editor in Logic Pro for iPad

Release velocity refers to how fast your finger releases a key on a musical keyboard after you press it down. Not many physical keyboards support that functionality. A software instrument plug-in also has to support the release velocity feature to assign it to a specific parameter. For example, if the release velocity is assigned to the release time of an envelope generator, then the faster you release a key, the shorter the ring-out of a note will be.

Change release velocity in the inspector

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button in the view control bar to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.
5. Drag the Release Velocity value up or down, or tap the Release Velocity field to open the numeric input dialog and enter a numeric value.

   You can set the value from 0 to 127, or drag all the way up to set it to off.

Note: You can change the display of the Release Velocity field to show values in higher MIDI 2.0 resolution. See View settings.

Change the MIDI channel in a note in the Piano Roll Editor in Logic Pro for iPad

Each MIDI note event has an embedded MIDI channel number that you can change in the Logic Pro for iPad Note inspector.

Change the note MIDI channel

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.

   The MIDI Channel pop-up menu shows the current MIDI channel for the selected note.
5. Tap the MIDI Channel pop-up menu and choose a channel number.

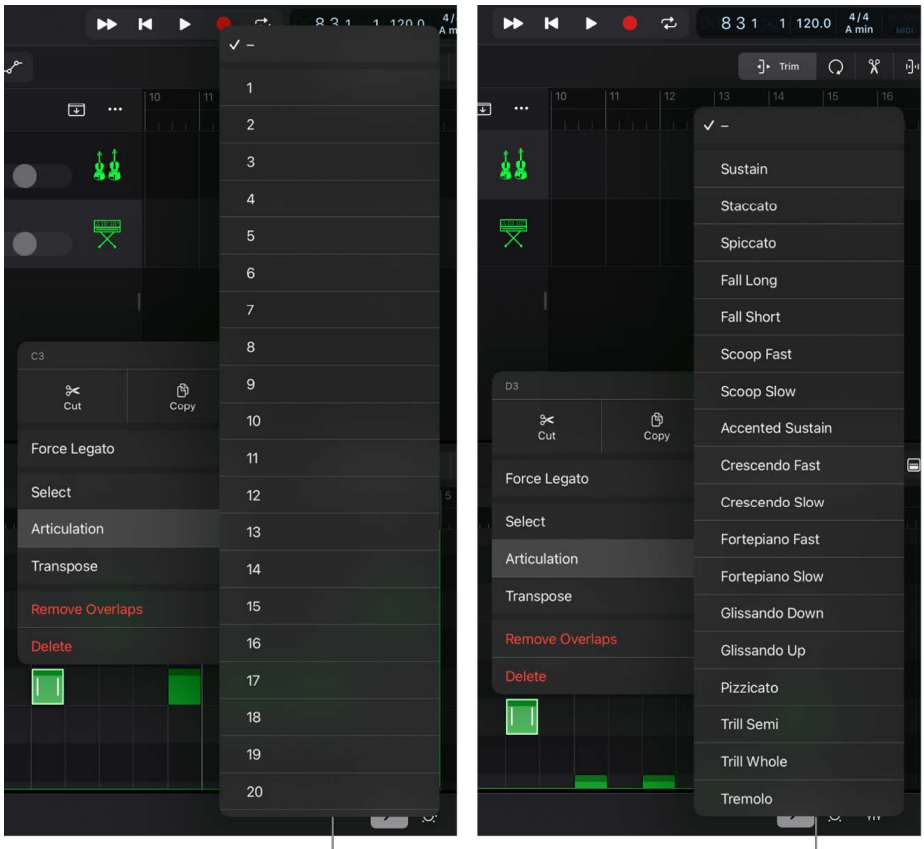
Set the articulation IDs in the Piano Roll Editor in Logic Pro for iPad

A MIDI note in Logic Pro for iPad can embed an articulation ID, which is a number from 1 to 255, or it is set to off. A software instrument plug-in (for example, Studio Strings) that supports articulation IDs can be programmed so that individual patches representing various playing styles (for example, legato, pizzicato, or staccato) are mapped to individual articulation IDs. When the plug-in receives MIDI notes during playback, it not only reacts to the pitch and velocity, it can also switch to a specific playing style based on the articulation ID it receives from a MIDI note. For example, when the plug-in receives a note with ID 1, it switches to staccato, and when it receives a note with ID 2, it switches to pizzicato.

With the Articulation Set Editor, available in Logic Pro for Mac, you can create Articulation Sets that let you add names to articulation IDs, making mapping easier. An Articulation Set is loaded in Logic Pro for iPad when you import a Logic Pro for Mac project that uses those Articulation Sets or when you load a software instrument plug-in with an embedded Articulation Set, such as Studio Strings or Studio Horns.

By default, when you open the Articulation menu, it only shows the numbers 1 to 255. With an Articulation Set loaded on a track, the menu displays those articulation names instead of numbers.

Note: The Articulation Set loaded on a software instrument track is used on all MIDI regions on that track.



Default Articulation menu

Articulation menu with loaded Articulation Set

When editing MIDI notes in the Piano Roll Editor, you can quickly assign notes or a group of notes to specific articulations by selecting the articulation ID from the menu.

Change the note articulation ID in the Piano Roll Editor

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the selected note to open its shortcut menu, tap Articulation, then choose an articulation, or choose the hyphen (-) to remove any articulation ID from the MIDI note.

Change the note articulation ID in the inspector

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Details disclosure arrow to show the Details parameters.
5. Tap the Articulation pop-up menu and choose an articulation, or choose the hyphen (-) to remove any articulation ID from the MIDI note.

Quantize the timing of notes in the Piano Roll Editor in Logic Pro for iPad

The Quantize parameters in the Logic Pro for iPad Region inspector apply the quantize values to all note events of a selected MIDI region. With the Quantize parameters in the Note inspector, you can quantize selected notes and also apply different quantization to different notes.

Important: The Quantize values displayed in the inspector are not the values of the selected region or notes; they are the values that are applied when you execute the command. Applying a quantization in the Region inspector will overwrite the quantization applied in the Note inspector and vice versa.

Quantize Algorithm

The first parameter in the Time Quantize section of the Note inspector, Algorithm, shows the Quantize type. This is a read-only field that shows the selection made for the Q-Algorithm parameter in the Region inspector of that MIDI region, either Classic Quantize or Smart Quantize. See Choose a quantize algorithm for MIDI regions in Tracks view.

Time quantize notes in the Piano Roll Editor

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Time Quantize disclosure arrow to show the Time Quantize parameters.
5. Tap the Quantize pop-up menu and choose a Quantize value or tap Time Quantize Again to apply that quantization if you have moved the note manually.

   Adjust the Q-Swing and Q-Strength parameters if needed.

Setting the Quantize value to Off moves the selected notes back to the timing position it was recorded at or moved to manually.

Quantize the note pitch in the Piano Roll Editor in Logic Pro for iPad

Scale Quantize in Logic Pro for iPad applies quantization to the pitch of notes in a MIDI region. Notes are shifted vertically to conform to a particular scale and key. This is especially useful when you want to reuse a repeating pattern of notes but transpose them to a different key.

Any selected note that doesn't exist in the chosen key and scale is shifted to the nearest note of that scale. For example, if you have F notes in your region and set the key to D and scale to Major, every F note is shifted up a semitone to F#.

Scale quantize notes in the Piano Roll Editor

1. In the Piano Roll Editor menu bar, tap the Trim button.
2. Tap a note to select it, or select multiple notes.
3. Tap the Inspector button on the left side of the view control bar (or press I on your external keyboard) to open the Note inspector.
4. Tap the Scale Quantize disclosure arrow to show the Scale Quantize parameters.
5. Tap the Key pop-up menu to choose any of the 12 keys (or Off), and tap the Scale pop-up menu to choose any of the 27 scales.

   If the correct Key and Scale values are already shown in the inspector, tap Scale Quantize Again to apply that quantization.

Edit Live Loops in the Cell Editor in Logic Pro for iPad

In Logic Pro for iPad, you can arrange and edit Live Loops cells in the Live Loops grid. Cells are like containers that have one or more regions inside. To view and edit that content, select the cell and open the Editors area, which shows the Cell Editor. Depending on what type of cell you select (audio, MIDI, Session Player, or pattern), the Cell Editor displays the corresponding editor interface (Audio Editor, Piano Roll Editor, Session Player Editor, or Step Sequencer). See Work in the Cell Editor.

Open the Cell Editor

1. In the Tracks area menu bar, tap the Grid View button to switch to Live Loops.
2. In the Live Loops menu bar, tap the Cell Edit button to turn on Cell Edit mode.
3. Tap the cell you want to edit, then tap the Editors button in the view control bar (or press E on your external keyboard) to view it in the Cell Editor.

As long as you stay in Cell Edit mode, you can tap other cells to view and edit their content in the Editors area.

Start and stop preview in the Cell Editor

- In the Cell Editor, double-tap the ruler area to start preview.

  Double-tap again anywhere on the ruler to stop preview.

Create automation in the Cell Editor

1. In the Cell Editor menu bar, tap the Automation View button to view and edit the region automation.
2. Use the same editing tasks available in the other editors, such as the Piano Roll Editor. See region automation.

A cell that contains automation shows the small automation symbol in the lower-right corner.



Convert regions

Convert regions into different region types in Logic Pro for iPad

You can convert a region to a different region type in Logic Pro for iPad. The new region replaces the previous region on the same track.

Convert a MIDI region into a pattern region

1. In the Tracks area in Logic Pro, select the MIDI region.
2. Tap the selected MIDI region, tap Convert, then tap Convert to Pattern Region.

Convert a pattern region into a MIDI region

1. In the Tracks area in Logic Pro, select the pattern region.
2. Tap the selected pattern region, tap Convert, then tap Convert to MIDI Region.

Replace a MIDI or pattern region with a Session Player region

1. In the Tracks area in Logic Pro, select the MIDI or pattern region.
2. Tap the selected MIDI or pattern region, tap Convert, then tap Replace with Session Player Region.

Convert a Session Player region into a MIDI or pattern region

1. In the Tracks area in Logic Pro, select the Session Player region.
2. Tap the selected Session Player region, tap Convert, then tap Convert to MIDI Region or Convert to Pattern Region.

Note: If a MIDI or Session Player region is longer than four bars, then converting it into a pattern region splits it into multiple regions, each with a maximum length of four bars.

Copy regions to Live Loops in Logic Pro for iPad

In Logic Pro for iPad, you can copy any region to a new cell in the Live Loops grid. The new cell will be placed on the same track in the next empty cell position.

Copy regions to Live Loops

1. In the Tracks area menu bar, tap the Trim button.
2. Tap a region to select it, then tap again to open its menu and choose Edit > Copy Regions to Live Loops Scene.

   You can also use the command on multiple selected regions to copy them all at once.

Copy a section to Live Loops

1. In the Tracks area menu bar, tap the Trim button.
2. Position the cycle area in the ruler to mark the section you want to copy, and tap the Cycle Mode button to select it.
3. Tap the More button ••• on the right side of the Tracks area menu bar and choose Copy Section to Live Loops Scene.

All regions (or portions of the region) that encompass the cycle area are copied to the Live Loops grid as cells in a new Live Loops scene.

Bounce regions to a new track in Logic Pro for iPad

in Logic Pro for iPad, you can mix any regions in your project to a new audio region.

See Bounce one or more regions in place.

Work with Session Players

Intro to Session Players in Logic Pro for iPad

The Session Players in Logic Pro for iPad let you add realistic bass, piano, and drum performances to your project. Just like an expert backing band, the Session Players can quickly create musical performances and respond instantly to your input and direction in a near-endless variety of ways.

The Session Players feature the Bass Player, Keyboard Player, and Drummer. You can choose Session Players from a wide range of styles, from pop rock to R&B. Each Session Player comes with their own patch and a distinct playing style.



The harmonies played by the Bass Player and Keyboard Player follow the global Chord track or region chords. By using the Chord track, you can have multiple Session Players follow the same chords so that they play in sync. You can use region chords with Session Players so that the Session Player for that region plays chords different from those on the Chord track. For information about working with chords, see Intro to chords.

Session Player performances are contained on Session Player regions on software instrument tracks. You can create multiple Session Player regions on a track, each with a different playing style, allowing you to give different sections of your project a unique musical feel.

In the Session Player Editor, you can change the Session Player's performance by changing to a different style, choosing different presets, selecting a predefined rhythmic pattern, and creating your own pattern from scratch. You can then fine-tune the performance using various settings and regenerate the performance based on the current settings. You can also edit region chords and have the Session Player regions incorporate the rhythm of another track.

The Bass Player and Keyboard Player come with plug-ins—the Studio Bass and the Studio Piano—to give you control over the players' sound. The plug-ins are optimized for the two Session Players and for Session Player regions. Each plug-in has a selection of sample-based instruments and settings that you can use to faithfully reproduce bass and piano sounds.

The Drummer can play both electronic and acoustic kits. Acoustic Drummers use Drum Kit Designer, and electronic Drummers use Drum Machine Designer.

For even greater flexibility, you can influence the sound of Session Players by choosing patches in the Browser, adding plug-ins, and adjusting plug-in parameters. With the Drummer, you can exchange individual kit pieces and edit their settings in Drum Kit Designer or Drum Machine Designer.

The Browser features Session Player loops that you can add to your project the same way as other loops, which allows you to quickly build a song or find inspiration. See Add Apple Loops to your project.

Note: You can convert Session Player regions to MIDI or pattern regions so that you can edit them in other editors.

Add a track with a Session Player region

1. In Logic Pro, tap the Add Tracks button + above the track headers.
2. In the New Tracks dialog, choose the Session Player you want to use (Keyboard Player, Bass Player, or Drummer) in the pop-up menu in the Session Player button.
3. To choose a different Session Player style, tap the More button ⋯ in the Session Player button, then choose a style in the Style pop-up menu.
4. For the Bass Player or Keyboard Player, if you don't want the Session Player region on the new track to use the default progression, tap the Use Default Chord Progression for New Regions switch to turn it off. See Use chord progressions.
5. To create the track, tap the Session Player button in the New Tracks dialog.
   - If there are no chords on the Chord track, a default eight-bar chord progression is added (unless you deselected the Use default chord progression for new regions checkbox).
   - If the cycle area is on, a software instrument track containing a Session Player region is created. The length of the Session Player region corresponds to the cycle area.

Create a track with a Session Player loop

In the Browser, you can find loops for all Session Players. Loops for the Bass Player and Keyboard Player are annotated with chords.

1. Tap the Browser button, then tap Loops.
2. Tap the All Filters button.
3. In the Type category, tap Session Player Loop.
4. Tap the More button ••• in the Browser, then tap New Track with Loop.

   A new track is created, and the loop is placed on the track at the beginning of the project.

When you add a loop containing chords to the Tracks area, you can choose to have the chords copied to the Chord track so that they can be followed by the Session Players in the project. See Add Apple Loops to your project.

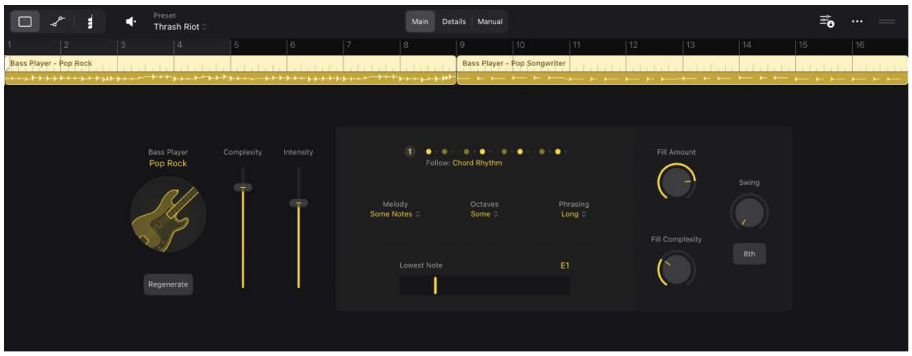
Create an additional Session Player region on a track

- In Logic Pro, with no other region selected, tap an empty area of the software instrument track, then choose Create Session Player Region from the shortcut menu.

You can choose whether a new Session Player region loads with the default chord progression for the style or loads with only the tonic chord of the project's key. See Turn off adding a default chord progression.

The Session Player Editor in Logic Pro for iPad

You edit the content of Session Player regions in the Session Player Editor in Logic Pro for iPad. It is available in the Editors area when a Session Player region is selected. The changes you make apply to the selected Session Player region.



In the editor, you can choose a Keyboard Player, Bass Player, or Drummer for the selected Session Player region, edit the region-based performance of a Session Player, create your own pattern, and work with chords. The changes you make influence the complexity, fills, and other aspects of the Session Player's performance. You can also quickly regenerate a performance without editing the settings in the editor.

Some performance settings in the editor, such as intensity and complexity, are common to all Session Players. Others are unique to the Keyboard Player, Bass Player, or Drummer, giving you control over playing techniques that are characteristic of their music styles.

You can also choose, create, and delete presets. Presets offer a quick way to browse predefined, region-based Session Player Editor settings, such as patterns, fills, and swing settings.

The Session Player Editor also features an Automation view to show region automation. For more information about automation, see Intro to automation.

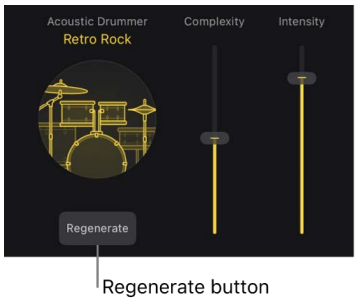
Open the Session Player Editor

1. Logic Pro, tap a Session Player region in the Tracks area to select the region.
2. Tap the Editors button in the middle of the view control bar.

The Session Player Editor opens below the Tracks area. When you tap a different Session Player region, the editor shows the player and settings for that region.

Change a Session Player type and style in Logic Pro for iPad

In the Session Player Editor in Logic Pro for iPad, you can select different player types and styles in the Session Player dialog. The players include different kinds of acoustic and electronic Drummers, the Bass Player, and the Keyboard Player. Each type of player comes with a variety of distinct styles.



You can choose a different style for each Session Player region on a track, which allows you to vary the playing style for different sections of your project. When you choose a different style for a region, the default instrument patch associated with that style is loaded, affecting all other regions on the track. You can change this behavior so that the instrument patch does not change when you choose a new style.

Likewise, when you choose a new Session Player, the instrument patch for that track also changes. However, if you have other regions on the same track, they will retain their notes and settings. This may produce undesirable results when played with the new instrument patch.

Choose a different Session Player style

1. In the Session Player Editor in Logic Pro, tap the Session Player button.
2. Choose a new style from the menu.

Choose a different Session Player

1. In the Session Player Editor in Logic Pro, tap the Session Player button.
2. Tap the Type pop-up menu and choose a new type.

Chords and Session Players in Logic Pro for iPad

In order to play harmonies, the Keyboard Player and the Bass Player require chords in Logic Pro for iPad. Chords are contained on the global Chord track in the global tracks area and as region chords on Session Player regions. The Keyboard Player and the Bass Player can follow either the Chord track or the region chords. You can add your own chords or choose from a set of chord progressions for Session Players to follow. All Session Players can follow the rhythm of the chord progression and a specific track.

Note: If no chords exist on the Chord track at the position of the Keyboard Player or Bass Player region, or as region chords on the region, the player plays the tonic chord of the project's key signature.

Session Players and the Chord track

With the Chord track, multiple Session Players can follow the same chords to play in sync harmonically. You can add and edit the chords on the Chord track, and the Session Players' performances adapt to reflect your changes. You can also group chords together on the Chord track.

For more information, see the following:

- Follow chords on the Chord track
- Paste chords from a Session Player region to the Chord track
- Use chord progressions
- Add a chord to the Chord track
- Group chords on the Chord track

Session Players and region chords

Region chords affect only the Session Player for the individual region. When a Session Player region contains chords, by default, the player for that region follows those chords. If the Session Player region contains no region chords, by default, the player follows the Chord track. You only see region chords if the Session Player region is set to follow region chords. You edit region chords in the Chord view in the Session Player Editor.

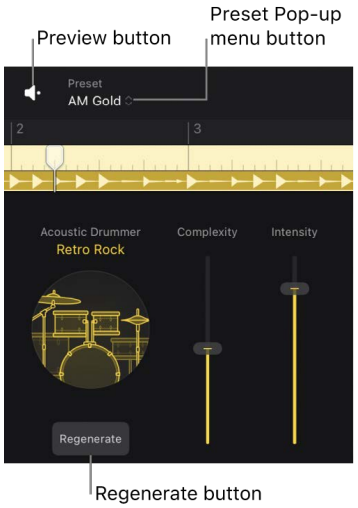
For more information, see the following:

- Follow chords on the Session Player region
- Paste chords from the Chord track to a Session Player region
- View region chords in the Session Player Editor
- Add a region chord to a Session Player region
- Edit a chord
- Move chords on a Session Player region
- Cut, copy, and paste chords
- Delete a chord and Delete all chords on a Session Player region

For detailed information about adding and editing region chords and chords on the Chord track, see Intro to chords.

Choose Session Player presets in Logic Pro for iPad

After you choose a Session Player type and style, you can choose from a collection of presets in the Session Player Editor. Presets offer a quick way to browse predefined, region-based Session Player Editor settings, such as patterns, fills, and swing settings. You can use the default settings, or you can edit them and save your own presets. User presets can be deleted, but included presets cannot.



Whenever you choose a different preset or edit settings for the current one, you can play back the selected region to hear the changes. You can also regenerate a subtly different version of the selected region without editing any of the region settings .

Choose a different preset for the selected region

- In Logic Pro, tap the Preset pop-up menu on the left side of the Session Player Editor menu bar, then choose a new preset.

The region settings on the right side of the editor update to reflect the chosen preset, and the selected Session Player region in the Tracks area is regenerated.

Preview the current preset for the selected region

- In Logic Pro, tap the Preview button on the left side of the Session Player Editor menu bar.

  When the selected Session Player region is playing, the cycle area is set to the region and the region is set to solo.

Save a modified user preset

- In Logic Pro, tap the Preset pop-up menu on the left side of the Session Player Editor menu bar, then tap Save Preset.

  The preset now appears in the list of presets.

Delete a user preset

- In Logic Pro, tap the Preset pop-up menu on the left side of the Session Player Editor menu bar, then tap Delete Preset.

Recall the default preset

You can recall the default preset that was loaded when you chose the current style.

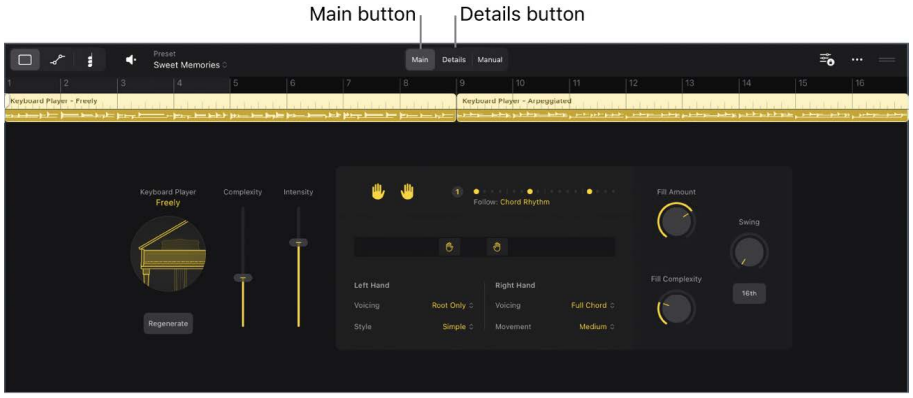
- In Logic Pro, tap the More button ••• on the right side of the Session Player Editor menu bar, then tap Recall Default.

Edit a Session Player performance

Edit a Session Player performance in Logic Pro for iPad

There are a number of settings in the Session Player Editor in Logic Pro for iPad that are common to all Session Players (Bass Player, Keyboard Player, and Drummer). You can access these settings using the Main button and Details button in the Session Player Editor.

For all Session Players, you can choose a pattern, edit the complexity and intensity of the performance, adjust the amount and complexity of fills, and edit swing settings and other performance settings. As you adjust the settings, they interact with each other, creating a near-endless number of performances. You can also quickly regenerate a performance without editing the settings in the editor.



Patterns form the rhythmic basis of a performance and are rough visualizations of performances. Each pattern represents a musical bar divided into sixteenth notes (dots). A brighter dot indicates the main accents for the Session Player to play or accentuate a note. The dimmer dots indicate probable accents when the complexity setting is higher. In addition to choosing a predefined pattern, you can also create your own pattern from scratch.



Some settings are unique to specific Session Players, instruments, and styles. See Edit a Keyboard Player performance, Edit a Bass Player performance, and Edit a Drummer performance.

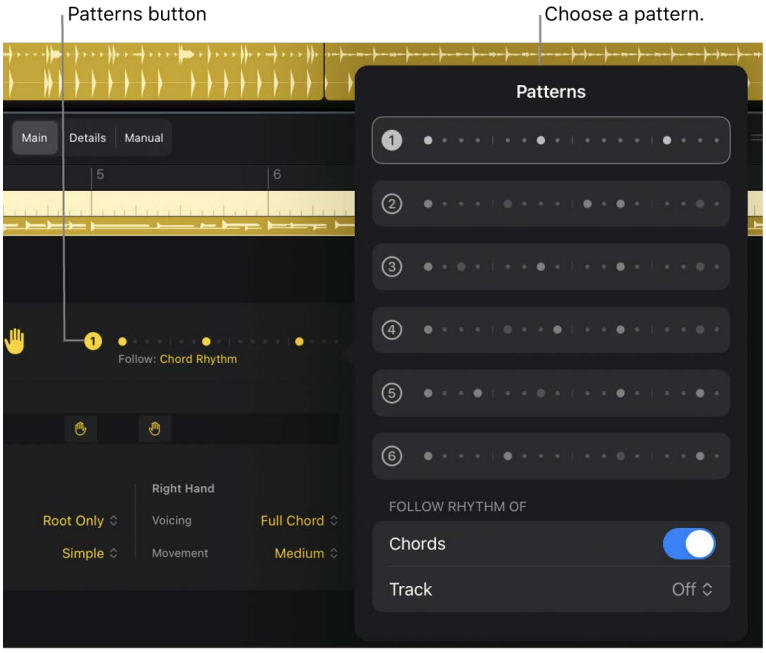
Adjust the complexity or intensity of the performance

- In the Logic Pro Session Player Editor, drag the Complexity slider or Intensity slider to adjust the performance.

The higher you drag the respective slider, the greater the complexity or intensity of the performance.

Choose a rhythmic pattern

- In the Logic Pro Session Player Editor, tap the Patterns button to open the Patterns dialog, then choose a pattern.



Note: The Drummer features multiple Patterns buttons that allow you to choose different patterns for the various kit pieces. The patterns show multiple rows of dots for the different kit pieces, which you can mute using the kit piece icons. For the hi-hat, cymbal, toms, and percussion pieces, the brighter dots indicate stronger accents and the dimmer dots weaker accents.

Edit fill settings

In the Logic Pro Session Player Editor, do any of the following:

- *To decrease or increase the number and length of fills:* Drag the Fill Amount knob vertically.
- *To decrease or increase the complexity of the fills:* Drag the Fill Complexity knob vertically.

Edit swing settings

In the Logic Pro Session Player Editor, do any of the following:

- *To adjust the shuffle feel of the currently playing pattern:* Drag the Swing knob vertically.
- *To determine whether the swing is based on eighth notes or sixteenth notes:* Tap the 8th or 16th button.

Edit other performance settings

In the Logic Pro Session Player Editor, tap the Details button, then do any of the following:

- Drag the Feel knob up to have the Session Player play ahead of the beat or down to play behind the beat.
- Drag the Dynamics knob vertically to adjust the range of the volume.
- Drag the Humanize knob vertically to influence the quantization of patterns. The more to the right you turn the knob, the more rhythmically loose the performance becomes.
- Choose an option from the Tempo pop-up menu to change how fast the rhythm is played.

  Note: When you choose Automatic, the Session Player plays in half-time or double-time when the project tempo differs greatly from the default tempo of the style.

Copy settings from one Session Player region to another

1. In Logic Pro, tap the More button ••• on the right side of the Session Player Editor menu bar, then tap Copy.
2. Select the destination Session Player region in the Tracks area.

   The Session Player Editor refreshes to show the currently selected region's settings.
3. In the Session Player Editor, tap the More button again, then tap Paste.

   The performance settings of the destination region are replaced with the style and settings of the copied region.

Keep settings when changing style or preset

After you make changes to the Session Player's performance, you can lock the performance settings to prevent any changes when switching styles. You can also lock the Fills and Swing parameters when changing styles and presets.

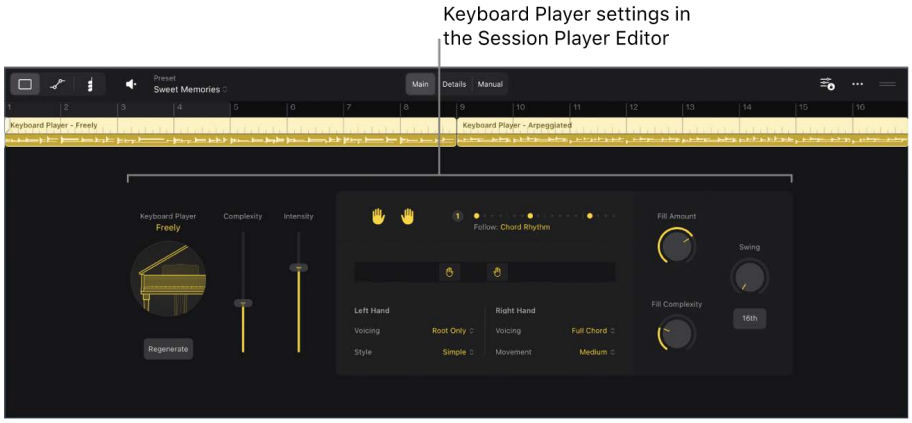
- In Logic Pro, tap the Lock Settings button on the right side of the Session Player Editor menu bar, then choose the settings you want to lock.

You can also quickly regenerate a new Session Player performance, without editing any settings in the Session Player Editor, to play back a subtly different version.

Edit a Keyboard Player performance in Logic Pro for iPad

You can use the Keyboard Player in Logic Pro for iPad to create authentic piano and keyboard harmonies in a variety of styles.

In addition to the common settings available for all Session Players, the Keyboard Player has settings that are designed for keyboard and piano performances. These settings control various aspects unique to keyboard and piano performances, such as hand positions, voicing, and style. They appear in the Session Player Editor when the Keyboard Player is the Session Player for the selected Session Player region.



Some settings and menu options only appear in the editor for specific Keyboard Player styles.

Mute or unmute a playing hand

Similar to a real keyboard player, the left and right hands work together to create the performance. This means, for example, that muting the left hand changes how the right hand plays voicings.

- In the Logic Pro Session Player Editor, tap the Left Hand button or Right Hand button so that it's selected (unmuted) or dimmed (muted).

Set the hand positions

- In the Logic Pro Session Player Editor, drag the Left Hand and Right Hand sliders to set the hand positions.

  The slider control represents the range of the keyboard, with the lower keys on the left and the higher keys on the right.

  Tip: You can simultaneously move the Left Hand and Right Hand sliders by dragging the space between them.

Edit left-hand voicing and style

The left hand typically plays the root notes of chords or an alternative bass note when one is specified in the Edit chord dialog. In the Logic Pro Session Player Editor, do any of the following:

- *To change what notes the left hand plays:* Choose one of the following options in the Left-Hand Voicing pop-up menu:
  - *Root Only:* Play just the root note.
  - *Root & Octave:* Play the root note and octave.
  - *Root & Fifth:* Play the root note and fifth.
  - *Root, Fifth & Octave:* Play the root note, fifth, and octave.
- *To change the complexity of the left-hand playing style:* Choose one of the following options in the Style pop-up menu:
  - *Sustain Only:* Play only long, sustained notes.
  - *Simple:* Play mostly long notes and sometimes short notes.
  - *Moderate:* Play a moderate rhythmic pattern.
  - *Complex:* Play a more intricate rhythmic pattern.
  - *Follow Right Hand:* Play accents in sync with the right hand.
  - *Steady 8ths:* Play straight eighth notes.

Edit right-hand voicing and movement

The right hand plays chords in the chord progression. In the Logic Pro Session Player Editor, do any of the following:

- *To influence the voicing number, common tones, and chord extensions:* Choose one of the options in the Right-Hand Voicing pop-up menu.
- *To change the range of keys the right hand uses:* Choose an option in the Right-Hand Movement pop-up menu.

Adjust the probability of grace notes

- In the Logic Pro Session Player Editor, tap the Details button, then drag the Grace Notes knob vertically.

  Note: The Grace Notes knob is not available for Simple Pad.

Adjust other performance settings for specific styles

In Logic Pro, some styles provide additional settings in the Session Player Editor to complement performance aspects and articulations typical of the playing style.

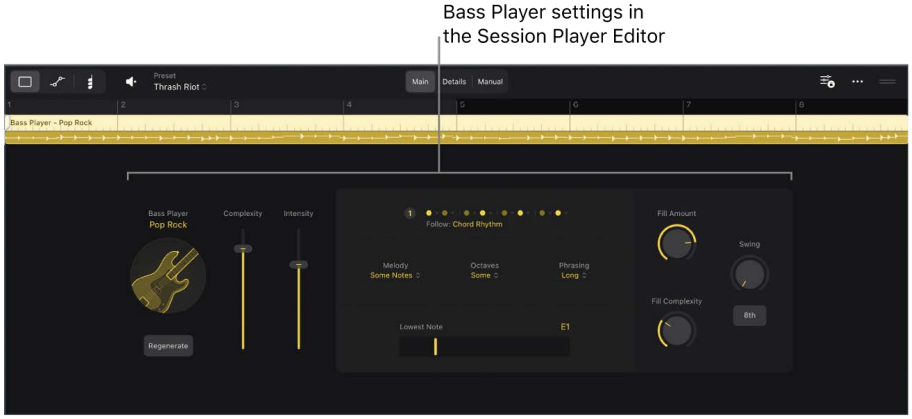
- For Block Chords:
  - *To fill the pattern with eighth notes:* Tap the Patterns button, then turn on the Steady 8ths switch.
  - *To have the player play staccato notes, more longer notes with some short notes, or all long notes with the sustain pedal pressed:* In Details view, choose an option from the Phrasing pop-up menu.

- For Arpeggiated:
  - *To influence the primary direction of arpeggios and include chords on the beats accentuated by the pattern:* In Details view, choose an option from the Arpeggio Mode pop-up menu.
- For Simple Pad:
  - *To have the player sustain notes of the same pitch that are common across multiple chords in the progression:* Choose an option from the Tie Notes pop-up menu.
  - *To shift the start and end of each note so that it is ahead or behind the beat:* Drag the Note Start knob vertically.
  - *To change the length of notes:* Drag the Note Length knob vertically.

Edit a Bass Player performance in Logic Pro for iPad

You can use the Bass Player in Logic Pro for iPad to quickly add authentic bass lines to your project.

In addition to the common settings available for all Session Players, the Bass Player comes with a set of specific settings. These settings are designed to control various aspects unique to a bass performance, such as chord tones, mute notes, and slides across the frets. They appear in the Session Player Editor when the Bass Player is the Session Player for the selected Session Player region.



Some settings and menu options only appear in the editor for specific Bass Player styles.

Choose the melody notes

You can influence the notes played by the Bass Player, such as only the root note or more elaborate passages that also use other chord tones. The options available depend on the Bass Player style you have chosen. For example, with Retro Rock you can choose various grooves that are typical for rock music.

- *To change the melody:* In the Logic Pro Session Player Editor, choose an option in the Melody pop-up menu.

Add octaves

- In the Logic Pro Session Player Editor, choose an option in the Octaves pop-up menu to determine the frequency and probability that the Bass Player plays octave jumps.

Change the phrasing

You can change the maximum possible length of the notes to influence the phrasing of a Bass Player's performance.

- In the Logic Pro Session Player Editor, choose one of the options in the Phrasing pop-up menu.

Set the lowest note

You can set the lowest note the Bass Player can play. This can be useful if, for example, a chord tone is lower than E3 and you want to include it.

- In the Logic Pro Session Player Editor, drag the Lowest Note slider.

  Tip: Setting the lowest note value to B0 emulates five-string bass performances.

Adjust muting

In the Logic Pro Session Player Editor, tap the Details button, then do any of the following:

- *To change how heavily notes are muted:* Drag the Mute Offset value.

  Note: This is an offset for the Mute slider in the Studio Bass plug-in. If you've set this slider to zero, changing Mute Offset has no effect. See Studio Bass.

- *To have muted notes occur based on the surrounding notes:* Tap the Dynamic Mute button to turn it on.

Edit percussive elements

In the Logic Pro Session Player Editor, tap the Details button, then do any of the following:

- *To adjust the number of percussive, unpitched notes:* Drag the Dead Notes knob vertically.
- *To have the Bass Player hit the strings with an open palm on the second and fourth beats:* Tap the Pickup Hits button to turn it on.

Adjust slides

- *To adjust how often the Bass Player slides between and before notes:* In the Logic Pro Session Player Editor, tap the Details button, then drag the Slide Notes knob vertically.

Choose closer intervals for root notes

- *To have the Bass Player choose closer intervals for root notes when moving through the chord progression:* In the Logic Pro Session Player Editor, tap the Details button, then tap the Align Root button to turn it on.

Adjust other performance settings for specific styles

In Logic Pro, some styles provide additional settings in Details view in the Session Player Editor to complement performance aspects and articulations typical of the playing style.

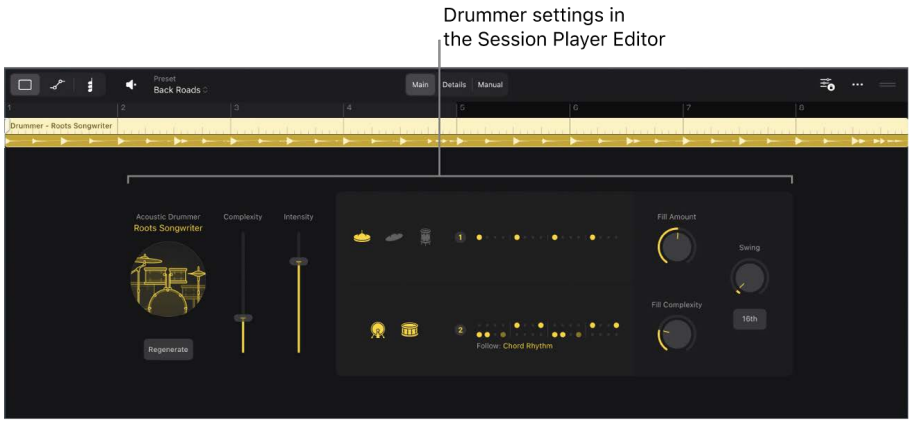
- For Disco Slap:
  - *To adjust the probability of buzz trills:* Drag the Buzz Trills value.
- For Modern R&B, Retro Rock, and Pop Songwriter:
  - *To adjust the probability of double stops (two notes played together):* Drag the Double Stops value.

- For Modern R&B:
  - *To shift the last sixteenth note in a beat back, giving a laid-back feeling:* Drag the Laid Back value.
- For Retro Rock and Roots Upright:
  - *To adjust the probability of bends from minor thirds to major thirds when playing major chords and quarter-tone slides:* Drag the Blue Notes value.
- For Roots Upright:
  - *To adjust the probability of percussive slaps:* Tap the Slaps button to turn it on.

Edit a Drummer performance in Logic Pro for iPad

There are a number of settings in the Session Player Editor in Logic Pro for iPad that affect the Drummer's playing style.

In addition to the common settings available for all Session Players, the Drummer comes with a set of specific settings. You can choose whether a pattern is played on the toms, cymbals, hi-hat, or percussion instruments. You use the kit piece icons to turn on different instruments, and you can choose between different patterns for the drum and percussion pieces. The Drummer settings appear in the Session Player Editor when the Drummer is the Session Player for the selected Session Player region.



The Drummer can play acoustic kits or electronic kits. Acoustic kit patches use Drum Kit Designer, and electronic patches use Drum Machine Designer.

Mute or unmute a drum or percussion instrument

- *To include the kit piece in the performance:* In the Logic Pro Session Player Editor, tap the kit piece so that it's selected, or unmuted.
- *To remove a kit piece from the performance:* In the Session Player Editor, tap the kit piece so that it's dimmed, or muted.

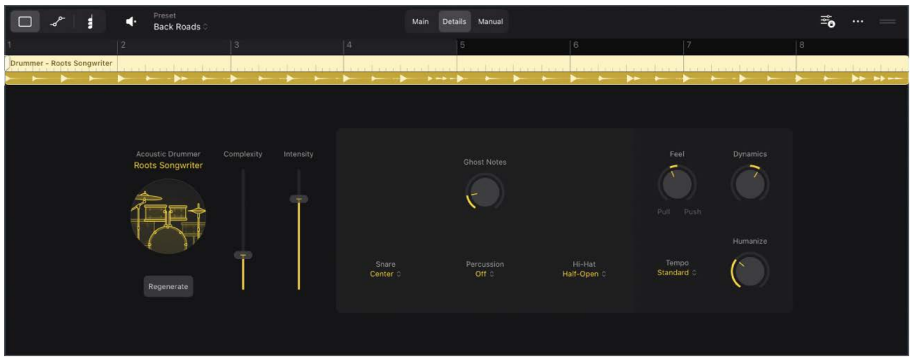
Adjust the snare brush technique of a Drummer using a brush kit

When using a Drummer who plays with snare brushes (Pop Brush or Roots Brush), the Brush Sweep or Brush Taps switch appears in the Patterns dialog for the kick and snare. Brush Sweep is a swirling, sweeping brush technique reminiscent of percussion fills. Brush Taps is a gentle, tapping snare brush technique.

- In the Logic Pro Session Player Editor, tap the Patterns button for the kick and snare to open the Patterns dialog, then tap the switch to turn on Brush Sweep or Brush Taps.

Edit additional performance settings for acoustic drums

In Logic Pro, tap the Details button in the Session Player Editor, then do any of the following:

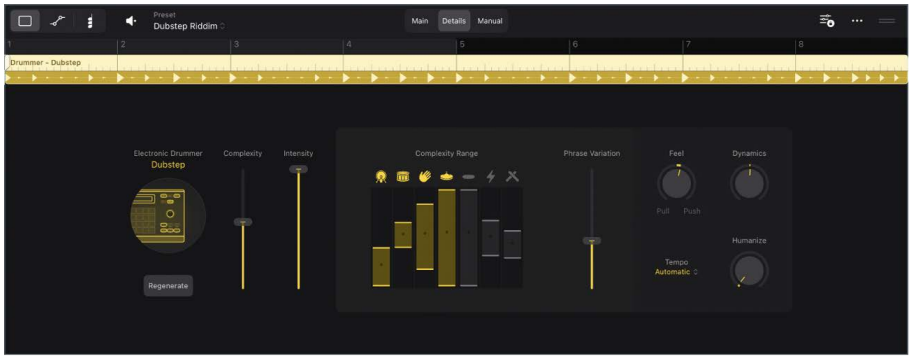


- *To adjust snare hits:* Choose an option from the Snare pop-up menu.
- *To add percussion, such as a tambourine, shaker, or claps:* Choose an option from the Percussion pop-up menu.
- *To control the degree to which the hi-hat is opened and closed during the drum performance:* Choose an option from the Hi-Hat pop-up menu.
- *To set the cymbal sounds:* Choose an option from the Cymbals pop-up menu.
- *To control which toms are played:* Choose an option from the Toms pop-up menu.

Note: The pop-up menus for the hi-hats, cymbals, and toms appear only when you choose the respective kit piece in the Main view.

Edit additional performance settings for electronic drums

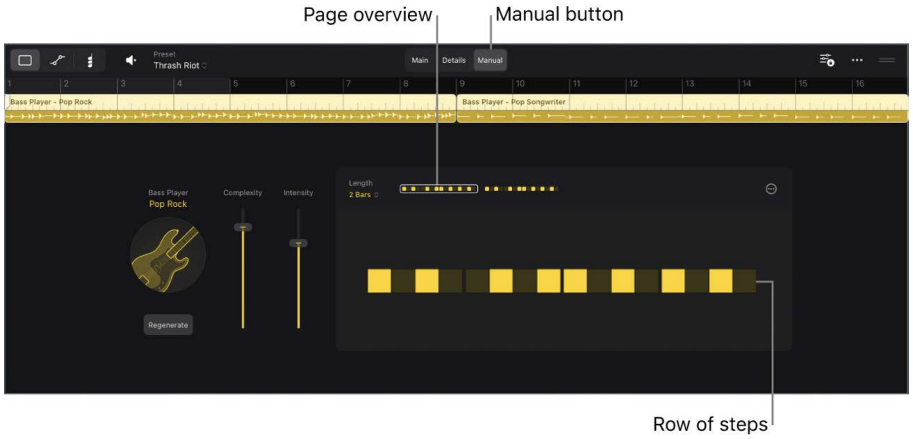
In Logic Pro, tap the Details button in the Session Player Editor, then do any of the following:



- *To adjust the complexity range of kit pieces:* Drag the kit piece sliders.
- *To determine the amount of rhythmic change that occurs over the course of several bars within a region:* Drag the Phrase Variation slider.

Create a custom Session Player pattern in Logic Pro for iPad

You can create custom patterns for the Keyboard Player, Bass Player, and Drummer to follow. You create a pattern by turning steps in a row on and off in Manual view in the Session Player Editor. When editing the Keyboard Player and Bass Player, a single row is available. When editing a Drummer, multiple rows are available for different kit pieces.



Each step in a row represents a sixteenth note, meaning a row of sixteen steps equals one musical bar. You can increase the length of a custom pattern and define the length in bars or steps.

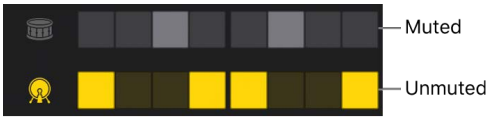
Create a custom pattern

1. In the Logic Pro Session Player Editor, tap the Manual button to switch to Manual view.
2. Tap a step to activate the pattern.
3. Tap steps to turn them on and off.

Creating a custom pattern turns on the pattern. You can turn it off by choosing a predefined pattern again in the Patterns dialog.

Mute or unmute a kit piece for the Drummer

- In Manual view in the Logic Pro Session Player Editor, tap the kit piece icon at the beginning of a row so that it's selected (unmuted) or dimmed (muted).



Change the length of a custom pattern

- In Manual view in the Logic Pro Session Player Editor, choose a bar or step value from the Length pop-up menu.

When the pattern length is more than 16 steps, it's divided into sections called *pages*, with each page showing a part of the pattern. An overview of each page appears above the first row. You can tap the page overviews to switch between the different parts.

Copy and paste the steps from one page to another

1. In Manual view in the Logic Pro Session Player Editor, tap the page you want to copy in the page overview, located above the first row of steps.
2. Tap the More button, then choose Copy Page.
3. Select the destination page above the first row of steps, tap the More button again, then choose Paste Page.

Copy and paste a custom pattern

1. In Manual view in the Logic Pro Session Player Editor, tap the More button, then choose Copy Pattern.
2. Select the destination Session Player region, then, in the Session Player Editor for that region, tap the More button again, then choose Paste Pattern.

Clear a custom pattern

- In Manual view in the Logic Pro Session Player Editor, tap the More button , then choose Reset.

Regenerate a Session Player performance in Logic Pro for iPad

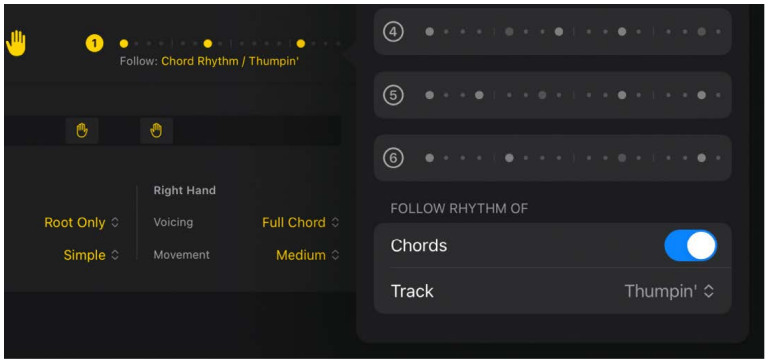
You can regenerate a Session Player region to quickly create a variation of a performance without editing any of the settings in the Session Player Editor. Regenerating a performance is more noticeable when you're using more complex styles or when you've increased settings such as complexity and fills.

Regenerate the performance

- In the Logic Pro Session Player Editor, tap the Regenerate button, located below the Session Player button.

Follow rhythm from chords and other tracks in Logic Pro for iPad

You can set Session Player regions to place rhythmic emphasis on chord changes and to follow the rhythm of another track. You can set these options for each individual Session Player region, allowing you to create interesting rhythmic variations for different parts of your song.



You may find, for example, that it makes more musical sense during the chorus to have the Drummer and Bass Player follow the rhythm of a guitar track. Or perhaps it sounds better when the Keyboard Player emphasizes the chord changes in the intro but lays back during the verse.

The option to follow the rhythm of chords is turned on by default. Session Player regions follow chords in the global Chord track or their individual region chords, depending on that region's settings in the Session Player Editor. See Chords and Session Players.

Follow rhythm of another track

1. In Logic Pro, select a Session Player region in the Tracks area.
2. In the Session Player Editor, depending on what kind of Session Player region is selected, do one of the following:
   - *Bass Player and Keyboard Player:* Tap the Patterns button.
   - *Drummer:* Tap the Patterns button for the Kick and Snare kit pieces.
3. Below Follow Rhythm Of, choose a track from the Track pop-up menu.

   Note: The Track pop-up menu is not available for the Percussionist Session Player type.

Follow rhythm of chords

1. In Logic Pro, select a Session Player region in the Tracks area.
2. In the Session Player Editor, depending on what kind of Session Player region is selected, do one of the following:
   - *Bass Player and Keyboard Player:* Tap the Patterns button.
   - *Drummer:* Tap the Patterns button for the Kick and Snare kit pieces.
3. Below Follow Rhythm Of, make sure the Chords switch is on.

   Note: The Chords switch is not available for the Percussionist Session Player type.

Convert Session Player regions into MIDI or pattern regions in Logic Pro for iPad

In the Logic Pro Session Player Editor, you can edit Session Player regions, but not specific notes. To edit specific notes, you need to use the Piano Roll Editor or Step Sequencer. Before you can do so, you must first convert your Session Player regions into MIDI regions or pattern regions. See Overview of the Piano Roll Editor and Intro to Step Sequencer.

After converting a Session Player region into a MIDI or pattern region, you can replace it with a Session Player region at any time. However, any edits you've made to the region will be lost.

Convert a Session Player region into a regular MIDI region

You can convert a Session Player region into a pattern region, and then edit it in Step Sequencer. If the Session Player region is longer than four bars, additional pattern regions are created (each with a maximum length of four bars) to equal the length of the converted Session Player region.

1. In the Tracks area in Logic Pro, select the Session Player region.
2. Tap the selected Session Player region, tap Convert, then tap Convert to MIDI Region.

The resulting MIDI region behaves the same way as any other MIDI region, and you can edit it in the Piano Roll Editor.

Convert a Session Player region into a pattern region

1. In the Tracks area in Logic Pro, select the Session Player region.
2. Tap the selected Session Player region, tap Convert, then tap Convert to Pattern Region.

The resulting pattern region behaves the same way as any other pattern region, and you can edit it in Step Sequencer.

Replace a regular MIDI or pattern region with a Session Player region

1. In the Tracks area in Logic Pro, select the MIDI or pattern region.
2. Tap the selected MIDI or pattern region, tap Convert, then choose Replace with Session Player Region.

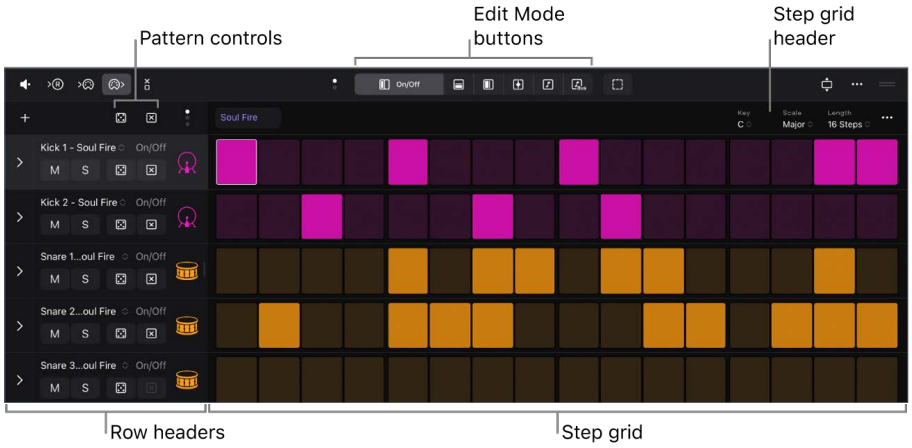
The resulting Session Player region doesn't contain any MIDI edits you may have made.

Create patterns with Step Sequencer

Intro to Step Sequencer in Logic Pro for iPad

Step Sequencer in Logic Pro for iPad is inspired by classic hardware step sequencers with rows of configurable switches or knobs used to generate repeating musical patterns. In Step Sequencer, you create patterns by editing multifunctional steps in the *step grid*. Each row controls either a sound (which can be a drum kit piece, your own sample, a note on an instrument, or a range of notes) or an automation parameter (letting you create automation changes over time in the pattern). Each step represents a definable length of musical time–by default, steps are of equal length, but you can change the length for individual rows or steps. You can adjust a wide range of parameters for individual steps, including velocity, pitch, gate time, and more; and edit pattern and row settings, including pattern length, row loop start and end points, playback position, and rotation.

Step Sequencer appears in the Editors working area of Logic Pro. The Step Sequencer interface includes the following:



- *Step Sequencer menu bar:* Contains a Preview button, a Live Record button, MIDI In and MIDI Out buttons, a Mono Mode button, the Edit Mode buttons, a Step Select button, a Vertical Auto Zoom button, and a More button.
- *Step grid header:* Contains a Pattern Key pop-up menu, a Pattern Scale pop-up menu, a Pattern Length pop-up menu, and a More button for changing the pattern in the step grid.
- *Step grid:* The main working area, where you turn steps on and off and graphically edit step settings using edit modes. See Edit Step Sequencer steps.

- *Pattern controls:* Located in the area above the first row header, these consist of a set of controls for the pattern and a Page Switch button that you use to cycle through the sets of controls in the pattern controls, row headers, and subrow headers.
- *Row headers:* Each header contains a subrow disclosure arrow to show subrows and a set of controls for the row that you can cycle through using the Page Switch button in the pattern controls. See Modify Step Sequencer pattern playback and Edit Step Sequencer rows.

Pattern regions and pattern cells

Step Sequencer patterns are contained in pattern regions (in the Tracks area) and pattern cells (in the Live Loops grid). Pattern regions and cells are used primarily in MIDI-based (software instrument and external instrument) tracks. Pattern regions (but not pattern cells) can also be used on audio tracks to automate effect and channel strip parameters. A project can contain any number of pattern regions or cells.

Each pattern region or cell functions as an independent step sequencer, with its own pattern, configuration, and settings. You can copy and move pattern regions like other regions in the Tracks area. Pattern cells can be copied, moved, triggered, and queued like other Live Loops cells. You can modify pattern region and cell parameters in the inspector.

All pattern, row, and step settings, as well as Step Sequencer view settings, are stored with the pattern. You can also save a pattern as a *template*, which contains all the current settings except for the step values, so you can use it as a starting point for creating new patterns.

Patterns can include two types of rows:

- *Note rows:* Generate MIDI note events (for each active step). By default, all notes in a note row have the same pitch, but you can change the pitch for individual steps using the Note and Octave edit modes.
- *Automation rows:* Generate stepped automation events for an automatable parameter. You can assign an automation row to any automatable parameter, including MIDI continuous controller (CC) parameters, channel strip controls, and plug-in parameters.

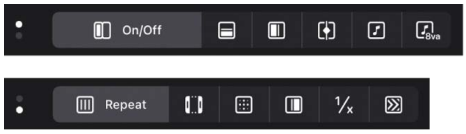
Each row can have its own length, step rate, playback mode, start offset, and other settings. Patterns can be from 12 to 64 steps in length, allowing for different time signatures and multiple bar patterns.

You can add rows to a pattern manually or using Learn mode. When Learn mode is active, rows are added when you play notes for which no row exists, or when you manipulate an automation parameter for which no row exists. Using Learn (Assign) mode, you can reassign existing note rows to match incoming note events, or reassign automation rows to match automation parameters. You can also add your own samples or audio files.

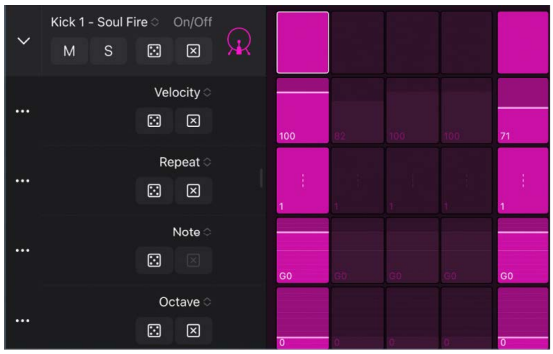
See Pattern creation basics and Change the musical length of a pattern.

Edit modes

Using edit modes, you can control different attributes of the note or event triggered by a step. Some edit modes apply to only one row type, while others are common to both types. For note rows, you can change the velocity, pitch, gate time, number of note repetitions in a step, and other attributes. For automation rows, you can change the value of the automated parameter. Edit modes common to both row types include skipping and tying steps, changing the loop start and end point, and changing the step rate.



You select the edit mode for all rows in the pattern using the Edit Mode buttons in the Step Sequencer menu bar. You can also view and edit multiple edit modes per row using subrows. Rows always match the edit mode selected, while you can choose any unused edit mode for a subrow. You can add and delete subrows as needed.



See Use Step Sequencer edit modes.

Use Step Sequencer with Drum Machine Designer in Logic Pro for iPad

Step Sequencer is especially suited to creating drum patterns using Drum Machine Designer patches in Logic Pro for iPad. When you create a new pattern region on a track with a Drum Machine Designer patch, note rows show names and icons matching the kit pieces in the patch (rather than MIDI note names), and the Row Assignment pop-up menu shows the kit piece names rather than MIDI note names.

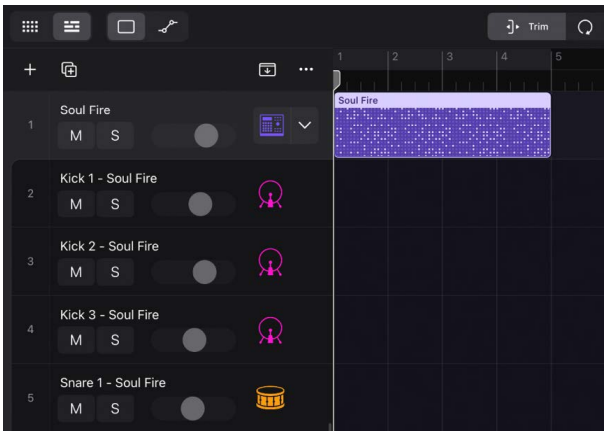
When using Step Sequencer with a Drum Machine Designer patch, changing the note or octave values for steps transposes the pad kit piece rather than changing the drum sound. Unlike with other types of instruments, the row name retains the name of the kit piece rather than changing to Melodic.

Using Drum Machine Designer patches and the Drum Machine Designer Play Surface, you can quickly record Step Sequencer patterns live.

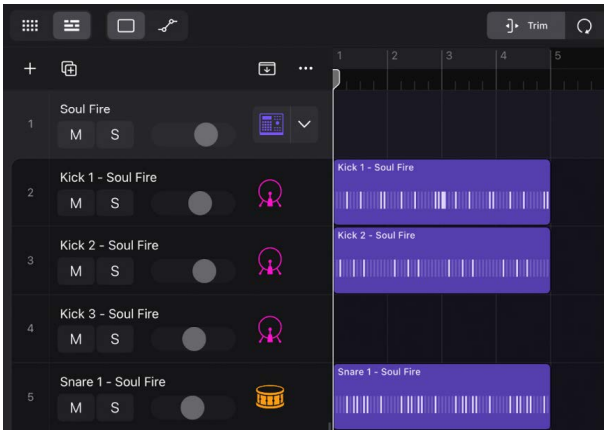
A pattern region that uses a Drum Machine Designer patch can be separated into multiple pattern regions so that each row is separated into its own one-row pattern region. The separated regions are placed on the subtracks of the Drum Machine Designer track stack matching the originating kit piece rows. This can be useful when you want to work with the resulting rows as separate regions. This function is similar to the MIDI Separate by Note Pitch function.

Separate a Drum Machine Designer pattern region per kit piece

1. In the Logic Pro Tracks area, tap the pattern region to select it, then tap it again.



2. Tap Convert, then tap Separate by Kit Piece.
3. To view and edit the new pattern region for each row, tap the disclosure arrow to open the track stack.



Create Step Sequencer patterns

Pattern creation basics in Logic Pro for iPad

Using Step Sequencer in Logic Pro for iPad, you can create rhythm-based drum patterns and note-based instrument patterns using software instruments. You can start with an empty pattern or use an existing pattern or template as a starting point.

You create a pattern by turning steps on and off, modifying steps using edit modes, and editing aspects of the overall pattern, including the pattern length, the step rate for the pattern, and the pattern key. You can increase the number of notes or drum sounds in a pattern by adding rows and choosing the row assignment. When you activate Learn mode, you can quickly add rows by playing notes or manipulating automation parameters. You can also add your own samples using drag and drop.

Create an empty pattern region in the Tracks area

- In Logic Pro, tap an empty software instrument track, then tap Create Pattern Region.

Create an empty pattern cell in the Live Loops grid

- In Logic Pro, tap an empty software instrument cell, then tap Create Pattern Cell.

Open Step Sequencer

- Tap a pattern region, then tap the Editors button in the middle of the view control bar to display that region in Step Sequencer in the Editors area.

Turn steps on or off

- In Logic Pro, tap the Step On/Off button in the Step Sequencer menu bar, then tap an inactive step in the grid to turn it on.
- Tap an active step to turn it off.

Enter steps monophonically

Using Mono mode, you can easily create monophonic lines by suppressing the creation of more than one note per step position. When you turn on a step, and another step is already active at the same vertical position, the previously active step is turned off. This can be useful, for example, when creating patterns for a monophonic instrument.

Turning on Mono mode does not turn off steps that are already active, but once you activate a new step, Step Sequencer turns off all other active steps at the same vertical step position.

- To turn on Mono mode, tap the Mono Mode button in the Step Sequencer menu bar.

Preview a pattern

- In Logic Pro, with the project stopped, tap the Preview button in the Step Sequencer menu bar.

  Tap the Preview button again to stop the pattern playing.

Add a row

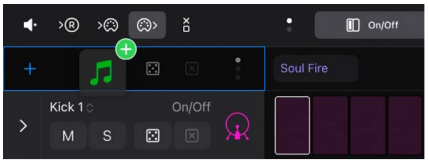
You can add a row and choose the kit piece (for kit piece rows), pitch (for note rows), or automation parameter (for automation rows) directly using the Add Row button. You can also add rows using Learn mode.

1. Next to the pattern controls in Logic Pro, tap the Add Row button +, then do one of the following:
   - *To add a kit piece row:* Choose Kit Pieces, then choose a kit piece from the submenu.
   - *To add a note row:* Choose Notes, then do one of the following:
     - Choose a fixed pitch or a drum sound for the row from the Notes submenu.
     - Choose Melodic if you plan to add a note row with steps set to different pitches.
   - *To add an automation row:* Choose Automation, then choose the automation parameter for the row from one of the submenus.
   - *To activate Learn mode:* Choose Learn (Add) or Learn (Assign).
2. After adding a row, you can turn steps on or off and edit other settings using edit modes.

Add a sound from the Browser

When you have pattern regions on a track that uses Drum Machine Designer, you can quickly add sounds, such as a kit piece, loop, or sample, from the Browser to Step Sequencer.

- In the Browser in Logic Pro, touch and hold a kit piece or sample, then drag it to the area above the row headers in Step Sequencer.



A new row is created with the sound.

Add your own samples or audio files

You can quickly add your own samples or audio files to Step Sequencer from the Files app in Slide Over view.

1. In Logic Pro, tap the Multitasking button ••• at the top of the screen, then tap Split View.

   Logic Pro moves aside, and your Home Screen appears.
2. Tap the Files app on your Home Screen.

   The Files app appears side by side with Logic Pro.
3. In the Files App window, touch and hold the sample you want to import until it appears to lift off the screen slightly. To select multiple samples, touch and hold one, drag it slightly, then continue to hold it while you tap additional samples with another finger. A badge indicates the number of selected items.
4. Drag one or multiple samples from the Files app to the area above the row headers in Step Sequencer.

   A new row is created for each sample.
5. When you finish, tap the Multitasking button at the top of the Files App window, then tap Close.

Add multiple note rows

You can simultaneously add multiple note rows within a specified range. A row is added for each note in the range of the pattern's key and scale.

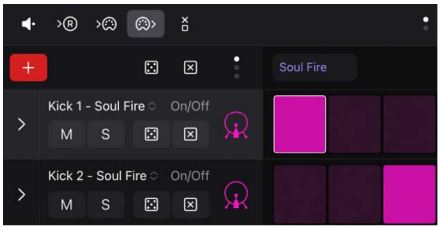
1. Next to the pattern controls in Logic Pro, tap the Add Row button +, tap Notes, then tap Range.
2. Set the range for the note rows you want to add by choosing a low note and a high note, then tap Create.

Add rows using Learn (Add) mode

You can add rows by playing MIDI notes or manipulating automatable parameters using Learn mode. When Learn (Add) mode is active, Step Sequencer creates a new note row for any played MIDI note or parameter for which a row does not already exist. Similarly, it creates a new automation row for any received parameter controller event for which a row does not exist. Learn (Add) mode simplifies the process of creating a step grid with the notes, drum sounds, and automation parameters you want to use in your pattern.

1. To activate Learn (Add) mode, tap the Add Row button +, then tap Learn (Add).

   While Learn (Add) mode is active, the Add Row button is red.



2. Do either of the following:
   - *To add note rows:* Play notes on a Play Surface in Logic Pro or a connected MIDI keyboard or other MIDI controller.
   - *To add automation rows:* Manipulate a control for an automatable parameter (such as a plug-in parameter), either in Logic Pro or using a connected MIDI controller.
3. To turn off Learn (Add) mode, tap the Add Row button.

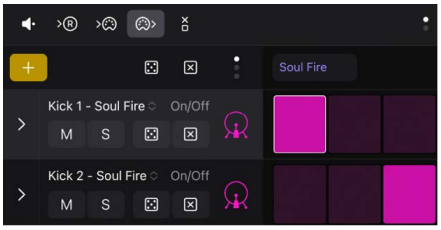
After adding a row, you can turn steps on or off and edit other settings using edit modes.

Reassign rows using Learn (Assign) mode

You can reassign existing rows by playing MIDI notes or manipulating automatable parameters using Learn (Assign) mode. When Learn (Assign) mode is active, Step Sequencer reassigns the selected row to match any played MIDI note for which a row does not already exist, or to match any received parameter controller event for which a row does not exist.

1. To activate Learn (Assign) mode, tap the Add Row button +, then tap Learn (Assign).

   While Learn (Assign) mode is active, the Add Row button is yellow.



2. Tap the icon of the row you want to reassign.
3. Do either of the following:
    - *To reassign a note row:* Play notes on a Play Surface in Logic Pro or on a connected MIDI keyboard or MIDI controller.
    - *To reassign an automation row:* Manipulate a control for an automatable parameter (such as a plug-in parameter), either in Logic Pro or using a connected MIDI controller.
4. To turn off Learn (Assign) mode, tap the Add Row button.

After adding a row, you can turn steps on or off and edit other settings using edit modes.

Step Sequencer provides many controls and functions for working with patterns. You can modify pattern playback, edit steps and rows, and edit pattern, row, and step settings in the inspector. You can also customize different aspects of Step Sequencer to suit your workflow. See Customize the Step Sequencer interface.

Change the musical length of a pattern in Logic Pro for iPad

Several factors determine the musical length of a Step Sequencer pattern (the time in bars and beats before the pattern repeats) in Logic Pro for iPad. The most fundamental are the *pattern length*, which defines the maximum number in steps available to each row, and the *pattern step rate*, which defines the length of each step in musical divisions (note values).

Another important factor affecting the musical length of a pattern is the Loop Start/End edit mode. Using Loop Start/End, you can set the number of steps for each row independently from the pattern length and the length of other rows. Technically, the musical length of a pattern is the length of the longest row. For example, if all rows in a pattern loop after 4 steps, and each step has a step rate of 1/16, then the musical length is only one beat (1/4), even if the pattern length is 16 steps or longer.

When row lengths are evenly divisible, the overall length is equal to the length of the longest. For example, if you shorten several rows in a 16-step pattern to 4 or 8 steps (which both divide evenly into 16), the pattern remains a one-bar pattern. When row lengths are not evenly divisible, however, the musical length is increased (sometimes substantially) because the pattern doesn't repeat until all rows start at the same time again.

Using the Skip edit mode can also result in the length of rows changing, which affects the overall musical length of the pattern in a similar manner to changing the Loop Start/End setting.

The playback mode can also affect the musical length of the pattern. Choosing Ping Pong as the playback mode doubles the pattern length, while setting any row to Random playback mode can result in the musical length of the pattern being essentially infinite.

Ultimately, how long a pattern plays in a project depends on the length of the pattern region or pattern cell. If the musical length of the pattern exceeds the region or cell length, it plays only until the end of the region or cell is reached. When the region or cell length exceeds the pattern length, the pattern repeats until the end of the region or cell, or restarts if the region or cell is looping. If the musical length of the pattern, or of any row, does not fit equally into the region length (or cell length), the rows in the pattern restart before they complete a full cycle.

Change the pattern length

- In Logic Pro, choose a new length from the Pattern Length pop-up menu in the step grid header.

When you increase the pattern length, the added steps duplicate the existing pattern. You can edit the added steps to add variation or change the pattern.

When the pattern length is more than 16 beats, the entire pattern may not be visible in the step grid, depending on the zoom level. In this case, the pattern is divided into sections called *pages*, each showing a part of the complete pattern. An overview of each page appears above the step grid. You can tap the page overviews to quickly switch between different parts of the pattern.

You can also change the pattern length in the inspector.

Change the step rate for the pattern

The step rate sets the duration of steps in the step grid as a note value. You can set the step rate for the overall pattern and also use the Step Rate mode in the edit modes to set a different step rate for individual rows and steps.

The following table provides the step rates and their musical lengths for Step Sequencer in Logic Pro.

Step rate	Musical length
4	4 whole notes
2	2 whole notes
1	1 whole note
/2	Half note
/4	Quarter note
/8	Eighth note
/16	Sixteenth note
/32	Thirty-second note
/64	Sixty-fourth note
1T	Whole-note triplet
2T	Half-note triplet
4T	Quarter-note triplet
8T	Eighth-note triplet
16T	Sixteenth-note triplet
32T	Thirty-second-note triplet
1D	Dotted whole note
2D	Dotted half note
4D	Dotted quarter note

Step rate	Musical length
8D	Dotted eighth note
16D	Dotted sixteenth note
32D	Dotted thirty-second note
64D	Dotted sixty-fourth note

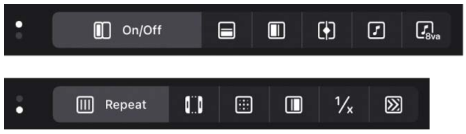
1. In Logic Pro, tap the Page Switch button in the pattern controls until you see the Step Rate button 1/x.
2. Tap the Step Rate button, then choose a new step rate.

You can also change the step rate for the pattern in the inspector.

Use Step Sequencer edit modes in Logic Pro for iPad

You can control different aspects of the event triggered by a step using edit modes. You can choose the edit mode for a pattern, and view multiple edit modes for each row using subrows. Some edit modes are common to both note rows and automation rows, while others are specific to one row type.

The Edit Mode buttons in the middle of the Step Sequencer menu bar control the edit mode for all rows in the pattern. Tap the Page Switch button to alternate between the two rows of buttons.



Edit modes for both row types

- *Step On/Off:* Tap steps to turn them on or off. Active steps appear highlighted in the step grid, while inactive steps appear darker.
- *Tie:* Tap the right edge of a step to tie it to the following step, or tap the left edge to tie it to the previous step. The duration of the step is lengthened by the value of the step it is tied to.
- *Loop Start/End:* When this mode is active, a frame appears around the row. Drag the left edge of the frame to set the start of the row relative to the overall pattern. Drag the right edge of the frame to set the end of the row relative to the overall pattern. You can also tap a step to set the start or end point (whichever is closest) to that step, and drag vertically to other rows to set their start or end positions.
- *Chance:* Drag vertically in the step to set the chance percentage. Chance controls the probability that the step plays each time the pattern repeats. The active state of the step is determined when you edit the chance value and does not change until you edit it again.
- *Start Offset:* Drag vertically in the step to move the start offset of the step from –50 to +50 percent of the step rate.

- *Step Rate:* Drag vertically in the step to set the length of the step (in note values, relative to the project tempo). This determines how long it takes for the playhead to move across the step, whether or not it is active. For information about the step rates, see Change the musical length of a pattern.
- *Skip:* Tap a step to turn skipping on or off. When skipping is on, the step is skipped and playback moves immediately to the next step, in effect shortening the row by the duration of the skipped step.

Edit modes for note rows

- *Velocity:* Drag vertically in the step to set the velocity value from 1 to 127. Velocity typically controls the loudness of the note attack, but can control other parameters depending on the parameter mapped to Velocity for the patch.
- *Gate:* Drag vertically in the step to set the gate value as a percentage of the step. The gate value shortens the note length to less than the duration of the step.
- *Note:* Drag vertically in the step to set the note value from –12 to 12 semitones, transposing the pitch of the step in notes.

  When you change the pitch of a step in a fixed-pitch note row, the row header label changes to Melodic to indicate that the row contains multiple pitches.
- *Octave:* Drag vertically in the step to set the octave value from –2 to 8 octaves, transposing the pitch of the step in octaves.
- *Note Repeat:* Drag vertically in the step to set the note repeat value from 1 to 16. Note Repeat controls how often the note repeats during the duration of the step.

Edit modes for automation rows

There is only one edit mode specific to automation rows:

- *Value:* Drag vertically to set the value for the automation parameter controlled by the row. The value range depends on which parameter the row is set to control.

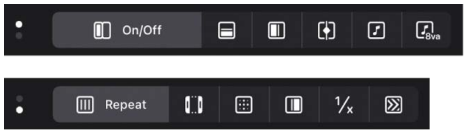
  Note: Tapping the Velocity / Value button sets the edit mode to velocity for note rows, and to the automation value for automation rows. In row headers, Velocity appears in the Edit Mode menu for note rows only.

View and edit multiple edit modes for a row using subrows

You can view and edit multiple edit modes for a row using subrows. When you tap the subrow disclosure arrow in the row header, a default set of subrows, each with its own edit mode, appears. When you add a subrow, it defaults to the next available edit mode for that row type. Two subrows of a row cannot have the same edit mode.

Choose the edit mode for the pattern

The Edit Mode buttons are located in the middle of the Step Sequencer menu bar. They are arranged in two rows, of which only one is visible at a time. Use the Page Switch button to switch between the two rows.



- Tap the corresponding Edit Mode button in the Step Sequencer menu bar.

  If the button is not visible, tap the Page Switch button to show the other row of buttons.

Change edit mode values for steps in the grid

1. In Logic Pro, in the Step Sequencer menu bar, tap an Edit Mode button.

   By default, each step shows the current value for the selected mode. You can change the display of step values in the step grid.

2. In the step grid, edit the value of each step.

   For most edit modes (except On/Off , Tie, Loop, and Skip), you edit the value by dragging vertically in the step. The value appears above the step as you drag. Some edit modes have only on and off states, rather than a range of values. In this case, tapping the step switches between the two states. For Loop Start/End, tapping a step sets the loop start or loop end position (whichever is closer) to that step.

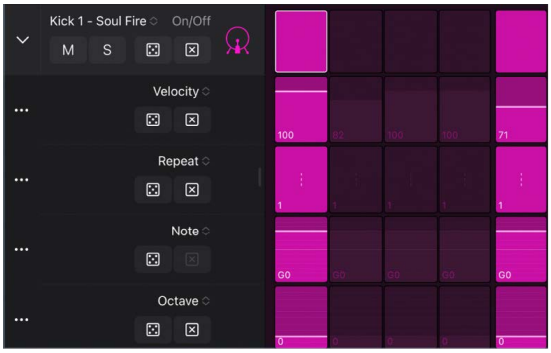
Create ramped values across steps

- In Logic Pro, drag across the steps you want to include in a ramp.

Show subrows for a row

You can view and edit multiple edit modes for a row at the same time using subrows.

- In Logic Pro, tap the subrow disclosure arrow on the left side of the row header.

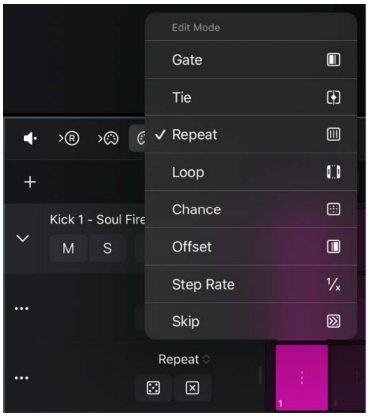


  By default, several subrows appear below the row, depending on the row type.

You can add subrows and change the edit mode for a subrow.

Change the edit mode for a subrow

- In Logic Pro, choose a new edit mode from the Edit Mode menu, located in the upper-right area of the subrow header.



Add a subrow

When you add a subrow, it defaults to the next available edit mode for that row type. Two subrows of one row cannot have the same edit mode.

1. In Logic Pro, tap the More button ••• on the left side of a subrow header, then tap Add Subrow.

   A subrow appears below the subrow, set to the next available edit mode for the row.

2. Tap the Edit Mode menu in the upper-right area of the subrow header, then choose an edit mode for the subrow.

   The steps in the subrow show the values for the selected edit mode.

Delete a subrow

- In Logic Pro, tap the More button ••• on the left side of a subrow header, then tap Remove Subrow.

Pattern creation examples in Logic Pro for iPad

The following examples provide steps to follow as well as general guidelines for working with different types of patterns in Step Sequencer in Logic Pro for iPad.

Drum pattern example

For drum and percussion (rhythm-based) patterns, edit modes such as Velocity and Note Repeat can be effective for creating interesting-sounding patterns. You can also create interesting variations by copying the pattern and changing the pattern length of the copy.

1. In Logic Pro, open the Browser and choose an Electronic Drum Kit patch that uses Drum Machine Designer.
2. Create an empty pattern region in the Tracks area or an empty pattern cell in the Live Loops grid.
3. Turn on some steps in the pattern to create a basic beat. It's often good to begin with a simple kick pattern to set the foundation, followed by a few snare hits and a hi-hat pattern.

4. Tap the Preview button in the Step Sequencer menu bar to hear the pattern as you work.
5. Tap the Velocity / Value button in the Step Sequencer menu bar and adjust the velocity of steps.
6. Choose Note Repeat button in the Step Sequencer menu bar and add note repetition to some steps. This can work especially well with closed hi-hats or other sounds with a quick decay.
7. Tap the Preview button again to stop the pattern playing.
8. Choose a different pattern length from the Pattern Length pop-up menu in the step grid header.

Instrumental pattern example

Edit modes such as Velocity, Note, Octave, and Tie can be useful for creating interesting instrument and melodic patterns.

1. In Logic Pro, open the Browser and choose a patch featuring a relatively fast note attack.
2. Create an empty pattern region in the Tracks area or an empty pattern cell in the Live Loops grid.
3. Tap the Preview button in the Step Sequencer menu bar to hear the pattern as you work.
4. Turn on some steps in the pattern to create the basic feel.
5. Tap the Velocity / Value button in the Step Sequencer menu bar and adjust the velocity of steps.
6. Tap the Tie button in the Step Sequencer menu bar and tie some steps to lengthen some notes.
7. Tap the subrow disclosure arrow on the left side of a row header to show subrows for that row.
8. In the Gate subrow, choose Note from the Edit Mode menu to change the edit mode for the subrow.
9. Drag vertically in some steps to change their pitch. The new pitch appears above the step as you edit it.

   Note: When you change the pitch of individual steps in a row, the row is labeled Melodic to indicate that the steps in that row no longer trigger the same pitch.

Adding automation example

Using Learn mode to quickly add automation rows by manipulating plug-in parameters for a software instrument simplifies the process of adding automation to a pattern. For more information about plug-ins, see Intro to plug-ins.

1. In Logic Pro, open Loops in the Browser, choose a melodic pattern, and drag it to a new software instrument track or Live Loops cell.
2. Tap the Preview button in the Step Sequencer menu bar to hear the pattern as you work.
3. Tap the Plug-ins button to show the plug-ins for the software instrument.

4. Tap the Add Row button + located above the row headers, then tap Learn (Add) to activate Learn mode.
5. Manipulate a plug-in control in Track view or Details view and look for the row created for that parameter in Step Sequencer.

   Notice how the parameter moves abruptly from one value to the next.

   Note that changes to the parameter value will be audible only on steps that are turned on.
6. In Step Sequencer, tap the Page Switch button ⋮ in the pattern controls until you see the Automation Mode button, then choose Slide ∿.

   Notice that automation parameters now move smoothly between values.

Record Step Sequencer patterns live in Logic Pro for iPad

With Live Record, you can record both MIDI note events and automatable parameter events to a pattern region or pattern cell while the pattern is playing in Logic Pro for iPad. Notes matching existing note rows are recorded as steps in those rows, and new note rows are created for notes that do not match an existing row. Similarly, automation parameters for which a row exists are recorded to those rows, and new automation rows are created for parameters with no existing row.

When you play intervals or chords, steps on note rows matching the pitches played are turned on, unless Mono mode is active. Mono mode restricts note input so that only one step for each time position is active. That is, when multiple notes are played, only the last note received in the time range of the step is active.

During Live Record, when the selected row is a Melodic row, incoming note events turn on steps on that row only, with each active step set to the correct Note and Octave value. Live Pattern Recording on Melodic note rows is always monophonic. If notes are played simultaneously, the last note received during the time range of the step determines the pitch of that step.

When incoming note or automation events fall between steps, the step closest to the time position of the event is activated.

Drum Machine Designer is particularly suited to creating patterns with live recording.

Live Record options

You can control whether to capture note velocity and length during Live Record, as well as whether to quantize the recorded note or automation events to the start of the step they activate. The Live Record options include:

- *Velocity:* When selected, the velocity of the incoming note events is applied to the newly activated steps. When deselected, the new steps retain the existing value of the step.
- *Note Length:* When selected, the duration of notes played during recording is captured and played back. Step gate and tie values are modified to make the step the same length as the recorded MIDI event. If the played note is shorter than the step length, Step Sequencer reduces the gate value to shorten the step to match the played note. If the played note is held longer than the step length, a tie is activated for the step to increase its duration. The gate value is also adjusted for the tied step to match the length of the played note as closely as possible. When Note Length is deselected, tie and gate values do not change to reflect the duration of held notes. Only the step closest to the start of the incoming event is activated, at its standard step length.

  In general, it's best to keep Note Length off when recording drums, and turn it on when recording pitched instrument events.
- *Quantize:* When Quantize is selected, notes snap to the start of active steps so that they play in perfect metronomic time, with no offset. When deselected, a Step Offset value is added to each active step so that the event is triggered at the precise time position of the played note.

Set Live Record options

1. In Logic Pro for iPad, do one of the following:
   - Touch and hold the Live Record button ›Ⓡ.
   - Tap the More button ••• in the Step Sequencer menu bar, then tap Live Record.
2. Choose one of the following:
   - To have recorded steps match the velocity of incoming note events, choose Velocity.
   - To have recorded steps match the duration of incoming note events, choose Note Length.
   - To add a step offset to recorded steps to match the start time of incoming note events, choose Quantize.

Create a live pattern recording

1. In Logic Pro, start the pattern playing by doing one of the following:
   - Tap the Preview button in the Step Sequencer menu bar.
   - Start the project playing. When the playhead reaches the start of the pattern region, recording starts, and continues until the playhead reaches the end of the pattern region.

     Note: You can extend recording time for the pattern by setting the cycle area to the start and end of the pattern region.
   - For a pattern cell, tap the cell to start playback. Recording continues until the cell stops playing.
2. Tap the Live Record button ›Ⓡ in the Step Sequencer menu bar.

3. Perform the parts you want to record. Both played notes and controller-driven automation changes are recorded.
4. When you finish, tap the Live Record button again to stop recording.

Step record Step Sequencer patterns in Logic Pro for iPad

With step recording, you can record both MIDI note events and automatable parameter events to a pattern region or pattern cell in sequence. You can step record to a pattern with the playhead either running or stopped in Logic Pro for iPad.

When step recording is active, incoming MIDI events turn on steps in sequence (one step at a time), starting from the position of the currently selected step. If a row assigned to the incoming MIDI event exists, the step on that row is activated. If no corresponding row exists, a row assigned to that event is created, similar to the way Learn mode and Live Record work.

For incoming note events, once the Note Off message for the last held note event is received, the next step in the row is selected. For example, if you are using a standard MIDI keyboard controller, the step is enabled when you press a key on the controller, and the next step is selected when you release the key. If you press additional keys on the controller before releasing the currently held ones, the next step is not selected until you release the last held key. This makes it easier to input chord notes.

Unlike note events, MIDI CC and automaton events do not move to the next step automatically. When Logic Pro detects a new incoming event, either the matching row is selected or a new one is created, and then a step is activated at the current location with the current parameter value. The value of that step continues to change as long as the parameter or CC value is manipulated, until you select a new step.

Create a pattern using step recording

1. Tap the MIDI In button in the Step Sequencer menu bar to turn on step recording.
2. Play the notes, and manipulate any parameter automation changes.
3. When you finish, tap the MIDI In button again to turn off step recording.

Load and save patterns in Logic Pro for iPad

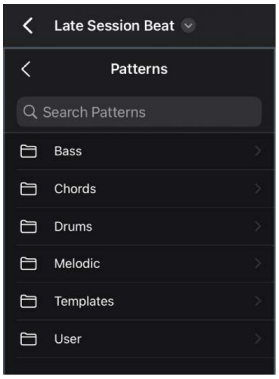
The Browser in Logic Pro for iPad includes Patterns view, where you can choose and save patterns and templates. Patterns view contains a variety of premade patterns for drums, bass, keys, and other instrument categories that you can use in your projects. Patterns view also features *templates*, which include pattern, row, and step settings but with an empty step grid that you can use as a starting point for creating patterns.

Patterns can also be contained in *pattern loops*. A pattern loop contains the patch for the pattern's sound as well as the pattern, row, and step settings and the step values. Loops view in the Browser includes a collection of pattern loops that you can use in your projects. You add pattern loops to the Tracks area or the Live Loops grid in the same way as other loops.

Choose a pattern from Patterns view in the Browser

1. In Logic Pro, tap the More button ••• in the Step Sequencer menu bar.
2. Tap Patterns, then tap Show Patterns.

   Patterns view opens in the Browser on the left side of the screen.



3. In Patterns view, choose a Pattern folder (such as Bass or Chords), then choose a pattern.

Search for patterns by name

- In Logic Pro, tap the search field in Patterns view, enter a search term.
- As you type, matches for patterns containing your search term are updated in the list below the search field.
- Tap one of the matching results.

Transpose the selected pattern to the project key

1. In Logic Pro, with the pattern open in Step Sequencer, tap the More button ••• in the step grid header.
2. Tap Transpose, then tap Transpose to Project Key.

Save a pattern to the Browser

1. In Logic Pro, with the pattern open in Step Sequencer, tap the More button ••• in the Step Sequencer menu bar.
2. Tap Patterns, then tap Save Pattern.
3. Enter a name for the pattern, then tap OK.

The pattern is saved to the User folder in Patterns view in the Browser.

Save a pattern as a template

1. In Logic Pro, with the pattern open in Step Sequencer, tap the More button ••• in the Step Sequencer menu bar.
2. Tap Patterns, then tap Save Template.
3. Enter a name for the template, then tap OK.

The template is saved to the User folder in Patterns view in the Browser.

Convert a MIDI region or cell to a pattern region or cell

1. In Logic Pro, tap a region or cell to select it, then tap it again.
2. Tap Convert, then tap either Convert to Pattern Region or Convert to Pattern Cell.

Note: You can only convert MIDI regions or cells that have four or fewer bars.

Convert a pattern region or cell to a MIDI region or cell

1. In Logic Pro, tap a region or cell to select it, then tap it again.
2. Tap Convert, then tap Convert to MIDI Region.

Add a pattern loop from Loops view in the Browser

1. In Logic Pro, tap the Browser button on the left side of the view control bar to open the Browser.
2. Tap the Loops button, then tap the All Filters button to open the All Filters window.
3. In the Type category, tap Pattern Loop, then tap outside the All Filters window to close it.
4. Touch and hold a pattern loop, then drag it to a software instrument track. If regions already exist on the track, the pattern loop uses the existing track instrument; if the track is empty, the track uses the patch (including the instrument) saved with the pattern. You can also drag a pattern loop to the area below the last track header.

Modify Step Sequencer pattern playback in Logic Pro for iPad

Some options in Step Sequencer in Logic Pro for iPad control how and when steps play back, and can be fun to manipulate while the pattern is playing. For example, you can mute and solo rows, rotate rows (moving all steps in a row left or right, including their step values and other edit mode settings), change the playback mode for the pattern or for a row, and perform other actions while the pattern is playing. There are three rows of buttons in each row header; use the Page Switch button to switch between them.

Mute a row

- In Logic Pro, tap the Page Switch button in the pattern controls until you see the Mute button M in the row header, then tap the button.

Solo a row

- In Logic Pro, tap the Page Switch button in the pattern controls until you see the Solo button S in the row header, then tap the button.

Rotate a row

When you rotate a row, all steps in the row, including their edit mode values, are shifted either left (counterclockwise) or right (clockwise). When you rotate a subrow, the edit mode value for that subrow is shifted left or right.

- *To rotate the row left (counterclockwise):* Tap the Page Switch button in the pattern controls until you see the Rotate Left button in the row header, then tap the button.
- *To rotate the row right (clockwise):* Tap the Page Switch button in the pattern controls until you see the Rotate Right button in the row header, then tap the button.

Rotate all steps in the pattern

- In Logic Pro, do one of the following in the pattern controls:
  - *To rotate steps left (counterclockwise):* Tap the Rotate Left button.
  - *To rotate steps right (clockwise):* Tap the Rotate Right button.

Rotate edit mode values for steps in a row

When you use the Rotate controls in a subrow, you can rotate edit mode values for the subrow independently of the step values (on or off). You can use this technique to, for example, keep the same rhythm while changing the pitches being played.

1. In Logic Pro, tap the subrow disclosure arrow in a row header to show subrows for a row.
2. If necessary, change the edit mode for a subrow to show the one you want to rotate.
3. Tap the Page Switch button in the pattern controls until you see the Rotate buttons in the subrow header.
4. Tap the Rotate Left button or Rotate Right button in the subrow header to rotate edit mode values.

Change the playback mode for the pattern

By default, steps in a pattern sound from left to right, similar to how the playhead moves from left to right in the Tracks area. You can change the playback mode for the overall pattern and choose a different playback mode for individual rows.

- In Logic Pro, tap the Page Switch button in the pattern controls until you see the Playback Mode button, then tap the button in the pattern controls and choose a playback mode.

  The choices are:

  - *Forward:* Steps play from left to right.
  - *Reverse:* Steps play from right to left.
  - *Ping Pong:* Playback alternates between left to right and right to left.
  - *Random:* Steps play in an undetermined order.

You can also change the playback mode in the inspector.

Change the playback mode for a row

- In Logic Pro, tap the Page Switch button in the pattern controls until you see the Playback Mode button, then tap the button in the row header and choose a playback mode.

  The choices are:

  - *Forward:* Steps play from left to right.
  - *Reverse:* Steps play from right to left.
  - *Ping Pong:* Playback alternates between left to right and right to left.
  - *Random:* Steps play in an undetermined order.

Choose the transition type for an automation row

When automating a parameter on an automation row, you can choose whether the transition between steps is a sudden or gradual change.

- In Logic Pro, tap the Page Switch button in the pattern controls until you see the Automation Mode button, then choose Latch or Slide in the row header.

You can also change the automation mode in the inspector.

Edit Step Sequencer steps in Logic Pro for iPad

You can edit individual steps in several ways, including cutting, copying, and pasting steps. You can also repeat a step, decrement or increment the values of all steps in a row, transpose all steps in a pattern by semitones or octaves, randomize values for all steps in a row or all steps in the pattern, and reset steps to default values.

Pattern regions can be edited only in Step Sequencer in Logic Pro for iPad, not in the other MIDI editors. You can convert a pattern region to a MIDI region, which can be edited in the Tracks area and in the Piano Roll Editor.

Cut a step

1. In Logic Pro, tap the Step Select button in the Step Sequencer menu bar.
2. Tap the step to select it, tap it again, then tap Cut.

When you cut a step, the step value and edit mode settings are cut, but the empty step remains in the step grid. The order of following steps does not change.

Copy and paste a step

You can copy a step, including all of its step settings. When you paste a copied step, the destination row should be of the same row type (note or automation) as the source row.

1. In Logic Pro, tap the Step Select button in the Step Sequencer menu bar.
2. Tap the step to select it, tap it again, then tap Copy.
3. Tap the destination step to select it, tap it again, then tap Paste.

Repeat a step

1. In Logic Pro, tap the Step Select button in the Step Sequencer menu bar.
2. Tap the step to select it, tap it again, then tap Repeat.

Raise or lower the value of all steps in the pattern

In Logic Pro, tap the Page Switch button in the pattern controls until you see the Decrement and Increment buttons, then do one of the following:

- *To lower the value of all steps in the pattern:* Tap the Decrement button in the pattern controls.
- *To raise the value of all steps in the pattern:* Tap the Increment button in the pattern controls.

You can also continuously change the value for all steps in the pattern by touching and holding either button and dragging vertically.

When the edit mode is set to Step On/Off, tapping the Increment button turns on all inactive steps, and tapping Decrement button turns off all active steps. When the edit mode is set to Tie, tapping the Increment button ties all steps, and tapping the Decrement button unties all tied steps.

Raise or lower the values of all steps in a row

In Logic Pro, tap the Page Switch button in the pattern controls until you see the Decrement and Increment buttons, then do one of the following:

- *To lower the value of all steps in the pattern:* Tap the Decrement button in the row header.
- *To raise the value of all steps in the pattern:* Tap the Increment button in the row header.

Transpose all steps in a pattern

In Logic Pro, tap the More button in the step grid header, tap Transpose, then do one of the following:

- *To transpose the pattern up one semitone:* Choose Transpose +1 Semitone.
- *To transpose the pattern down one semitone:* Choose Transpose –1 Semitone.
- *To transpose the pattern up one octave:* Choose Transpose +1 Octave.
- *To transpose the pattern down one octave:* Choose Transpose –1 Octave.
- *To transpose the pattern to the project key:* Choose Transpose to Project Key.

Randomize step values in a pattern for the active edit mode

- In Logic Pro, tap the Page Switch button in the pattern controls until you see the Randomize button, then tap the button in the pattern controls.

Randomize step values in a row for the active edit mode

In Logic Pro, do one of the following:

- Tap the Page Switch button in the pattern controls until you see the Randomize button, then tap the button in the row header.
- Tap the row icon to select the row, tap it again, then choose Randomize for the active edit mode.

Reset step values to default settings

When you create a pattern in Logic Pro for iPad, many Step Sequencer settings, including all edit modes and the playback mode, have a default value. After you change the value for a step, it no longer retains the default value. You can *clear* steps, which resets all their edit mode values to default values (for the step rate, the default is defined by the row step rate). You can clear a single step, all steps in a row, or all steps in the pattern. You can also clear the values for the currently selected edit mode in a single row, for all note rows or all automation rows, or for steps in all rows in the pattern.

- *To clear edit mode values for a step:* Tap the Step Select button in the Step Sequencer menu bar, tap the step to select it, tap it again, then tap Clear Step.
- *To clear edit mode values for all steps in a row:* Tap the row icon to select the row, tap it again, then choose Clear Row.

- *To clear edit mode values for all steps in all note rows:* Tap the More button ••• in the step grid header, tap Clear, then tap Clear for Note Rows for the active edit mode.
- *To clear edit mode values for all steps in all automation rows:* Tap the More button ••• in the step grid header, tap Clear, then tap Clear Value for Automation Rows.
- *To clear all steps in the pattern:* Tap the More button ••• in the step grid header, tap Clear, then tap Clear Pattern.

Edit Step Sequencer rows in Logic Pro for iPad

You can edit Step Sequencer rows in a variety of ways. You can copy and paste rows or row settings, duplicate a row with the same row assignment and row and step properties, change a row assignment, reset row values to a default setting, and delete a row.

Rename a row

1. In Logic Pro, tap the row icon to select the row, tap it again, then choose Edit Row Name.
2. Enter a name for the row, then tap OK.

Copy and paste rows

1. In Logic Pro, tap the row icon to select the row, tap it again, then choose Copy Row.
2. Tap the row icon of the row that you want to replace with the pasted row, tap it again, then choose Paste Row.

When the copied and pasted rows are both fixed note rows, the Note and Octave values are ignored. You can copy and paste a row to duplicate the rhythm of the copied row to a row with a different drum sound or pitch. When you copy from a Melodic note row, however, the Note and Octave values are maintained.

Copy and paste row settings

1. In Logic Pro, tap the row icon to select the source row, then choose Copy Row.
2. Select the destination row (in the same or another pattern region), then choose Paste Row Settings.

Duplicate a row

- In Logic Pro, tap the row icon to select a row, then choose Duplicate.

The row and the step settings are duplicated using the same row assignment. If you duplicate a row when Mono mode is turned on, the active steps in the original row are turned off.

Change the row assignment

You can change the row assignment for a row, including changing the row type.

- In Logic Pro, tap the Row Assignment pop-up menu in the row header, then do one of the following:
  - *For a note row:* Choose Notes, then choose a different note value from the submenu, or else choose Melodic (if you plan to assign different pitches to different steps).

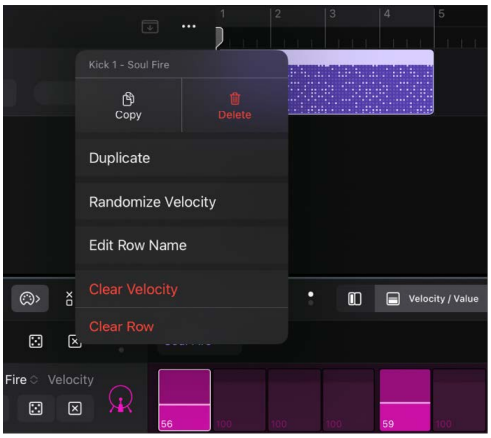
    Note: When a pattern using a Drum Machine Designer patch is selected, the Row Assignment pop-up menu shows the kit piece names rather than MIDI note names.
  - *For an automation row:* Choose Automation, then choose an automation parameter from one of the submenus.

You can also change the row assignment in the inspector.

Reset values in a row to default settings

In Logic Pro, do one of the following to clear values in a row for the active edit mode:

- Tap the Page Switch button ⋮ in the pattern controls until you see the Clear button ⊠, then tap the button in the row header.
- In the Step Sequencer menu bar, tap the Edit Mode button for the values you want to clear, tap the row header icon, then tap Clear for the active edit mode. For example, if Velocity mode is selected, Clear Velocity appears in the Row menu.



Delete a row

- In Logic Pro, tap the row, then choose Delete Row.

Delete all unused rows

- In Logic Pro, tap the More button ••• in the step grid header, then choose Delete Unused Rows.

You can also view and edit many row settings in the inspector.

Edit pattern, row, and step settings in the inspector in Logic Pro for iPad

You can edit a variety of settings for patterns, rows, and individual steps in the inspector in Logic Pro for iPad.

Some controls in the inspector are also available in other parts of Step Sequencer (for example, some pattern settings are available in the step grid header, and many row settings are available in the row headers). By viewing and editing them in the inspector, you can more easily compare values and copy and paste values between settings.

Open the inspector

- In Logic Pro, tap the Inspector button in the view control bar to open the inspector.

Edit pattern settings

1. In Logic Pro, with Step Sequencer focused, tap the Level menu in the inspector, then tap Pattern to show the pattern settings.
2. Do any of the following:
    - *To change the pattern length:* Choose the number of steps in the pattern from the Pattern Length pop-up menu.
    - *To change the step rate:* Choose the note value for steps in the pattern from the Step Rate pop-up menu. For information about the step rates, see Change the musical length of a pattern.
    - *To change the playback mode:* Choose a playback option from the Playback Mode pop-up menu. The choices are:
        - *Forward:* Steps play from left to right.
        - *Reverse:* Steps play from right to left.
        - *Ping Pong:* Playback alternates between left to right and right to left.
        - *Random:* Steps play in an undetermined order.
    - *To change the swing percentage:* Set the swing percentage by dragging the value in the Swing field.
    - *To set the swing division:* Choose either 8th or 16th notes in the Swing Note Division pop-up menu.
    - *To change the key of the pattern:* Choose a musical key for the pattern from the Key pop-up menu.

      By default, when you choose a key from the Pattern Key menu, all rows are transposed to the new key.
    - *To set the scale of the pattern:* Choose a scale type from the Scale pop-up menu.
    - *To not transpose steps when changing the key of a pattern or loading the saved pattern:* When No Transpose is turned on and you choose a new key from the Key menu, only rows with notes that are not in the new key are transposed. If No Transpose is turned on when you save a pattern, the pattern won't transpose when you load it in a project with a different key.

- *To set all rows in the pattern to use Legato mode:* Turn on Legato.

  When Legato is turned on, a 100% gate value is increased by one tick so that it overlaps slightly with the following step. When triggering notes on a synthesizer or other software instrument, this ensures that the steps trigger the legato behavior of the instrument.

- *To set the MIDI channel for all automation rows in the pattern:* Choose a channel from the MIDI Channel pop-up menu. Changes overwrite any existing settings and are used when new rows are created.

- *To set the automation mode for the pattern:* Choose a mode from the Automation Mode pop-up menu. Changes overwrite any existing settings and are used when new rows are created. The choices are:

  - *Latch:* Transitions for automation changes between steps are sudden.

  - *Slide:* Transitions for automation changes between steps are gradual.

Edit row settings

1. In Logic Pro, do one of the following:

   - Tap a row header to select the row.

   - In the inspector, with Step Sequencer focused, tap the Level menu, then tap Row to show the row settings for the currently selected row.

2. Do any of the following:

   - *To change the row assignment:*

     - *For note rows:* Choose a note value or drum sound from the Kit Pieces or Notes submenu in the Row Assignment pop-up menu.

       When a pattern using a Drum Machine Designer patch is selected, the Row Assignment pop-up menu shows the kit piece names rather than MIDI note names.

     - *For automation rows:* Choose a parameter from the Automation submenu in the Row Assignment pop-up menu.

   - *To add a custom name for the row:* Tap the Row Name field and enter the name for the row. The row name is displayed on the row header, replacing the row assignment label.

   - *To change the color for the row:* Tap the color well and choose a color.

   - *To change the icon for the row:* Tap the icon and choose a new icon.

   - *To change the step rate for the row:* Choose a note value for the steps in the row from the Step Rate pop-up menu. For information about the step rates, see Change the musical length of a pattern.

   - *To change the playback mode for the row:* Choose a playback option from the Playback Mode pop-up menu. The choices are:

     - *Forward:* Steps play from left to right.

     - *Reverse:* Steps play from right to left.

     - *Ping Pong:* Playback alternates between left to right and right to left.

     - *Random:* Steps play in an undetermined order.

- *To set the MIDI channel for the row:* Choose a channel from the MIDI Channel pop-up menu.
- *To set the automation mode for the row:* Choose a mode from the Automation Mode menu. The choices are:
  - *Latch:* Once set, the automation parameter value remains constant until a step with a different value is triggered.
  - *Slide:* Interpolates between the last automation parameter value and the next one to produce a smooth, gradual change.
- *To change the loop start and end for the row:* Choose values in the Loop fields.

Edit step settings

1. In Logic Pro, do one of the following:
   - Tap the Step Select button in the Step Sequencer menu bar, then tap a step to select it.
   - In the inspector, tap the Level menu, then tap Step to show the step settings for the currently selected step.
2. Do any of the following:
   - *To turn the step on or off:* Tap the Step On switch.
   - *To change the velocity level for the step:* Set the velocity value from 1 to 127 in the Velocity field.
   - *To change the gate amount for the step:* Set the gate value from 1 to 127 in the Gate field.
   - *To tie the step during playback:* Tap the Tie switch.
   - *To change the note or sound for the step:* Set the note or drum sound in the Note field.
   - *To change the note repeat value for the step:* Set the value from 1 to 16 in the Repeat field.
   - *To change the chance value for the step:* Set the percentage in the Chance field.
   - *To change the offset value for the step:* Set the percentage in the Start Offset field.
   - *To change the step rate for the step:* Choose a note value from the Step Rate pop-up menu. For information about the step rates, see Change the musical length of a pattern.
   - *To skip the step during playback:* Tap the Skip switch.
   - *To set the MIDI channel for the step:* Set the channel using the MIDI Channel pop-up menu.
   - *To change the articulation for the step:* Set a value from 0 to 255 using the Articulation pop-up menu.
   - *To set the step to play on a certain pass out of a number of cycles:* In the first Recurrence field, set which cycle pass a step plays on. In the second Recurrence field, set the total number of cycles.

     For example, when setting the first field to 2 and the second field to 3, the step only plays on the second pass of three cycles of the pattern.

Customize the Step Sequencer interface in Logic Pro for iPad

You can customize several aspects of Step Sequencer in Logic Pro for iPad to suit the pattern you are working on and the task you want to accomplish. You can zoom in and out to work in greater detail or view a larger part of the step grid, show or hide step values, color rows and steps, and reorder rows and subrows. You can also save the current pattern configuration as the default template for the channel strip, and revert to the original default template for the channel strip.

Zoom Step Sequencer

In Logic Pro, do any of the following:

- Tap the Vertical Auto Zoom button in the Step Sequencer menu bar to fill the available vertical space.

  Note: When Vertical Auto Zoom is on, controls in the row headers are not visible if you have many rows in Step Sequencer.

- Pinch the row headers to zoom in or out vertically.

Zoom the focused row

- In Logic Pro, tap the More button ••• in the Step Sequencer menu bar, then tap Zoom Focused Row.

  The size of the focused row is increased vertically. Selecting another row switches the zoom to that row.

Show or hide step values

In Logic Pro, tap the More button ••• in the Step Sequencer menu bar, tap Display Edit Mode Values, then choose one of the following from the submenu:

- *To display step values only when editing a step:* Choose Only When Editing Values.
- *To display step values for the selected row:* Choose Always for Selected Row.
- *To display step values for all rows:* Choose Always for All Rows.

Sort rows by type, name, and note assignment

You can sort the rows in a Step Sequencer pattern (region or cell) in several ways, including by row type, note assignment, row name, or a combination of several of these. For patterns using Drum Machine Designer patches, you can also sort by the order in which the subtracks appear in the Tracks area. When sorting, you can choose to display rows in either ascending or descending order.

In addition to reorganizing rows in the pattern, the sort options determine where rows created using Learn (Add), live pattern recording, or step recording are added to the pattern. The selected sort order is maintained until you manually move a row from the sort order.

- In Logic Pro, tap the More button ••• in the Step Sequencer menu bar, tap Sort Rows, then tap Row Sort Type and choose one of the following from the submenu:
  - *By Type:* Sorts rows by type without changing the current order within each type. Types are ordered as follows: notes, Melodic, MIDI CC, pitchbend, channel pressure, channel strip parameters, plug-in parameters.
  - *By Type and Note:* Sorts all rows by type and then sorts note rows by their note assignment. If you use this option with a pattern region or cell using a Drum Machine Designer patch, Step Sequencer references the input note for the drum pad when sorting the row.
  - *By Type and Name:* Sorts all rows by type and then by row name. The row name is the name displayed on the row header. By default, this is the row assignment unless you have created a custom row name.
  - *By Type and DMD Subtrack:* Sorts all rows by type and then sorts rows for Drum Machine Designer subtracks by the order in which the subtracks appear in the Tracks area.

To determine the sort direction regardless of which of the above options is selected, tap the More button in the Step Sequencer menu bar, tap Sort Rows, then tap Row Sort Direction and choose Ascending or Descending.

Change step colors in a row

1. In Logic Pro, tap the icon in a row header to select the row.
2. Tap the Inspector button to open the inspector.
3. Tap the color well and choose a new color.

   Note: The custom colors for individual rows appear only if Set Step Color is set to By Row in the More menu in the Step Sequencer menu bar.

Set step color in a pattern to region color

- In Logic Pro, tap the More button ••• in the Step Sequencer menu bar, tap Set Step Color, then tap By Region.

Reorder rows

- In Logic Pro, touch and hold a row header, then drag the row up or down.

Turn on MIDI Out for note rows and steps

When the MIDI Out button is turned off, no sounds are previewed when you work and edit in Step Sequencer.

When the MIDI Out button in the Step Sequencer menu bar is turned on, the note or drum sound for a fixed note row is previewed when you select a different row or step, and when you tap a step to change its value. For the Note and Octave edit modes, the note or drum sound for a fixed note row is also previewed as you drag a step to change its value.

- Tap the MIDI Out button in the Step Sequencer menu bar to turn it on.

  Tap the MIDI Out button again to turn it off.

Save a pattern as the default template

You can save the current row assignments and view state of Step Sequencer as the default template for new patterns created on the same track, or another track using the same channel strip. This also determines the default view of the editor when the track is selected and there is no region on the track.

- In Logic Pro, with the pattern open in Step Sequencer, tap the More button ••• in the Step Sequencer menu bar, tap Track Template, then tap Save as Template for Track.

Revert to the original default template

You can clear the pattern configuration data so that new patterns, and the default view, appear as they did before the Save as Template for Track option was used.

- In Logic Pro, with the pattern open in Step Sequencer, tap the More button ••• in the Step Sequencer menu bar, tap Track Template, then tap Clear Template for Track.

Work with plug-ins

Intro to plug-ins in Logic Pro for iPad

Logic Pro for iPad includes a large collection of professional-quality effect and instrument plug-ins. It also supports third-party plug-ins delivered on iPadOS as Audio Unit Extensions. There are three types of plug-ins in Logic Pro:

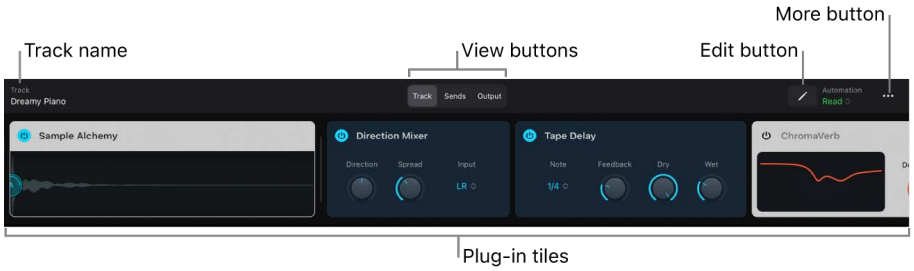
- *Audio effects:* Can be inserted on all channel strip types (audio, instrument, aux, and output) except the master channel strip.
- *MIDI effects:* Can be inserted on instrument channel strips only.
- *Software instruments:* Can be inserted on instrument channel strips only.

This chapter includes information about working with plug-ins in the Plug-ins area. Some information also applies to the Mixer, particularly information about working with plug-ins in Details view. For information about the Mixer, see Intro to mixing. For information about specific plug-ins, see the relevant sections in Effect plug-ins in Logic Pro and Instrument plug-ins in Logic Pro.

Work in the Plug-ins area

Intro to the Plug-ins area in Logic Pro for iPad

You can view and edit the plug-ins for a track (or channel strip) in the Plug-ins area. You can also view and edit the sends on the track and the plug-ins for the output channel of the track.



When you open the Plug-ins area, it appears above the view control bar. The track name appears on the left side of the Plug-ins area menu bar. Plug-ins appear as rectangles called *tiles*, each showing key editable parameters.

The Plug-ins area features three views—Track view, Sends view, and Output view—that you access using the View buttons in the center of the Plug-ins area menu bar.

- *Track view:* Add, replace, reorder, and remove plug-ins on the selected track. You can edit key plug-in parameters directly on plug-in tiles or open plug-ins in Details view to access all plug-in parameters.

  When a channel strip is selected rather than a track, the name changes to Channel view.
- *Sends view:* Add sends, change send destinations, and adjust the send level.
- *Output view:* Add, replace, reorder, and remove plug-ins from the output channel strip for the track. You can edit key plug-in parameters directly on plug-in tiles or open plug-ins in Details view to access all plug-in parameters.

When you select a track in the Tracks area, the Plug-ins area shows the plug-ins and sends for the selected track. This makes it easy to move between tracks to view plug-in and send settings and to edit plug-ins, sends, and other aspects of the signal flow.

Details view

In the Plug-ins area, plug-ins appear as tiles, but you can open a plug-in in Details view from either Track or Output view. In Details view, the plug-in expands to fill the width of the Logic Pro window, and all plug-in parameters are available to view and edit (sometimes by scrolling or using an overview). You can move between plug-ins in Details view by tapping the mini plug-in tiles at the bottom of the view.

For more information, see Intro to Details view for plug-ins.

Open the Plug-ins area

- In Logic Pro, tap the Plug-ins button in the center of the view control bar.

The Plug-ins area also includes options to choose the automation mode for the track, copy and paste channel strip settings, remove all effect plug-ins or all bypassed plug-ins, and reset the channel strip. See Additional Plug-ins area options.

Track view

In Track view, you can view and edit the plug-ins on the selected track. You can add, replace, reorder, and remove plug-ins or you can open a plug-in in Details view to view and edit all of its parameters.



In Track view, plug-ins appear in the following order, from left to right: MIDI effect plug-ins, an instrument plug-in (on software instrument tracks), and audio effect plug-ins.

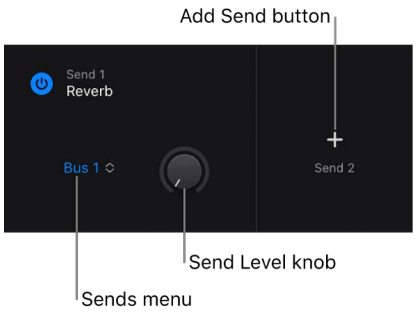
When you add a plug-in, it appears to the right of the current plug-in (equivalent to below the plug-in on a channel strip). The order of plug-ins is important to the sound, and you can reorder plug-ins to change the order in which they affect the signal.

Open Track view

- In Logic Pro, tap Track in the Plug-ins area menu bar.

Sends view

In Sends view, you can view the sends for a track, add and assign sends to busses, and control send levels.



When you open Sends view, you see the sends that currently exist on the track. You can add sends, choose the bus to use for a send, create a new bus, and adjust send levels.

Open Sends view

- In Logic Pro, tap Sends in the Plug-ins area menu bar.

Add a send in Sends view

1. In Sends view in the Plug-ins area, tap the Add Send button +.

   The Add Send button is numbered, showing the number of the next send to be created.

2. Choose a bus to use for the send, or tap Create New Bus.

Adjust the send level in Sends view

- In Sends view in the Plug-ins area, swipe the Send Level knob next to the Sends menu for the send.

Change the bus for a send in Sends view

- In Sends view in the Plug-ins area, tap the Bus menu for the send, then choose a new bus from the Bus submenu, or tap No Send.

Output view

In Output view, you can view and edit the audio effect plug-ins on the output channel for the track. You can add, replace, reorder, and remove plug-ins or you can open a plug-in in Details view to view and edit all of its parameters.



Open Output view

- In Logic Pro, tap Output in the Plug-ins area menu bar.

Add, replace, and remove plug-ins in the Plug-ins area in Logic Pro for iPad

You can add plug-ins, replace a plug-in with a different one, and remove plug-ins in the Plug-ins area in either Track view or Output view. You can also open a plug-in in Details view.

Add a plug-in

In the Plug-ins area in Logic Pro, do one of the following:

- To add a MIDI effect plug-in (on a software instrument track), tap the Add MIDI FX button +.
- To add an instrument plug-in (on a software instrument track), tap the Add Instrument button +.
- To add an audio effect plug-in, tap the Add Audio FX button +.

The plug-in is added at the end of the signal chain for that plug-in type on the track.

Add a plug-in before the current plug-in

1. In the Plug-ins area in Logic Pro, touch and hold the plug-in name, then tap Add Plug-in Before.
2. Choose the plug-in category, then choose the plug-in you want to add.

The plug-in is added before (above) the current plug-in on the track.

Open a plug-in in Details view

In the Plug-ins area in Logic Pro, do one of the following:

- Double-tap the plug-in name.
- Touch and hold the plug-in name, then tap Open.

Tip: You can open a selected plug-in by tapping the plug-in name once.

Replace a plug-in

1. In the Plug-ins area in Logic Pro, touch and hold the plug-in name, then tap Replace.
2. Choose a plug-in from the menu.

Remove a plug-in

In Logic Pro, do one of the following:

- In the Plug-ins area, touch and hold the plug-in name, then tap Remove.
- Tap the Edit button in the Plug-ins area menu bar, then tap the Remove button in the upper-right corner of a plug-in tile.

You can also add, replace, reorder, and remove plug-ins in the Mixer in Setup mode and open plug-ins in Details view from both Setup mode and Mix mode.

Reorder plug-ins in the Plug-ins area in Logic Pro for iPad

You can reorder effect plug-ins in the Plug-ins area in either Track view or Output view by dragging their plug-in tiles. You can also enter Edit mode to quickly reorder multiple plug-in tiles. In Edit mode you can also remove plug-in tiles.

Reorder plug-ins by dragging

- In the Plug-ins area in Logic Pro, touch and hold a plug-in tile, then drag it horizontally before or after other plug-ins of the same type.

Reorder plug-ins in Edit mode

1. In the Plug-ins area in Logic Pro, tap the Edit button in the Plug-ins area menu bar.
2. Touch and hold a plug-in tile, then drag the tile horizontally before or after other plug-ins of the same type.
3. When you finish, tap the Edit button again to exit Edit mode.

For information on removing plug-ins in Edit mode, see Add, replace, and remove plug-ins in the Plug-ins area.

Copy and paste plug-ins in the Plug-ins area in Logic Pro for iPad

You can copy plug-ins in the Plug-ins area in either Track view or Output view and paste them to a different track, as long as the destination track supports the same plug-in type.

Copy a plug-in in the Plug-ins area

- In Logic Pro, touch and hold a plug-in in either Track view or Output view, then tap Copy.

Paste a copied plug-in in the Plug-ins area

1. In Logic Pro, select the destination track to show it in the Plug-ins area.
2. Tap the Add Plug-in button for the corresponding plug-in type (MIDI FX, Instrument, or Audio FX), then tap Paste.

Additional Plug-ins area options in Logic Pro for iPad

You can choose the automation mode for the selected track in the Plug-ins area menu bar (for both track automation and region automation). For information about automation modes, see Automation modes.

The More menu in the Plug-ins area menu bar also includes commands to copy and paste channel strip settings, remove all effect plug-ins or all bypassed plug-ins, and reset the channel strip.

Choose the automation mode for the track in the Plug-ins area

- Tap the Automation Mode pop-up menu in the Plug-ins area menu bar, then tap an automation mode, or tap Off.

  You can choose separate automation modes for track automation and region automation.

Copy a channel strip setting

- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then tap Copy Channel Strip Setting.

Paste all or part of a copied channel strip setting

- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then do one of the following:
  - To paste the complete channel strip setting, tap Paste Channel Strip Setting.
  - To paste only the plug-ins, tap Paste Plug-ins Only.
  - To paste only the sends, tap Paste Sends Only.

Turn off all effect plug-ins on a track

- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then tap Switch Off All Effect Plug-ins.

Remove inactive plug-ins

- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then tap Remove Inactive Plug-ins.

Remove all effect plug-ins

- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then tap Remove All Effect Plug-ins.

Rename an aux

1. In Logic Pro, in Sends view of the Plug-ins area, touch and hold a send, then tap Rename.
2. Select the name, then enter a new name.
3. Tap Rename.

Remove an aux

- In Logic Pro, in Sends view of the Plug-ins area, touch and hold a send, then tap Remove.

Remove all sends

- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then tap Remove All Sends.

Reset a channel strip

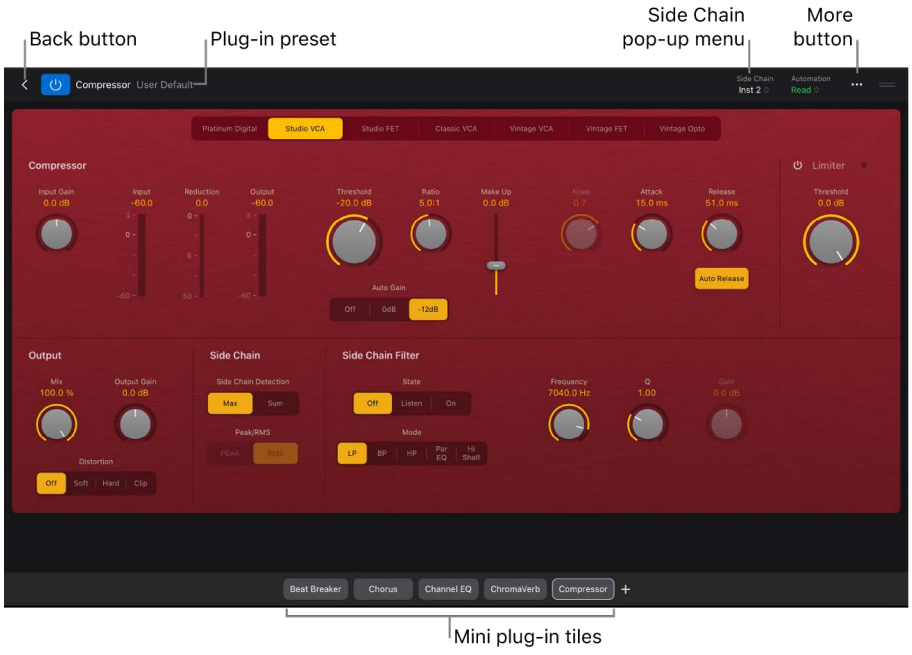
- In Logic Pro, tap the More button ••• in the Plug-ins area menu bar, then tap Reset Channel Strip.

Work with plug-ins in Details view

Intro to Details view for plug-ins in Logic Pro for iPad

You can open a plug-in in Details view from either Track view or Output view in the Plug-ins area, or from the Mixer. In Details view, the plug-in appears in a full-width view with all of the plug-in's parameters available to view and edit.

Below the open plug-in in Details view, other plug-ins on the track appear as mini plug-in tiles. You can use the tiles to switch between plug-ins, and also to remove, bypass, or replace another plug-in on the track, or to add a plug-in before another plug-in on the track.



Logic Pro for iPad Effects includes descriptions of every effect plug-in, including lists of plug-in parameters and usage tips. Similarly, Logic Pro for iPad Instruments includes descriptions of every instrument plug-in, including lists of plug-in parameters and usage tips.

Open a plug-in in Details view

- In the Plug-ins area, tap the name of a plug-in tile to select it, then tap it again.
- In the Mixer, do one of the following:
  - Tap the Setup button +, tap a plug-in in any effect or instrument slot, then tap Show Details.
  - Tap the Mix button, tap a plug-in in any effect or instrument slot.

Resize a plug-in in Details view

- To resize the plug-in, drag the resize handle on the right side of the plug-in menu bar up or down.

  You can also tap the resize handle to expand the plug-in to its maximum size, and tap the handle again to return to the previous size.

Adjust plug-in parameters in Details view

1. In Logic Pro, open a plug-in in Details view.
2. Do any of the following:
   - *To adjust a slider:* Swipe on the slider vertically or horizontally (depending on its orientation).
   - *To adjust a rotary knob:* Swipe up or down on the knob.
   - *To adjust a numeric value:* Do one of the following:
     - Drag the value up or down to edit it.
     - Tap the value, then edit the value in the numeric input dialog that appears using the Decrement/Increment buttons, the scroll wheel, or the numeric keypad.

Show patches for an instrument plug-in in Details view

- Tap the More button ••• in the plug-in menu bar, then tap Show Patches.

  The Browser opens, showing patches for the instrument plug-in.

Change the size of plug-in controls

1. Tap the More button ••• in the plug-in menu bar, then tap Plug-in Control Size.
2. Choose a new size for plug-in controls.

Quickly navigate to plug-in sections

You can show an overlay of the sections of a plug-in and quickly navigate to different parts of the plug-in. This is especially useful for complex plug-ins that require scrolling to view all plug-in parameters.

1. Tap the More button in the plug-in menu bar, then tap Show/Hide Section Overlay.
2. In the Section overlay, tap the section you want to access.
3. Adjust any plug-in parameters.
4. When you finish, tap the Close button in the upper-right corner of the Section overlay.

Choose the source for a side chain signal to a plug-in

For plug-ins with a Side Chain pop-up menu, you can use audio from an audio or software instrument track, hardware input, or bus to trigger the plug-in. For example, the dynamics of a drum groove can be used to rhythmically change the compression, and therefore dynamics, of a guitar, synthesizer, or bass part. The side chain signal is used to control the plug-in, but is not processed by the plug-in.

- In the plug-in menu bar, tap the Side Chain menu, then choose one of the available sources. To close the Side Chain menu, tap outside it.

When a plug-in has a side chain source, an indicator with a left-pointing arrow appears after the plug-in name in the plug-in slot.

Switch between plug-ins in Details view

- Tap the mini plug-in tiles that appear below the plug-in that is open in Details view.

Remove a plug-in in Details view

1. Touch and hold a mini plug-in tile below the plug-in that is open in Details view.
2. Tap Remove.

Bypass a plug-in in Details view

1. Touch and hold a mini plug-in tile below the plug-in that is open in Details view.
2. Tap Bypass.

   When a plug-in is bypassed, its mini plug-in tile appears dimmed.
3. To turn on a bypassed plug-in, touch and hold its mini plug-in tile, then tap Turn On.

Replace a plug-in in Details view

1. Touch and hold a mini plug-in tile below the plug-in that is open in Details view.
2. Tap Replace.
3. Tap to choose a different plug-in from the list (or search using the Search field).

Add a plug-in to the left of another plug-in in Details view

1. Touch and hold a mini plug-in tile below the plug-in that is open in Details view.
2. Tap Add Plug-in Before.
3. Tap to choose a different plug-in from the list (or search using the Search field).

Note: You can add a plug-in before an effect plug-in, but not before an instrument plug-in.

Close Details view and return to the Plug-ins area

- Tap the Back button ‹ on the left side of the plug-in menu bar.

Work with plug-in presets in Logic Pro for iPad

Each plug-in includes presets, which are sets of parameters used to achieve a particular sound from the plug-in. The current preset for each plug-in is stored with the project and automatically recalled the next time the project is opened.

You can choose plug-in presets in the Browser from a plug-in tile in the Plug-ins area or when a plug-in is open in Details view. You can also copy and paste plug-in presets in Details view.

Choose a plug-in preset in the Browser

1. In Logic Pro, do one of the following:
   - In the Plug-ins area, touch and hold the plug-in name on a plug-in tile, then choose Show Presets.
   - In the Mixer, with Mix mode active, tap the plug-in to open it in Details view.
   - In Details view, tap the More button in the plug-in menu bar, then tap Show Presets.

     The Browser opens, showing available presets for the plug-in. You can browse presets and search by name or using filters in the Browser.
2. Tap a preset in the Browser to replace the current preset used by the plug-in.

Copy and paste plug-in presets in Details view

1. In Logic Pro, open the plug-in in Details view.
2. Tap the More button ••• in the plug-in menu bar, then tap Copy Preset.
3. Open the destination instance of the plug-in in Details view.
4. Tap the More button ••• in the plug-in menu bar, then tap Paste Preset.

Work with Audio Unit Extensions in Logic Pro for iPad

In addition to the effect and instrument plug-ins included with Logic Pro for iPad, you can use plug-ins delivered on iPadOS as Audio Unit Extensions. Unlike the included plug-ins, Audio Unit Extensions need to first be installed on your iPad for you to use them. Some Audio Unit Extensions may already be installed on your iPad, and many more are available from other sources. You can buy Audio Unit Extensions from a variety of third-party vendors and can find free Audio Unit Extensions on the internet. Please check the documentation for your Audio Unit Extension for installation instructions and to ensure compatibility with the latest version of Logic Pro.

You use Audio Units Extensions in the same way as built-in plug-ins. When you install an Audio Unit Extension, it is installed as an app on the Home Screen of your iPad. In Logic Pro, installed Audio Unit Extensions appear in the Audio Units section of the Audio FX and Instrument menus, below all built-in plug-in categories.

In the App Store, you can search for Audio Unit Extensions, which can also be found by searching for “AUv3.”

Mix a project

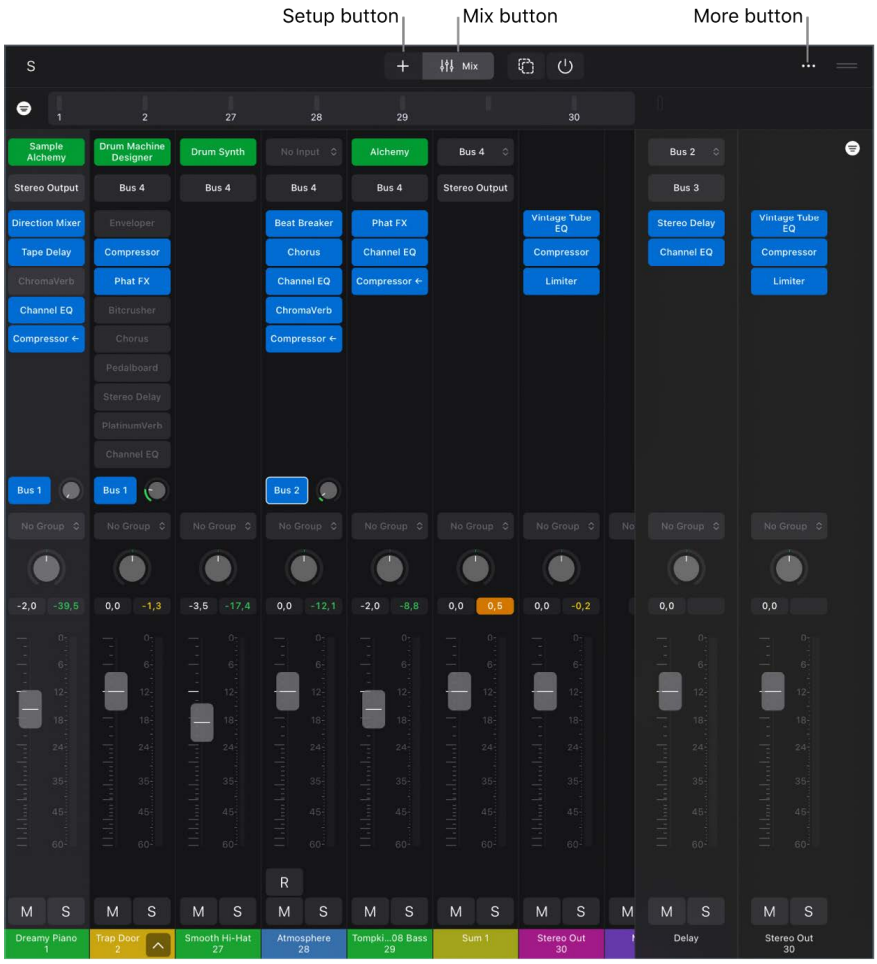
Intro to mixing in Logic Pro for iPad

When you mix a project, you balance the different parts and blend them into a cohesive whole. You can add effects to shape the sound, use routing and grouping to control the signal flow, and add automation to create changes over time. In Logic Pro for iPad, you can perform these tasks and more in the Mixer.

Although there are no hard rules for mixing, it typically involves the following steps:

- Set channel strip volume levels to balance different instruments.
- Set channel strip pan or balance positions to place instruments in the stereo field.
- Add and edit effect and instrument plug-ins to change the sound of individual tracks or the overall project.
- Control the signal flow to route a signal to multiple destinations, create subgroups, or process sounds individually.

In the Mixer you can adjust channel strip controls; add, replace, and remove plug-ins on channel strips; open individual plug-ins in Details view to access their parameters; add sends to route signals to auxiliary (aux) channel strips; and adjust send levels. Some tasks are performed in one of two modes: Setup mode or Mix mode. You select the mode using the buttons in the center of the Mixer menu bar:



- *Setup mode:* Add, replace, reorder, and remove plug-ins, add sends, and adjust send levels on the channel strips in the Mixer.
- *Mix mode:* Quickly open plug-ins in Details view so you can view and adjust all plug-in parameters, and turn plug-ins on or off.

Below the Mixer menu bar is a level meter bridge, which you can swipe to scroll through channel strips from left to right. This is useful in projects with a large number of channel strips, especially when using your iPad in portrait orientation. You can also hide the level meter bridge to create more vertical space in the Mixer.

When you resize the Mixer to fill most of the Logic Pro window, the track corresponding to the selected channel strip appears above the Mixer. You can select a different channel strip, and the corresponding track appears above the Mixer. Using the resize handle, you can resize the area above the Mixer to show or hide the ruler and the controls above the track header, or expand the Mixer to fill the Logic Pro window.

You can also view and edit the plug-ins and sends for the selected track in the Plug-ins area and perform many of the same functions as in the Mixer.

Open the Mixer

- In Logic Pro, tap the Mixer button in the view control bar.

Work in Setup mode

- Tap the Setup button in the Mixer menu bar.

  In Setup mode, you can add, replace, reorder, and remove plug-ins, add sends, and adjust send levels.

Work in Mix mode

- Tap the Mix button in the Mixer menu bar.

  In Mix mode, you can adjust channel strip controls, turn plug-ins on or off, adjust send levels, and open plug-ins in Details view to edit their parameters.

Show or hide the level meter bridge

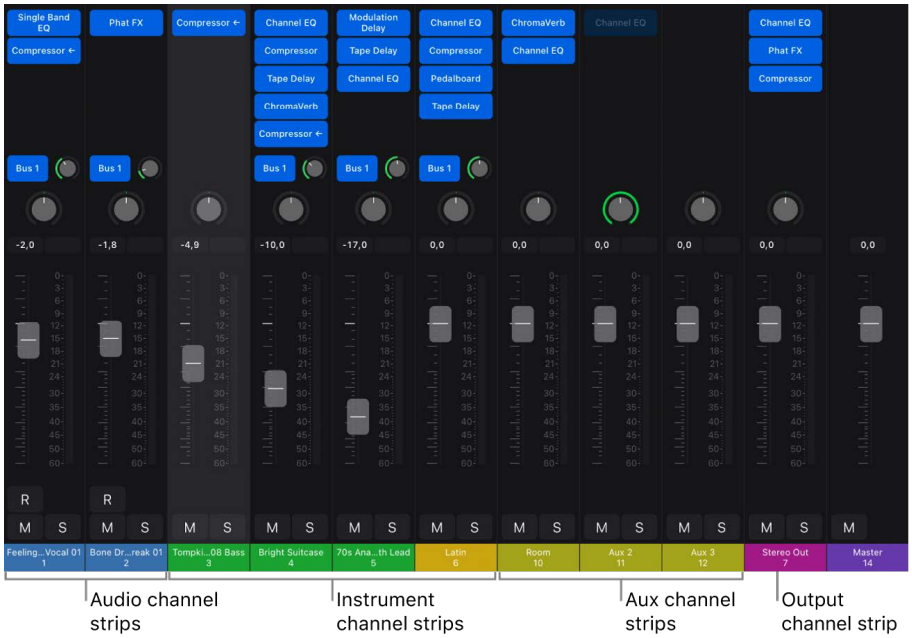
- In Logic Pro, tap the More button in the Mixer menu bar, then tap Show Meter Bridge to hide the level meter bridge.

  When the level meter bridge is hidden, repeat the process to show it.

Work with channel strips

Channel strip types in Logic Pro for iPad

The Mixer shows the channel strips in your project. When you create a project, the Mixer includes channel strips for audio and software instrument tracks in the project, as well as a stereo output channel strip and a master channel strip. Each time you add a track to a project, Logic Pro adds a corresponding channel strip to the Mixer. When you select a channel strip in the Mixer, the corresponding track is selected in the Tracks area.



- *Audio channel strips:* Used to control the playback and recording of audio signals on audio tracks. All data on the audio track is routed to the audio channel strip.
- *Instrument channel strips:* Used to control software instruments. You insert a software instrument using the Instrument slot. The instrument channel strip can then produce sound from any MIDI regions on the associated track, or from notes you play on a MIDI keyboard.
- *Auxiliary (aux) channel strips:* Used for various signal-routing purposes. Aux channel strips are used to set up send returns, where a channel strip signal is routed to an aux channel strip for effects processing. They are also used for grouping and for distributing a signal to multiple destinations via sends.
- *Output channel strips:* Represent the physical audio outputs of your iPad and any connected audio interface. They are used to adjust the overall level and stereo balance or pan position of the channel strips routed to them. Every project has at minimum one stereo output channel strip and may have additional outputs if an audio interface is connected to your iPad.
- *Master channel strip:* Used as a global volume control for all output channel strips. The master channel strip changes the gain of all output channel strips without affecting their relative levels.

Select channel strips

- In Logic Pro, tap the color bar (showing the channel strip name and number) on the bottom of a channel strip in the Mixer.
- To select multiple channel strips, tap the Multiple Select button in the Mixer menu bar, then tap the color bars of channel strips to select them.

Note: By default, when you select a track in the Tracks area, the Mixer autoscrolls to show the channel strip. To turn off autoscrolling, tap the More button ••• in the Mixer menu bar, then tap Autoscroll to Selection to deselect it.

Filter channel strips by type

- In Logic Pro, tap the Filter button on the left side of the Mixer, then tap channel strip types to show or hide them, or tap Deselect All to hide all channel strips.

  In the Utility section of the Type Filter window you can select Click and Preview to show these two channel strips, which are normally hidden. To show the Click channel strip, Software Instrument must also be selected. To show the Preview channel strip, Audio must also be selected.
- When all channel strip types are deselected, you can also tap Select All to select all types.

  Note: When the level meter bridge is hidden, tap the More button ••• in the Mixer menu bar, tap Type Filter, then tap channel strip types to show or hide them.

Rename channel strips

1. Tap the channel strip name (at the bottom of the channel strip) to select it.
2. Tap the channel strip name again, then tap Rename.
3. Enter a new name for the channel strip.
4. To rename the previous channel strip, tap the Left button above the onscreen keyboard (if you are using a computer keyboard, they appear in the middle of the view control bar).

5. To rename the next channel strip, tap the Right button above the onscreen keyboard (if you are using a computer keyboard, they appear in the middle of the view control bar).
6. Tap anywhere outside the channel strip to exit the Rename field.

   Tip: When renaming channel strips using the onscreen keyboard, you can also tap the Tab key to move to the next channel strip.

Note: When you rename a track, the corresponding channel strip is also renamed, and vice versa.

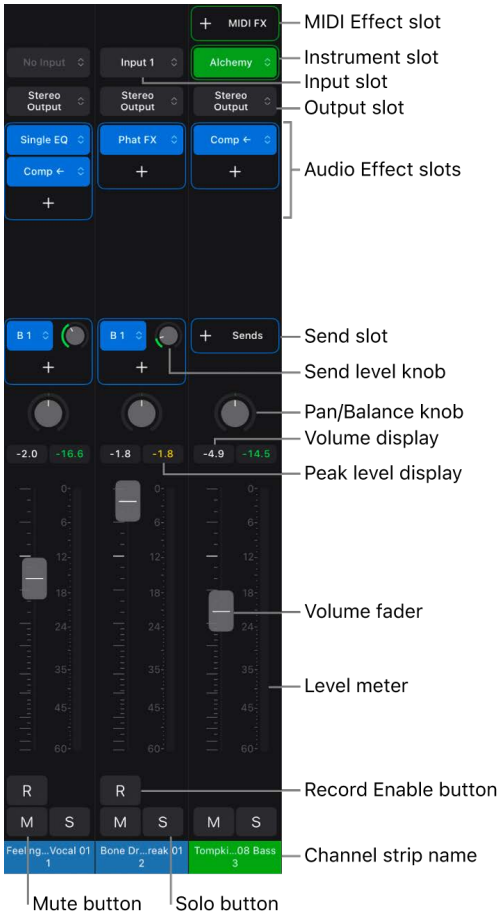
You can select and rename multiple channel strips. If you rename the channel strips with a name ending in a number (for example, Channel 01), they are numbered sequentially starting from that number (Channel 01, Channel 02, Channel 03, and so on).

Delete channel strips

- When you delete a track in the Tracks area associated with a channel strip, the corresponding channel strip is also deleted in the Mixer. See Delete tracks.

Channel strip controls in Logic Pro for iPad

Each channel strip has a set of controls, some of which vary for different channel strip types. You can adjust channel strip volume and pan or balance position, mute and solo channel strips, add and adjust effects, and send the output to auxiliary or output channel strips.



- *MIDI Effect slot:* Inserts a MIDI effect into the software instrument channel strip. See MIDI plug-ins overview.
- *Input slot:* Choose the channel strip's input source—the input source that your microphone or instrument is connected to (audio and aux channel strips only).
- *Instrument slot:* Choose a software instrument to generate the sound for the channel strip (instrument channel strips only).
- *Output slot:* Choose the channel strip's output destination—where the channel strip signal is sent to. This can be a hardware output or a bus. You can also choose the type of output, and choose pan options for stereo channel strips.
- *Audio Effect slot:* Inserts an audio effect into the channel strip. Use effects to alter the sound of the channel in real time.
- *Send slot:* Routes the signal to an aux channel strip. Use sends to process effects for multiple signals at the same time. See Use auxiliary channel strips.
- *Send Level knob:* Controls the amount of signal sent to an aux channel strip. Use sends to process effects for multiple signals at the same time. See Use auxiliary channel strips.
- *Group menu:* Controls a channel strip's group assignment. See Create Mixer groups.
- *Automation Mode menu:* Choose the automation mode or turn automation off for the channel strip. See Choose the automation mode.
- *Pan/Balance knob:* Sets the channel strip signal's position. On mono channel strips, it controls the signal's left/right position. On stereo channel strips, it controls the balance or stereo position between the left and right signals. See Set channel strip pan or balance.
- *Peak level display:* Updates during playback to show the highest peak level reached. A red display indicates signal clipping. See Peak level display and clipping.
- *Volume fader position field:* Shows the position of the Volume fader. To change the fader position, tap the field, then enter a position value.
- *Volume fader:* Drag vertically to adjust the playback volume of the channel strip signal.
- *Level meter:* Shows the signal level of the channel during playback. Orange and yellow signals are safe. Red indicates a level above 0 dB.
- *Record Enable button:* Tap the Record Enable button R to make the channel strip ready for recording.
- *Input Monitoring button:* (Audio channel strips only) Tap the Input Monitoring button | to hear incoming audio on audio tracks that aren't armed for recording. Use to hear your performance in the mix to practice parts before recording. The Input Monitoring button is available only when Software Monitoring is turned on. See General Audio settings.

  When the channel input is set to No Input, the Input Monitoring button is dimmed and inactive.
- *Mute button:* Tap the Mute button M to remove the signal from the overall project so it is not heard. See Mute and solo channel strips.
- *Solo button:* Tap the Solo button S to isolate the signal from the overall project so it is heard without any unsoloed channels. See Mute and solo channel strips.

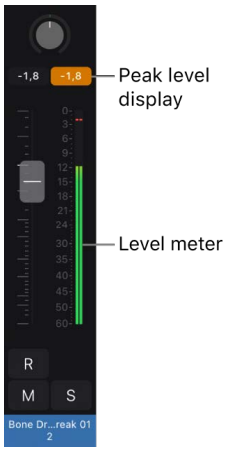
Filter which channel strip controls appear in the Mixer

- In Logic Pro, tap the Filter button on the right side of the Mixer, then tap components to show or hide them, or tap Deselect All to hide all channel strip components.

Peak level display and clipping in Logic Pro for iPad

Check channel strip levels

Each channel strip has a segmented level meter next to the volume fader that shows the playback level (or, when an audio track is record-ready, shows the input monitoring level). The colors that appear in the level meter provide a quick visual indication of channel strip monitoring levels:



- *Green:* The signal is at a safe level, and does not clip the channel strip output.
- *Orange and yellow:* A higher signal level, but still safe from clipping.
- *Red:* The signal is above 0 dB and is considered “hot.” On an output channel strip, this can cause clipping or distortion and should be avoided.

The peak level is displayed numerically above the level meter. It updates during playback to show the peak level reached since the beginning of playback, and provides a guide for setting the Volume fader.

Signal clipping

Signal clipping occurs when a signal that is too loud is fed through the output channel strip, exceeding the limit of what can be accurately reproduced, resulting in distorted sound. The value shown in the peak level display lights red (on output channel strips) or orange (on other channel strip types) when the signal rises above 0 dB. This part of the peak level display is called the *clipping indicator*.

Note: It’s not an issue if individual channel strips show evidence of clipping, as long as the output channel strip—the summed level of all channel strips in the signal flow—does not clip.

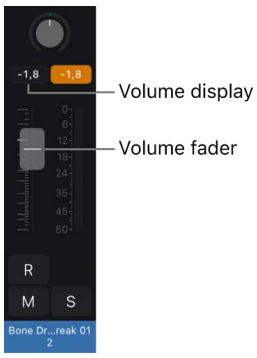
To avoid clipping, lower the Volume fader by the same value that is shown in the peak level display.

Reset all peak level displays

- In Logic Pro, tap a peak level display on any channel strip.

Set channel strip volume in Logic Pro for iPad

You can set the volume level of each channel strip to balance the relative volume of the tracks in your project.



Set channel strip volume level

- In Logic Pro, drag the Volume fader up or down to the desired level.

Set channel strip input format in Logic Pro for iPad

The input format determines the mono or stereo state of the channel strip.

- *Mono:* The channel has a mono input format. The level meter shows a single column.
- *Stereo:* The channel has a stereo input format. The level meter shows two independent columns.
- *Left:* The channel has a left channel input format. Only the left channel of a stereo audio file is played back. The level meter shows a single column.
- *Right:* The channel has a right channel input format. Only the right channel of a stereo audio file is played back. The level meter shows a single column.

Set the channel strip input format

1. In Logic Pro, tap the Input slot on a channel strip.
2. Under Channel Format, tap the input format for the channel strip.
3. Tap outside the dialog to close it.

Note: You can change the iPad microphone orientation for audio input by tapping the Microphone Orientation Setup button below the Channel Format pop-up menu, then choosing a different orientation in Audio Devices settings. Changing the microphone orientation may also change the input format.

Set the output for a channel strip

You can choose the stereo output pair for a channel strip in the Mixer. The Stereo Output (Speaker 1/2) sends output to the iPad's audio system. Other outputs may be available when an audio interface or other audio device is connected to the iPad. See Audio Devices settings for information about audio devices.

Choose the stereo output for a channel strip

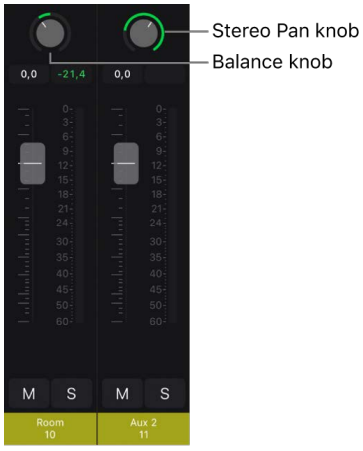
1. In Logic Pro, tap the Output slot on a channel strip.
2. Tap the Output pop-up menu, then choose a stereo output.
3. Tap outside the dialog to close it.

Set channel strip pan or balance in Logic Pro for iPad

You can control the position of individual channel strips using the pan/balance controls to position them (and their corresponding tracks) across the stereo field. Whether you are positioning important parts in the center, hard-panning to create a wide mix, or want to achieve an unusual effect, you can use the pan/balance controls to control the overall stereo width of the mix and the placement of each part within it.

The Pan/Balance knob (pan is short for *panorama*) controls the left-to-right position from which the channel is heard in the stereo field. You can set the pan or balance position for each track in a project.

Logic Pro includes several different panning modes. Mono channel strips have a Pan knob, and stereo channel strips can use either a Balance knob or a Stereo Pan knob:



- *Pan:* Mono channel strips have a Pan knob that determines the position of the signal in the stereo field. At the center position, equal amounts of the signal are sent to the left and right sides. If you move the knob to the left, more of the signal is sent to the left side and less is sent to the right.
- *Balance:* This is the default mode for stereo channel strips. In Balance mode, turning the knob to the left lowers the level of the right channel, and turning it to the right lowers the level on the left channel.
- *Stereo Pan:* This mode is also available for stereo channel strips. In Stereo Pan mode, you can control both the pan position and the width (spread) of the stereo image.

Signals at the center of the stereo field might sound louder than those panned hard right or hard left. To compensate for this perceived increase in volume at the center position, Logic Pro applies a standard amount of volume reduction for signals panned to the center (called *pan law*).

Choose the pan mode for stereo channel strips

1. In Logic Pro, tap the Setup button ┼ in the Mixer menu bar (if it is not already selected).
2. Tap the Output slot on a channel strip.
3. Under Pan Options, tap either Stereo Pan or Balance.
4. Tap outside the window to close it.

Adjust channel strip pan or balance position

- In Logic Pro, drag the Pan or Balance knob of a channel strip vertically to adjust the pan or balance position.

Adjust the spread for a Stereo Pan channel strip

1. In Logic Pro, tap the Stereo Pan knob for a channel strip to show the numeric input dialog.
2. In the numeric input dialog, do one of the following:
   - Drag the green ring vertically to adjust the Spread amount as well as the pan position (the Value number).
   - Tap the Spread amount, then adjust the amount using the Decrement/Increment buttons.
   - Tap the Spread amount, tap the Number Pad button #, then adjust the amount using the numeric keypad.
3. When you're done, tap Done to dismiss the numeric input dialog.

Note: You can invert the left and right channel by entering a negative Spread amount. When the Spread amount is negative, the ring changes to orange (both in the numeric input dialog and on the channel strip).

Mute and solo channel strips in Logic Pro for iPad

You can mute a channel strip so that it is silent when you play the project. Muting channel strips is useful when you want to compare how the project sounds with and without the track, compare alternative versions of a track, or try different loops in a project.

You can also listen to a channel strip alone (solo), silencing all unsoloed channel strips. Soloing channel strips is useful when you want to work on a track or region individually; for example, when you're editing regions on the track, re-recording a part, or adjusting volume curves.

The first time any track in a project is soloed, a large Clear/Recall Solo button appears in the area above the track headers. You can quickly unsolo or resolo all soloed tracks by tapping the Clear/Recall Solo button. See Mute and solo tracks.

Mute a channel strip

- In Logic Pro, tap the Mute button M in the channel strip.

  Tap the Mute button again to unmute the channel strip.

Solo a channel strip

- In Logic Pro, tap the Solo button S in the channel strip.

  Tap the Solo button again to unsolo the channel strip.

  When you solo a channel strip, the Mute buttons of all unsoloed channel strips flash to show that these channels are silent.

Quickly mute or solo multiple channel strips

- In Logic Pro, touch and hold either a Mute or a Solo button, then (without lifting your finger) swipe horizontally across the other channel strips you want to mute or solo. The Mute or Solo buttons of all swiped channel strips switch to the same state.

For channel strips with a corresponding track in the Tracks area, the Mute and Solo buttons are equivalent to those in the header of the corresponding track. See Mute and solo tracks.

Reorder channel strips in the Mixer in Logic Pro for iPad

In Logic Pro you can reorder channel strips in Tracks view in the Mixer, including reordering multiple channel strips. When you reorder channel strips assigned to tracks, the corresponding tracks are reordered in the Tracks area.

Channel strips that are not assigned to tracks can be moved to new positions between or to the right of track-assigned channel strips. When you move non-track-assigned channel strips, tracks are created for them.

Reorder a channel strip in the Mixer

- In the Mixer in Logic Pro, touch and hold the channel strip name, then drag horizontally to move the channel strip to a new position.

Reorder multiple channel strips in the Mixer

- In the Mixer in Logic Pro, select the channel strips (using the Multiple Select button), then drag one of the selected channel strips horizontally to move all of them to a new position. You can select and reorder nonadjacent channel strips, which brings them together in their new position.

When reordering, you can't simultaneously select channel strips that are part of a track stack and channel strips outside the track stack. If any channel strips inside a track stack are selected, and you add a channel strip outside the track stack to the selection, the channel strips inside the track stack are deselected and are not reordered. Similarly, if you select channel strips outside a track stack, then add a channel strip inside a track stack to the selection, the channel strips outside the track stack are deselected.

Replace a patch on a channel strip using drag and drop in Logic Pro for iPad

You can replace a patch on a Mixer channel strip by dragging a patch from the Browser, similar to replacing a patch on a track. You can replace a patch on an audio or instrument channel strip, as well as on an aux or output channel strip.

When you replace a patch on an audio or software instrument channel strip, the entire patch is loaded, including any send destinations. Send destinations use either the available effect busses of the same category or use the send destination settings from the patch.

When you replace an audio, aux, or output patch on an aux or output channel strip, the primary channel strip setting (.cst) from the patch is loaded on the channel strip, but send destinations from the patch are not loaded.

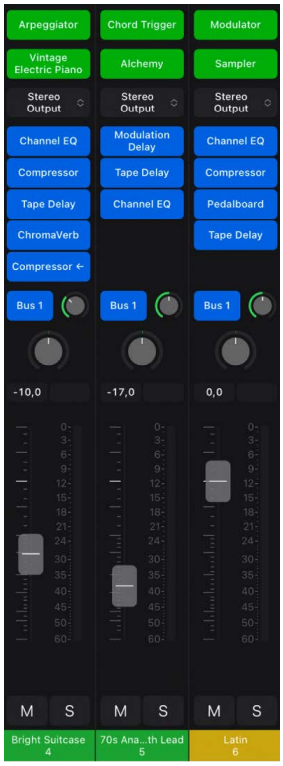
Replace an audio or instrument patch by dragging from the Browser

1. In Logic Pro, tap the Browser button to open the Browser.
2. In the Browser, locate the patch you want to use as the replacement. The patch must be of the appropriate type for the receiving channel strip.
   - Audio patches can be dragged to audio, aux, or output channel strips.
   - Instrument patches can be dragged to instrument channel strips.
   - Aux patches can be dragged to aux or output channel strips.
   - Output patches can be dragged to aux or output channel strips.
3. Touch and hold the patch, then drag it to the receiving channel strip.

   As you drag over the destination channel strip, a blue outline appears around it, indicating that it is the appropriate type of channel strip for the patch.

Work with plug-ins in the Mixer in Logic Pro for iPad

In addition to working with plug-ins in the Plug-ins area, you can work with plug-ins in channel strips in the Mixer. You can add plug-ins, replace a plug-in with a different one, search for a plug-in, and remove plug-ins in the Mixer. You can also reorder plug-ins and open plug-ins in a mini view or in Details view from the Mixer.



Add a plug-in to a channel strip in the Mixer

1. In Logic Pro, tap the Setup button ┼ in the Mixer menu bar (if it is not already selected).
2. Do one of the following:
   - To add a MIDI effect plug-in (on a software instrument track), tap an empty MIDI Effect slot, then choose a MIDI effect.
   - To add an audio effect plug-in, tap an empty Audio Effect slot, then choose an audio effect.

Open a plug-in mini view in the Mixer

- In Logic Pro, with the Mixer in Mix mode, touch and hold an instrument or effect plug-in slot.

The plug-in opens in a mini view in the Mixer, showing controls for the key plug-in parameters.



Open a plug-in in Details view from the Mixer

In Logic Pro, in the Mixer, do one of the following:

- In Setup mode, tap a plug-in slot, then tap Open.
- In Mix mode, tap a plug-in slot.

Replace a plug-in in the Mixer

1. In Setup mode, tap a plug-in slot, then tap Replace.
2. Choose a plug-in from the menu.

Move a plug-in to a different channel strip

- In Setup mode, touch and hold a plug-in slot, then drag it to a different channel strip.

Copy a plug-in to a different channel strip

- In Setup mode, tap a plug-in slot, then tap Copy.
- On a different channel strip, tap an empty plug-in slot, then tap Paste.

Reorder plug-ins in the Mixer

- In Setup mode, touch and hold a plug-in slot, then drag it up or down to reorder it.

Remove a plug-in in the Mixer

- In Setup mode, tap a plug-in slot, then tap Remove.

Quickly turn plug-ins or sends on or off in the Mixer

1. Tap the Mix button in the Mixer menu bar (if it is not already selected).
2. Tap the On/Off button in the Mixer menu bar.
3. Do one of the following:
   - Tap any plug-in slot in a Mixer channel strip to turn the plug-in off, or, if it is turned off, to turn it on.
   - Tap any send slot in a Mixer channel strip to turn the send off, or, if it is turned off, to turn it on.

Turn plug-ins and sends on or off in Setup mode

In addition to using the On/Off button in Mix mode, you can bypass plug-ins and sends in Setup mode.

1. Tap the Setup button in the Mixer menu bar (if it is not already selected).
2. Do one of the following:
   - To bypass a plug-in, tap the plug-in slot in a channel strip, then tap Bypass.
   - To bypass a send, tap the Send pop-up menu for the send, then tap Bypass.
3. To turn on a bypassed plug-in or send, do one of the following:
   - To turn on a bypassed plug-in, tap the plug-in slot in a channel strip, then tap Turn On.
   - To turn on a bypassed send, tap the Send pop-up menu for the send, then tap Turn On.

When multiple channels strips contain the same plug-in, you can turn the plug-in on or off on all of them by selecting the channel strips, tapping the On/Off button, then tapping the plug-in on one of the selected channel strips.

For detailed information about using plug-ins, see Work with plug-ins in Logic Pro.

Search for plug-ins in the Mixer in Logic Pro for iPad

In Logic Pro, with the Mixer in Setup mode, you can search for a plug-in by name; then you can quickly add the plug-in to an empty plug-in slot or replace the plug-in on an occupied plug-in slot.

Search for a plug-in from an empty slot

1. In Logic Pro, with the Mixer in Setup mode, tap an empty audio, instrument, or MIDI plug-in slot, then tap the search field at the top of the plug-ins list.
2. Enter the plug-in name. As you enter text, the results list shows matching plug-ins.
3. To add a matching plug-in to the slot, tap the plug-in in the results list.

Replace a plug-in from an occupied slot

1. In Logic Pro, with the Mixer in Setup mode, tap an occupied audio, instrument, or MIDI plug-in slot, then tap Replace.
2. Tap the search field at the top of the plug-ins list.
3. Enter the plug-in name. As you enter text, the results list shows matching plug-ins.
4. To replace the existing plug-in with a matching one, tap the plug-in in the results list.

Search for and select a plug-in side chain source

For plug-ins that feature side chain input (such as Alchemy, Sampler, Compressor, Sculpture, and Ultrabeat), you can search for a side chain source from the Side Chain pop-up menu.

1. In the Mixer in Logic Pro, open the plug-in in Details view.
2. Tap the Side Chain pop-up menu in the plug-in menu bar.
3. Enter the name of the source in the search field. As you enter text, the results list shows matching items.
4. To use a matching item as the side chain source, select it in the results list.

Control signal flow in the Mixer

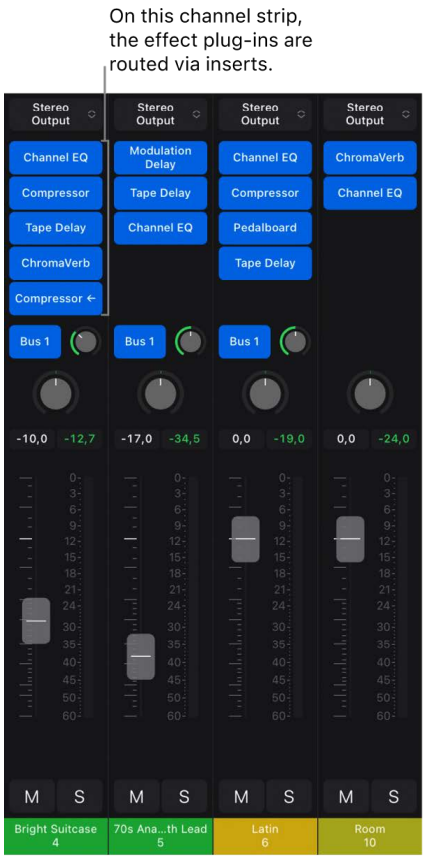
Intro to signal flow in Logic Pro for iPad

While you are working in the Mixer, you can insert plug-ins directly on channel strips, so that the signal on each channel strip is routed directly through its plug-ins; or you can route the audio from multiple channel strips to an aux channel strip with effect plug-ins and use the same effects on multiple channel strips.

Route audio via insert effects

When you insert an effect plug-in directly on a channel strip, it is called an *insert* effect. The channel strip's entire signal is processed by the effect plug-in. This behavior is suitable for equalizers or dynamic effects such as compressors. If you have enough processing capacity, you can use up to 15 insert effects on each channel strip.

When multiple effect plug-ins are inserted on a channel strip, they are said to be routed *in series*. When routed in series, the output of one effect is added to the incoming signal and becomes the input of the next effect in the chain. The image below illustrates this process.

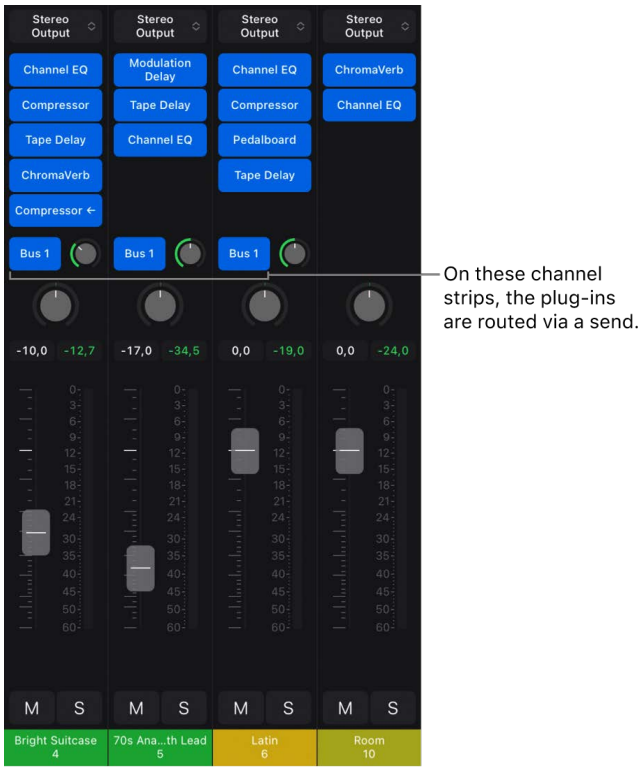


Route audio via send effects

When you route part of the signal from multiple channel strips via a send to an aux channel strip, you use *send* effects on the aux channel strip to alter the signal from the originating channel strips. When you create a send, you split the channel strip's signal. The channel strip's main signal continues to the chosen output, while the other part of the signal is routed on a parallel path via a bus to an aux channel strip. You control the amount of signal that is sent via the bus using the Send Level knob. This is called routing *in parallel*. You can route the signal back into the main signal flow at a later point, or you can output the signal from the aux channel strip to another destination.

The primary advantage of parallel routing using sends over series routing using inserts is efficiency: the signals from multiple channel strips can be processed by the same effects, which saves both processing power and time compared to inserting the same effect into multiple channel strips. Additionally, you can quickly switch between wet and dry versions of all channel strips that are sent to an aux channel strip by simply muting the aux channel strip (or turning off the effects on it), and completely change the effects configuration for multiple channel strips by choosing different effects for the aux channel strip.

The following image illustrates channel strips routed to an aux channel strip via sends—with reverb and EQ effects assigned to the aux channel strip.



The channel strip signal is split and routed via a send (Bus 1) from three channel strips to an aux channel strip with two inserted effects. You can create up to 12 sends on each audio, instrument, or aux channel strip.

You configure where in the channel strip the send occurs, and you set the destination for the parallel routing of the send in the Sends window. There are three options for where the send can occur in the signal flow:

- *Post Pan:* The signal is sent after the fader and the Pan knob; the send signal is affected by adjustments to both channel strip volume and pan adjustments.
- *Post Fader:* The signal is sent after the fader but before the Pan knob; the send signal is affected by volume adjustments but not pan adjustments.
- *Pre Fader:* The signal is sent before the fader and Pan knob; the send signal is affected by neither volume nor pan adjustments.

You can both insert effects on channel strips and use sends with aux channel strips in the Mixer. You can also route audio (for send effects) for the selected track in the Plug-ins area.

Choose the destination for a send in the Mixer

1. In Logic Pro, tap the Setup button ┼ in the Mixer menu bar (if it is not already selected).
2. Tap a send, then choose a destination from the Bus pop-up menu, or choose Create New Bus.

You can also choose send destinations in Sends view in the Plug-ins area.

Choose the mode for a send

Sends in Logic Pro can use one of three modes that control whether the signal is affected by volume adjustments, pan adjustments, or both.

1. In Logic Pro, tap the Setup button ┼ in the Mixer menu bar (if it is not already selected).
2. Tap an active send, then choose one of the send modes:
   - *Post Pan:* The signal is sent after the fader and the Pan knob; the send signal is affected by both channel strip volume and pan adjustments. When a send is Post Pan, the Send knob ring is green.
   - *Post Fader:* The signal is sent after the fader but before the Pan knob; the send signal is affected by volume adjustments but not pan adjustments. When a send is Post Fader, the Send knob ring is blue.
   - *Pre Fader:* The signal is sent before the fader and Pan knob; the send signal is not affected by volume or pan adjustments. When a send is Pre Fader, the Send knob moves to the left of the Send pop-up menu, and the Send knob ring is blue.

Show the routing destination for a send

You can show the routing destination for a send in the Mixer. When Send/Routing Destination is selected, the aux channel strip for the selected send appears on the right side of the Mixer, next to the output channel strip.

1. In Logic Pro, tap the More button ••• in the Mixer menu bar, then tap Send/Routing Destination to turn it on.
2. In the Mixer, tap the Bus pop-up menu for a send to select it.

Copy the current channel strip fader volume to the send level

You can copy fader volume from a channel strip directly to a send using the Copy Fader to Send command. Using this command, you can quickly set the level for a send without having to first enter Sends on Faders mode and make adjustments.

- In Logic Pro, tap the Setup button ┼ in the Mixer menu bar (if it is not already selected).
- Tap an active send, then tap Copy Fader to Send to turn it on.

Remove a send

- In Logic Pro, tap the Setup button ┼ in the Mixer menu bar (if it is not already selected).
- Tap an active send, then tap Remove Send.

Search for a send

1. In the Mixer, tap a Send slot, then tap the search field at the top of the list of sends. The slot can be empty or occupied.
2. Enter the send name. As you enter text, the results list shows matching sends.
3. To add a matching send to the slot, tap the send name in the results list. If the slot is occupied, the selected send replaces the existing one.

Use auxiliary channel strips in Logic Pro for iPad

Auxiliary (aux) channel strips can be used as effects returns, to create subgroups, to submix, and to route a signal to multiple output destinations. You can create aux channel strips as needed in the Mixer.

Create mix subgroups

You can route the signal from multiple channel strips via a single bus to an aux channel strip, which provides you with one set of controls over the entire group.

For example, say your mix contains multiple drum tracks that you want to manage using a single set of channel strip controls, or you want to use a compressor across the whole drum kit. You can do so using sends to route the signal from each of the drum tracks to the same bus with the same aux channel strip as the destination. You could route your vocal tracks to a second aux channel strip, providing a separate way to control those channel strips as a group. Finally, you could output both subgroups (drums and vocals) to the same destination or to separate destinations.

Creating a mix subgroup using an aux channel strip is similar to using a summing stack. The main difference is that you can add channel strips to an aux channel strip subgroup without their being part of a track stack.

There are also some similarities between using aux channel strips as subgroups and working with Mixer groups. You can control the group/subgroup properties from one set of channel strip controls. However, Mixer groups are typically used to control channel strip group properties, and not the signal flow.

Route signals to multiple output destinations

You can route a signal to several different output destinations using aux channel strips.

For example, you might have a main signal with the output destination set to external speakers. At the same time, you want to hear the signal as a separate headphone mix, at a different level or with some additional effects. To do this, you would set up two separate output destinations for your signal, with the aux channel strips controlling the headphone mix.

Create an aux channel strip

When you make a send assignment from a channel strip using a bus not already in use as an input source on another channel strip, an aux channel strip is created automatically.

Show a track for an aux channel strip in the Tracks area

- In Logic Pro, do one of the following:
  - With the Mixer in Mix mode, tap the bottom of an aux channel strip, then tap Create Track.
  - With the aux channel strip selected, tap the More button above the track headers, then tap Create Track.

When you show a track for an aux channel strip in the Tracks area, you can choose a patch for an aux channel strip in the Browser.

Create a subgroup using an aux channel strip

1. In Logic Pro, select multiple channel strips in the Mixer.
2. Tap the Output slot of a selected channel strip, then choose a bus from the pop-up menu.

   The Output slots of all selected channel strips reflect the chosen bus. A new aux channel strip is created, except when the chosen bus is already in use as an input source on another channel strip. Its Input slot contains the channel strip signal flow coming via the chosen bus.
3. Tap the Output slot of the aux channel strip, then choose the output destination for the main mix.
4. Use the aux channel strip controls to process the submix—adding inserts, setting volume and pan, and so on.

Route a channel strip to two output destinations

1. In Logic Pro, tap the Output slot of the channel strip, then choose the main output destination for the mix.
2. Tap the channel strip's Send slot, then choose the bus to route part of the signal to.

   An aux channel strip is created, with the bus in its Input slot.
3. Tap the Output slot of the aux channel strip, then choose an additional output destination for the mix, such as headphones.

   The signal is now routed to two separate output destinations. The main signal flow is routed through the channel strip to the speakers. The second signal flow is routed via a bus to the aux channel strip, and output to the headphones. The relative level of the signal can be adjusted using the Send Level knob.

Use multi-output instruments in Logic Pro for iPad

You can use multi-output instruments in your mix to process each sound individually with different effects (in a drum kit, for example) or to route the different software instrument outputs to different outputs on an audio interface.

Logic Pro supports the multiple outputs of all instruments that provide a multi-output configuration (including Drum Kit Designer, Sampler, Studio Horns, Studio Strings, and Audio Unit Extensions). One or more multi-output options may be displayed in addition to the mono and stereo versions shown in the plug-in pop-up menu of the Instrument slot.

Not all instruments offer multi-output options.

Insert and set up a multi-output instrument

1. In the Mixer in Logic Pro, tap the Instrument slot on an instrument channel strip, tap Replace, then choose a multi-output instance from the menu.

   The first two outputs of a multi-output instrument are always played back as a stereo pair by the instrument channel strip that the plug-in is inserted into. Additional outputs (3 and 4, 5 and 6, and so on) are accessed via aux channel strips.

2. In the Mixer, tap the Add button (+) above the Solo button on the instrument channel strip for the multi-output instrument.

   Note: The Add button (+) appears only on multi-output instrument channel strips.

   An aux channel strip is created to the right of the multi-output instrument channel strip. Use this new channel strip to isolate and route a sound for independent mixing and processing.

3. Repeatedly tap the Add button (+) to create more aux channel strips for all stereo or mono outputs available to the instrument plug-in.

   You should create only as many aux channel strips as are required for the number of outputs used by the multi-output instrument.

   If necessary, you can delete any unneeded channel strips by tapping the channel strip name, then tapping Delete.

Use output channel strips in Logic Pro for iPad

By default, a Logic Pro project contains one stereo output channel strip that represents the physical stereo outputs for the iPad. All the individual tracks in the project are routed to the output channel strip. If you are using an audio interface connected to your iPad, the available outputs reflect the hardware outputs on the audio interface.

The Effect slots of output channel strips allow signal processing for all the channel strips routed to the output during mixing, and they can also be used for mastering. Typical mastering plug-ins include compressors, limiters, de-essers, and equalizers. For technical reasons, you can only use plug-ins that don’t require mono to stereo conversions–in other words, you can use stereo to stereo plug-ins on stereo output channel strips, and mono to mono plug-ins on mono output channel strips.

Show a track for an output channel strip in the Tracks area

- In Logic Pro, do one of the following:
  - With the Mixer in Mix mode, tap the bottom of an output channel strip, then tap Create Track.
  - With the output channel strip selected, tap the More button above the track headers, then tap Show Output Track.

When you show a track for an output channel strip in the Tracks area, you can choose a patch for an output channel strip in the Browser.

Work with Mixer groups

Create Mixer groups in Logic Pro for iPad

While working on a mix, you may find it useful to create Mixer groups. You could create a drum group, for example, to group all drum channel strips together to adjust group parameters (volume, pan, mute, solo, sends, and so on) using a single control, while still maintaining the relative parameter values of volume and pan for each channel strip. You can:

- Create new groups and add and remove channel strips from a group.
- Control volume, pan, mute, and solo for the channel strips in a group.
- Control send levels for the channel strips in a group.
- Select or edit a region in the track of a group member and have the selection or edits apply to the corresponding range of all tracks in the group.

For all channel strips that are members of a group, you can control volume and pan settings, mute or solo state, and automation together, while maintaining the individual settings of each channel strip. You can have a maximum of 64 groups.

It is also possible to use auxiliary channel strips for grouping purposes, but Mixer groups provide greater flexibility.

Show the Group slots

- In Logic Pro, tap the Filter button in the upper-right area of the Mixer, then tap Groups to select it.

Create a new Mixer group

- Tap the Group slot on a channel strip, then tap Create New Group.

Add a channel strip to a Mixer group

- Tap the Group slot on a channel strip, then choose a group.

Note: You can also add multiple channel strips from a group by selecting the channel strips, tapping the Group slot on a selected channel strip, then choosing a group.

Remove a channel strip from a Mixer group

- Tap the Group slot on a channel strip, then tap Remove Group Assignment.

Note: You can also remove multiple channel strips from a group by selecting the channel strips, tapping the Group slot on a selected channel strip, then choosing Remove Group Assignment.

Note: If the Group slots are not visible, tap the Filter button in the upper-right area of the Mixer and select Groups in the Component Filter list.

View and edit group settings in Logic Pro for iPad

In the Group inspector, you can view and edit settings for the selected Mixer group, including group properties and group automation settings. Group properties include selection editing, record enabling, input state, and track color; and automation settings include automation mode, volume, pan, and mute and solo states.

Show the Group inspector

1. In Logic Pro, tap the Inspector button in the view control bar.
2. Tap the Level menu at the top of the inspector, then tap Group.

   Note: The Group inspector is available when a project contains at least one Mixer group.

Turn groups on or off

- In the Group inspector in Logic Pro, tap the checkmark for a group.

Turn all groups on or off

Do one of the following:

- In the Group inspector in Logic Pro, tap the All Groups switch.
- In the Mixer, tap the More button, then tap Groups active.

Edit group properties

1. In the Group inspector in Logic Pro, tap the More button for a group.
2. In the Group Settings dialog, tap Properties (if it is not already selected).
3. Do any of the following:
   - Tap the name in the Name field, then enter a new name.
   - Tap the Editing (Selection) switch to turn on group editing of selections, so that selecting a region in the Tracks area selects the same horizontal region range of all tracks in the group.
   - Tap the Record switch so that changing the record-ready state of one track changes the record-ready state of all tracks in the group. Multiple channel strips can be simultaneously made record-ready only if they use different inputs.
   - Tap the Input switch so that changing the input state of one track changes the input state of all tracks in the group.
   - Tap the Color switch so that changing the color of one track assigns this color to all tracks in the group.
   - To delete the group, tap Delete Group.

Edit group automation settings

1. In the Group inspector in Logic Pro, tap the More button ⋯ for a group.
2. In the Group Settings dialog, tap Automation (if it is not already selected).
3. Do any of the following:
   - Tap the Automation Mode switch so that changing the automation mode of one track changes the automation mode of all tracks in the group.
   - Tap the Volume switch so that changing the Volume fader of one track changes the volume level of all tracks in the group. The channel strips continue to maintain their relative volume levels.
   - Tap the Pan switch: When selected, changing the Pan knob of one track changes the Pan knob of all tracks in the group. The channel strips continue to maintain their relative pan positions.
   - Tap the Mute switch: When selected, changing the mute state of one track changes the mute state of all tracks in the group.
   - Tap the Solo switch: When selected, changing the solo state of one track changes the solo state of all tracks in the group.
   - Tap the All Sends switch: When selected, the Send Level knobs for all Send slots are linked, so that moving one knob moves the others while maintaining their relative positions.
   - Tap the Individual Sends menu, then tap sends to select them. When selected, the Send Level knobs for the selected Send slots are linked, so that moving one knob moves the others while maintaining their relative positions.

     Note: When the All Sends switch is off, the individual sends menu is available so that you can select individual Send slots to link for a Mixer group.

Automate Mixer groups in Logic Pro for iPad

By automating groups, you can easily change the values of parameters for a group of channel strips over time. For example, you may want to group all of your guitar channel strips together and have all of their relative volumes change at the same time throughout a project.

When you automate mixing functions (such as volume, pan, mute, or sends), any member of the group can be used to control the values of all members. When you write an automation parameter value on one group member, the same value (for mute and solo states) or offset (for volume and pan values) is written for the other group members, depending on their automation mode.

The data is written individually for each channel strip. As a result, you can deactivate the group later without affecting the automation of any group member, and you can edit or change channel strips individually when you remove them from the group.

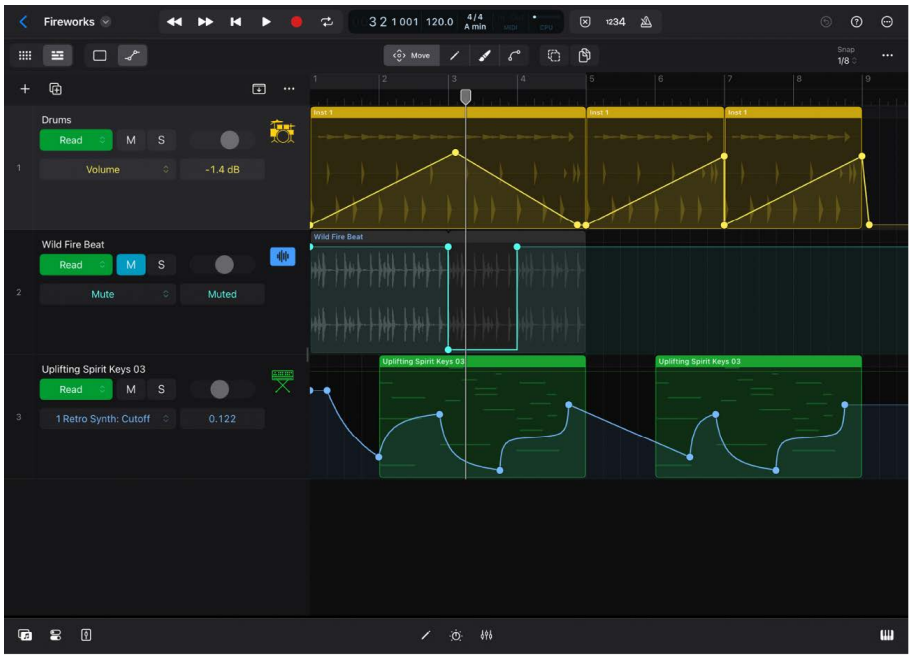
You control group automation in the Group Settings dialog. To learn more about automation, see Intro to automation.

Automate your mix

Intro to automation in Logic Pro for iPad

Automation refers to recording, editing, and playing back the movements of faders and knobs and the status of switches. Using automation, you can create changes over time to volume, pan, and other settings in the channel strips or plug-ins. For example, you can use automation to change the volume of an instrument throughout a project, create left-right pan movement and filter sweeps, mute a track during a section of the project, or create a fade-out at the end of a song.

In Automation view, you select an automation parameter to show and edit its individual automation points. The automation curve (the representation of the parameter's value change over time) is automatically created by connecting those points with a straight line. You can also bend the lines to change the shape of the automation curve.



You can add automation to all track types and even add automation to regions and cells. Logic Pro also lets you embed automation data in Step Sequencer for creating tempo-based automation.

Track automation vs. region automation

Logic Pro offers two types of automation: track automation and region automation. Track automation (available in the Tracks area) applies to the entire track, from the beginning to the end of your project. Region automation (available in the Editors area) is embedded in the individual region. With track automation, if you re-record, move, or copy regions (either to another point on the same track or to another track entirely), the automation data remains tied to the initial point on the track in which it was created. However, with region automation, if you re-record the region, the automation is overwritten; if you move or copy the region (either to another point on the same track or to another track), the automation remains with the region. Region automation is particularly useful when you are automating instrument parameters.

Important: If you create region automation and track automation for the same parameter on a track, region automation has priority. Automation data created in Step Sequencer has priority over region automation.

Writing automation vs. drawing automation

You can create and edit automation in two ways:

- You can write automation in real time by adjusting controls during playback to record those movements as automation data using various Automation modes.
- You can also draw and edit automation graphically by using various functions and gestures.

Each parameter that can be automated is listed in the Automation Parameter pop-up menu. You can turn off individual automation parameters or turn off all automation parameters on a track.

Automation points vs. MIDI data points

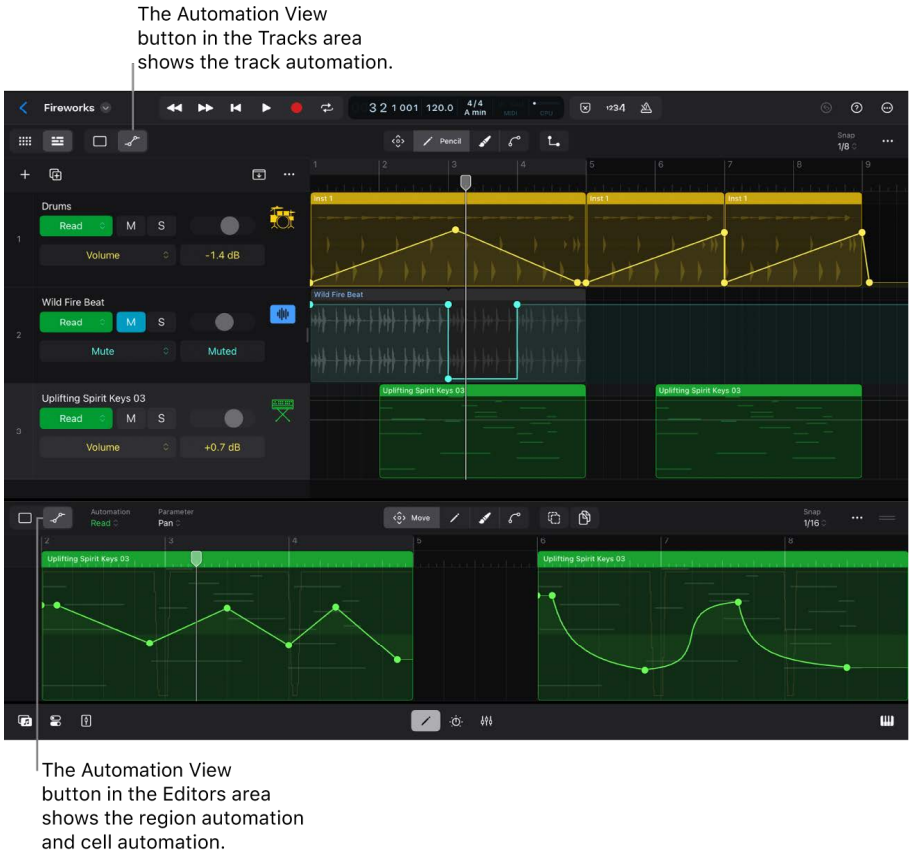
In addition to channel strip and plug-in controls, you can also automate MIDI data.

- *Automation points:* Any parameter value of a channel strip or plug-in control stored as automation data is called an *automation point*, visible in Automation view of the Tracks area or Editors area.
- *MIDI data points:* You can also automate MIDI events, such as program change, expression, and MIDI control. Those values are referred to as *MIDI data points*, which look and behave like automation points in Automation view. They are only available with MIDI regions and Session Player regions in the Editors area. In the View settings, you can choose to display those values in standard MIDI 1.0 or in a higher resolution.

Tip: Using the pinch gesture to zoom in vertically and horizontally helps create and edit automation points. Performing these edit tasks can be easier and more precise with Apple Pencil.

Show automation in Logic Pro for iPad

Automation curves are not displayed by default. You have to turn on Automation view to make them visible so you can view and edit them. There are two independent Automation View buttons, one in the Tracks area that shows the track automation and one in the Editors area (for the Audio Editor, Piano Roll Editor, and Session Player Editor) that shows the region automation or cell automation.



Show track automation

1. In the Tracks area menu bar, tap the Tracks View button.

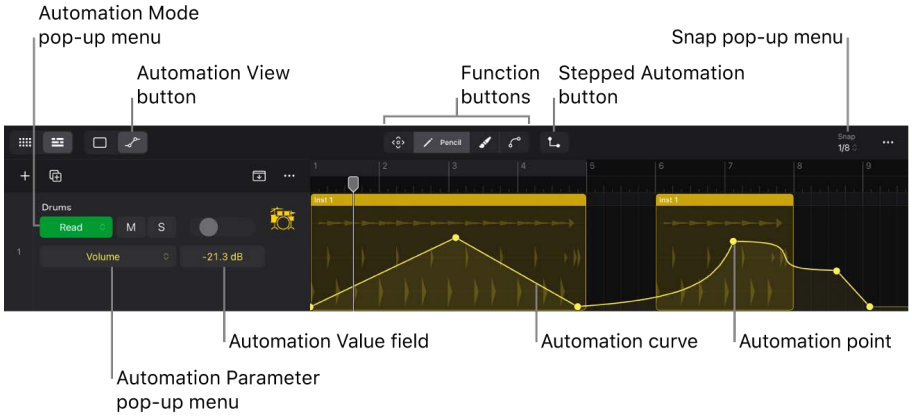
   Track automation can't be displayed in Grid view.

2. Tap the Automation View button or press A on your external keyboard.

The following changes occur:

- The track lanes show the automation curves.
- Regions on the track lane are still visible but cannot be edited.
- The track headers show three new components: the Automation Mode pop-up menu, the Automation Parameter pop-up menu, and the Automation Value field.
- The function buttons in the Tracks area menu bar change to a set of four automation-related buttons: Move, Pencil, Brush, and Curve.
- The Multiple Select button and the Copy Mode button are only available when Move is selected.

- The Stepped Automation button is available when any function button except Move is selected.
- The Snap pop-up menu in the menu bar in Automation view determines the Snap value when you move or draw automation points. This value is independent of the Snap value set in the Tracks area.



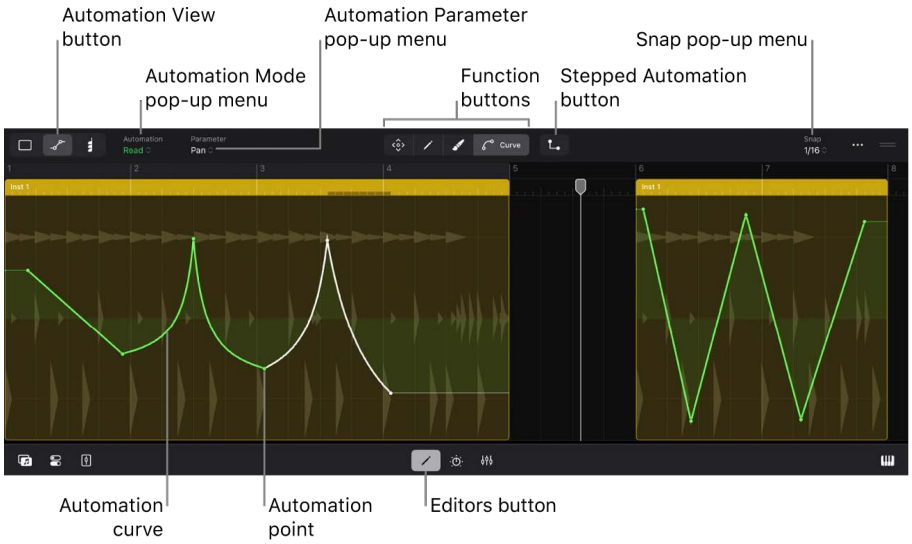
Show region automation

1. In the Tracks area menu bar, do one of the following:
   - To view a region's automation, tap the Tracks View button, tap the Default View button, then tap the Trim button.
   - To view the region automation for a cell, tap the Grid View button, then tap the Edit button.
2. Tap the region for which you want to show region automation.
3. Tap the Editors button in the middle of the view control bar (or press E on your external keyboard), then tap the Automation View button in the Editors area menu bar (or press A on your external keyboard).

The following changes occur in the Editors area when Automation view is selected:

- The Automation Mode pop-up menu and Automation Parameter pop-up menu are displayed in the Editors area menu bar.
- Any regions for that track are still displayed in the Editors area, but they cannot be edited.
- All regions display their automation curves. Any MIDI events or waveforms are dimmed.
- The function buttons change to a set of four automation-related buttons: Move, Pencil, Brush, and Curve.
- The Multiple Select button and the Copy Mode button are only available when Move is selected.
- The Stepped Automation button is available when any function button except Move is selected.

- The Snap pop-up menu in the Editors area menu bar determines the Snap value in Automation view when you move or draw automation points. This value is independent of the Snap value selected in Default view.



Write automation in real time in Logic Pro for iPad

Writing automation in real time means changing the controls in a channel strip or plug-in while playing back your project and recording those changes as automation data. For example, say you increase the volume of the vocal track during the chorus or mute the drum track at a specific bar. After that, whenever you play back (or bounce) your project, those parameter changes are performed automatically.

The automation data is written as track automation or region automation, depending on the selection in the Automation Mode pop-up menu.

Automation modes

There are several automation modes that determine whether to play existing automation or not, or what happens to any existing automation data when you write new automation.

Each track can be set independently to one of the following automation modes:

- *Read:* Plays back all automation data that exists on the track (track automation and region automation). Any onscreen control in the track header, channel strip, or plug-ins (sliders, knobs, and switches) will move accordingly during playback (in Play mode or Record mode) based on automation data. When you stop playback, you can change the value of any parameter, but once you start playback, the control jumps back to follow the values of the existing automation data.
- *Touch:* Plays back automation in the same way as Read mode. However, once you touch a control, that parameter now writes that new value based on your movements, overwriting any existing automation data. After you release the fader or knob, the parameter follows existing automation again. You can then touch the same control or a different control to write or overwrite another section in your project.

- *Latch:* Works like Touch mode, but after the fader or knob is released (while still playing back the project), that value continues to be written, replacing existing automation for that automation parameter until you stop playback. From that point on, the existing automation remains unchanged.
- *Off:* Temporarily turns off all existing automation data, track automation, and region automation. The automation curves turn gray. This is useful when you have already written automation but want to experiment with parameter changes without overwriting existing data.

Note: Selecting Touch or Latch in the Tracks area creates track automation, and selecting Touch or Latch in the Editors area creates region automation. The Mixer and Plug-ins area have separate Region and Track options for Touch and Latch.

Set the automation mode for the track

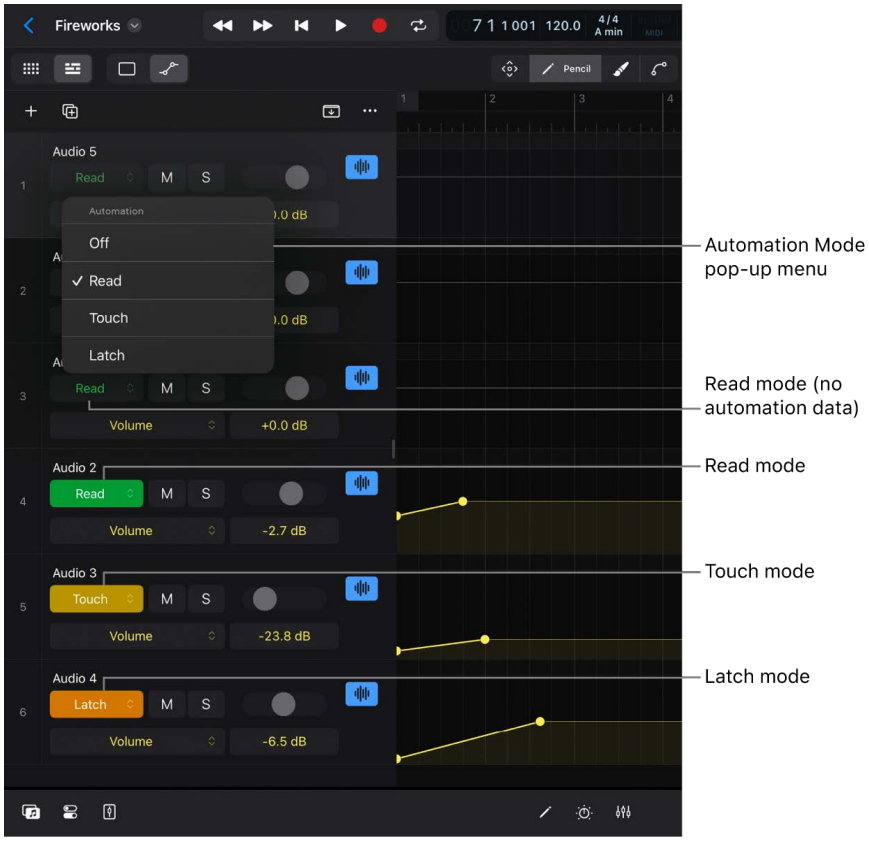
1. In the Tracks area menu bar, tap the Automation View button (or press A on your external keyboard).

   Make sure to swipe the track list to the right to reveal the track controls in the track headers.

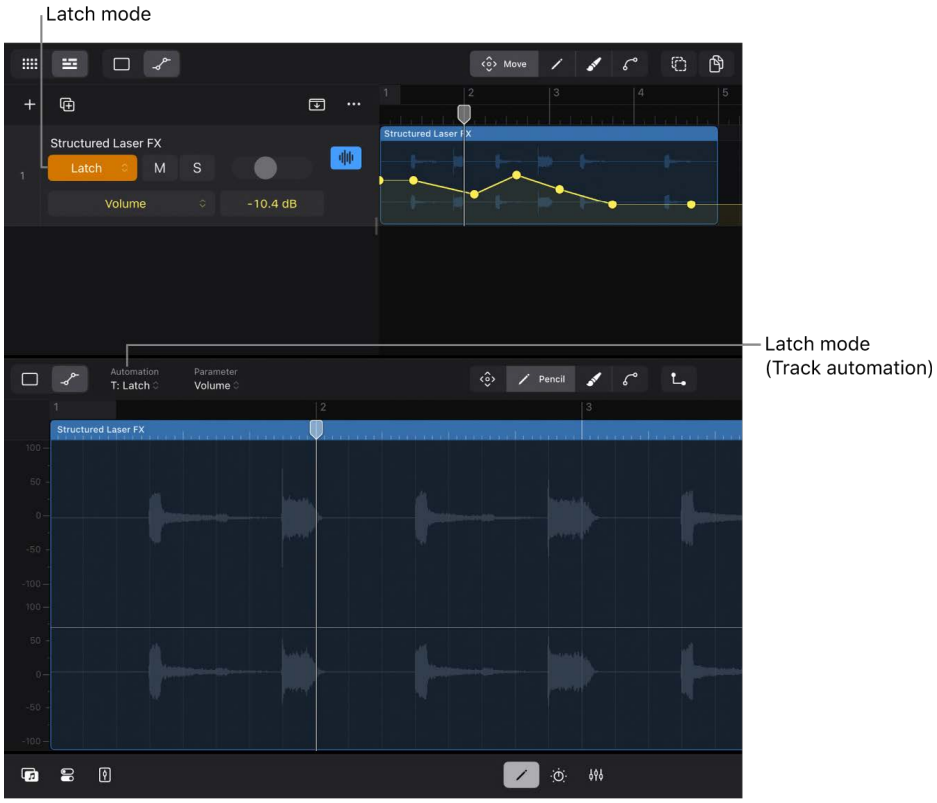
2. In the track header of a track, tap the Automation Mode pop-up menu and choose one of the four options.

   Note: Selecting an automation mode on a track that is a member of a Mixer group sets all tracks in that group to the same automation mode. See Create Mixer groups.

The Automation Mode button in the track header changes color depending on the chosen mode. Read mode has two appearances: green text on a gray background indicates that there is no existing automation data on that track, and white text on a green background indicates that there is automation that will be active when playing back your project.



If Touch or Latch is selected in the track header, the Automation Mode pop-up menu in the Editors area menu bar displays that mode preceded by the letter *T* (either “T: Touch” or “T: Latch”). This indicates that any movement of an onscreen control will be written as track automation. The Mixer and Plug-ins area show similar indications, whether automation is written as track automation or region automation.



Set the same automation mode for selected tracks

1. In the Tracks area menu bar, tap the Automation View button (or press A on your external keyboard), then tap the Move button.
2. Tap the Multiple Select button to select it, then select all the tracks you want to change their automation mode by tapping the track icon in their track header.

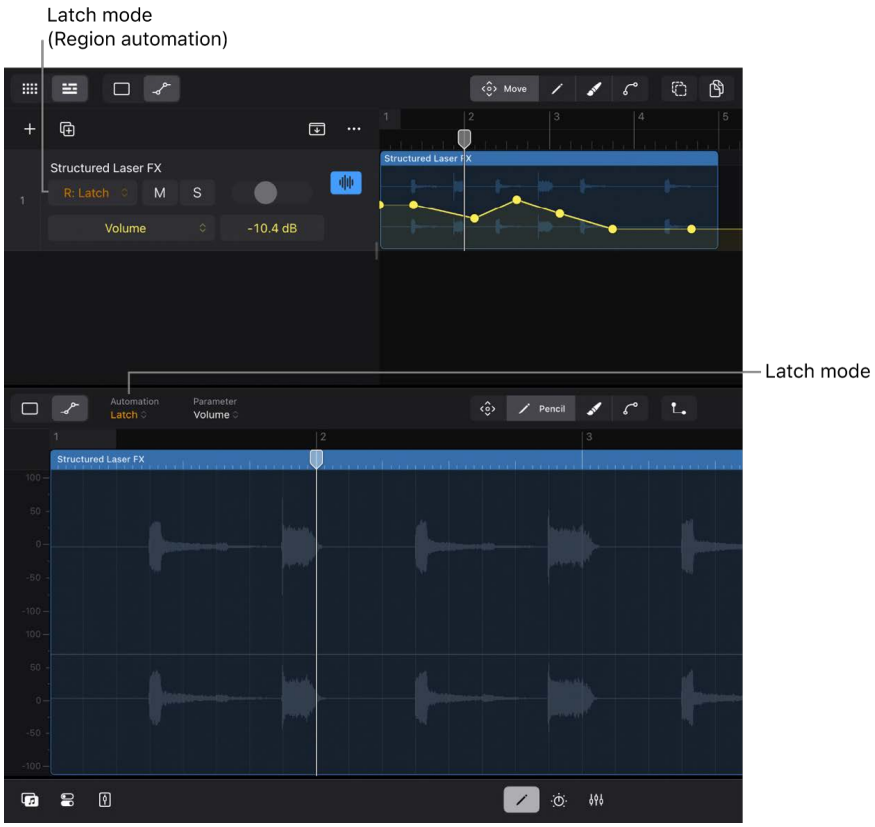
   You can also touch and hold the Multiple Select button in momentary mode or press and hold the Shift key on your external keyboard, make the track selection, and then release the button or the Shift key.
3. On one of the selected tracks, tap the Automation Mode pop-up menu and choose one of the four options.
4. Tap the Multiple Select button again to deselect it.

   Once you’re done performing an action on multiple selected tracks, tap the empty area below the last track header to deselect the tracks and avoid applying edits to multiple tracks unintentionally.

Set the automation mode for region automation

1. In the Tracks area menu bar, tap the Tracks View button, then tap the regions that you want to write automation to.
2. Tap the Editors button in the view control bar, tap the Automation View button in the Editors area menu bar (or press A on your external keyboard), then tap the Automation Mode pop-up menu next to it and choose one of the four options.

Choosing Read or Off changes the automation modes in the corresponding track header to the same mode. Choosing Touch or Latch will also change the track header's Automation Mode pop-up menu to Touch and Latch (if Automation view is selected), but now with the letter *R* (either "R: Touch" or "R: Latch"). This indicates that any automation is written to the region (region automation) and not to the track (track automation).

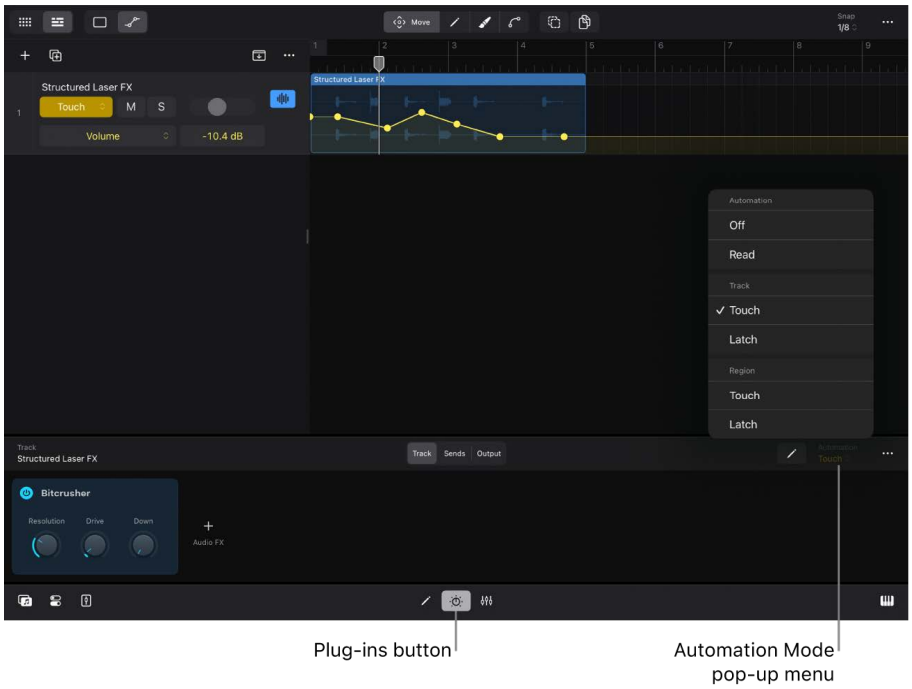


Set the automation mode in the Plug-ins area

1. In the Tracks area, tap the track icon of the track you want to write automation to.
2. Tap the Plug-ins button in the middle of the view control bar (or press B on your external keyboard).

   You can also double-tap the track icon to open the Plug-ins area (and for software instrument tracks also the Play Surfaces).
3. Tap the Automation Mode pop-up menu on the right side of the Plug-ins area menu bar and choose one of the options.

   The pop-up menu has a Track and a Region section; both provide the option Touch and Latch so that you can choose whether you want to write track automation or region automation.

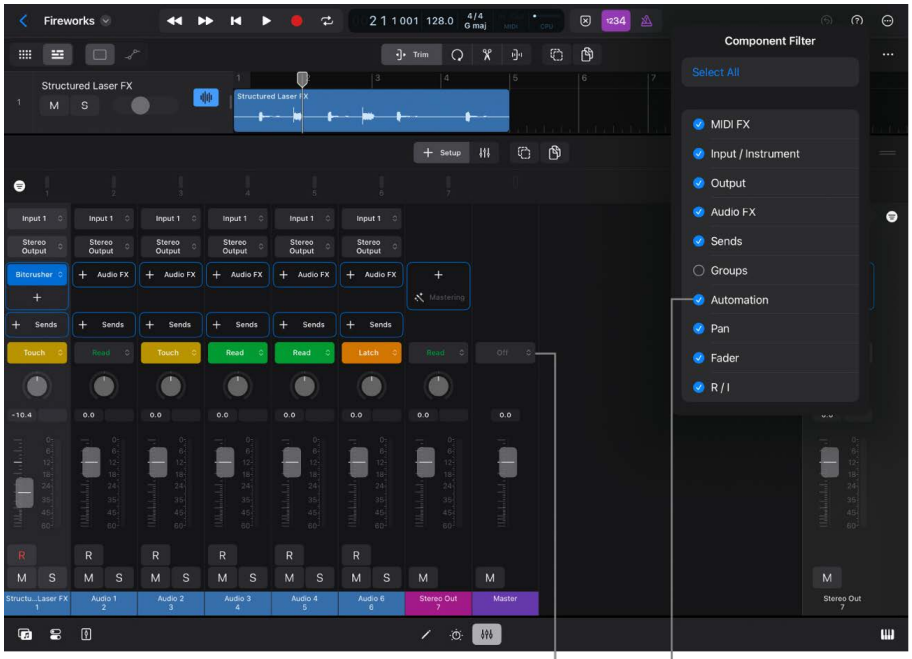


Set the automation mode in the Mixer

1. Tap the Mixer button in the middle of the view control bar to show the Mixer.
2. Tap the Filter button at the top of the output track on the far right to open the Component Filter list, tap Automation to select it, then tap the Filter button again to close the list.

   This step is only necessary if the Automation Mode pop-up menu is not displayed in the channel strips. By default, it is visible.
3. Tap the Automation Mode pop-up menu in any of the channel strips and choose one of the options.

   The pop-up menu has a Track and a Region section; both provide the option Touch and Latch so that you can choose whether you want to write track automation or region automation.



Note: Selecting an automation mode in an aux channel strip, output channel strip, or master channel strip creates the corresponding track in the Tracks area.

Set the automation mode for a Mixer group

When you choose an automation mode on a track that is part of a Mixer group, all tracks in that group change to the same automation mode. See Create Mixer groups.

1. Tap the Mixer button in the middle of the view control bar.
2. Tap the Filter button in the upper-right area of the Mixer and select Groups in the Component Filter list to make the Group slot visible in the channel strips.
3. In each channel strip you want to add to a group, tap the Group slot and choose the same group.

   You can also select the channel strips first and then tap the Group slot in one of the selected channel strips to choose a group.
4. Tap the Automation Mode pop-up menu in any of the channel strips and choose one of the options.

Write automation in real time

1. Choose either Touch or Latch from the Automation Mode pop-up menu on the track where you want to write automation.
2. Tap the Play button in the control bar, or press the Space bar on your external keyboard to start playback.

   You can also write automation while in Record mode.

3. Adjust any controls (faders, knobs, or switches), and the values for those parameters are written as automation data based on your movements.

   As the playhead moves across the timeline, the automation curve is being created on the track lane at the playhead position. Region automation can only be written between the left and right borders of a region.

4. Tap the Stop button ■ in the control bar or press the Space bar on your external keyboard to stop playback.

   You can place the playhead at any position and start playback again to continue writing automation or overwriting existing automation. Alternatively, you can edit the automation data graphically.

Note: While still writing automation during playback, you can scroll to other tracks or switch the view to open different plug-ins on that track to access the controls you want to adjust. You can also use Multi-Touch gestures to move multiple controls and write that as automation data at the same time.

Create automation graphically

Automation drawing tools in Logic Pro for iPad

Sometimes it is easier and more musical to write automation in real time by performing movements of onscreen controls while the project is playing. However, drawing automation can be faster and more precise. You draw the automation curve using touchscreen gestures with your finger or Apple Pencil. It also lets you easily experiment with movements that are difficult to perform in real time.

Creating or editing automation graphically requires the following steps:

- Switch to Automation view. See Show automation.
- Choose the parameter you want to automate. See Automation parameters.
- Select the drawing mode. See Adjust automation.
- Start drawing on the screen with various gestures using your fingers or Apple Pencil. See Add automation points.

Drawing tools

Similar to selecting a drawing tool, in Logic Pro, you tap a function button to select an edit mode that determines what happens when you tap or drag on the screen.

- *Move button:* With the Move button selected, you can move individual automation points or the automation curve (sections or the entire curve).
- *Pencil button:* With the Pencil button selected, you can add, move, and delete individual automation points.
- *Brush button:* With the Brush button selected, you can draw an automation curve (a series of automation points) or delete automation points.
- *Curve button:* With the Curve button selected, you can bend the straight lines between automation points.

- *Multiple Select button:* With the Multiple Select button selected, you can select multiple automation points.

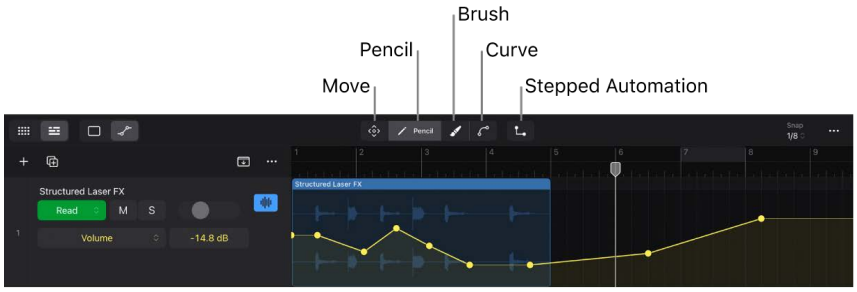
  This button is only available when the Move button is selected.

- *Copy Mode button:* The Copy Mode button changes the move gesture to a copy gesture.

  The Copy Mode button is only available when the Move button is selected.

- *Stepped Automation button:* With the Stepped Automation button selected, you can create horizontal lines between automation points instead of lines that gradually change values between points.

  The button is available when any function button except Move is selected.



Automation parameters in Logic Pro for iPad

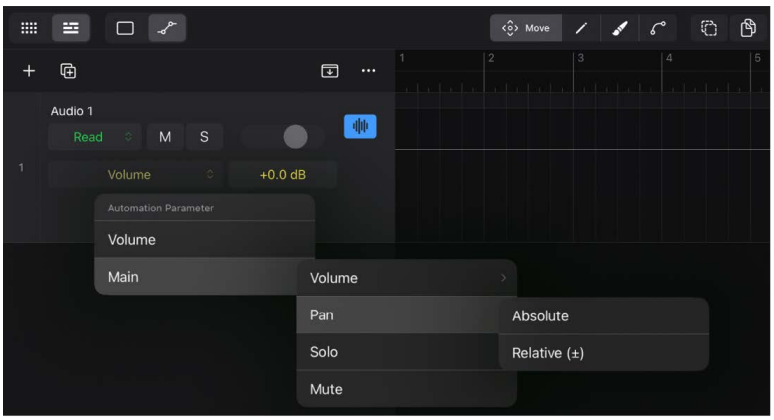
Each track in your project has an Automation Parameter pop-up menu listing all the parameters that can be automated on that track.

Default menu items

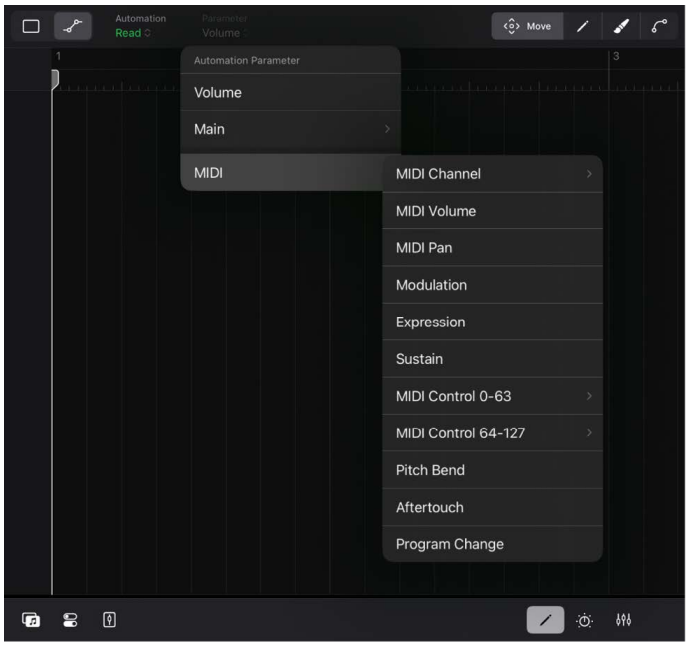
With no plug-ins loaded on a track and no automation created yet, the Automation Parameter pop-up menu only displays the header Automation Parameter and two items:

- *Volume:* The parameter used most often, volume is always listed first for quick access.
- *Main:* This submenu contains all the controls in the track's channel strip. By default, only four items are listed:
  - *Volume* is a submenu containing two independent automation parameters, Absolute and Relative (±), to automate the Volume fader.
  - *Pan* is a submenu containing two independent automation parameters, Absolute and Relative (±), to automate the Pan/Balance knob.
  - *Solo* lets you automate the Solo button.

- *Mute* lets you automate the Mute button.



- *MIDI:* This submenu contains all the MIDI events that can be automated. It is only displayed for region automation in the Piano Roll Editor and Session Player Editor.



Absolute vs. Relative (±)

The Volume fader and the Pan/Balance knob are the only controls that have two automation parameters:

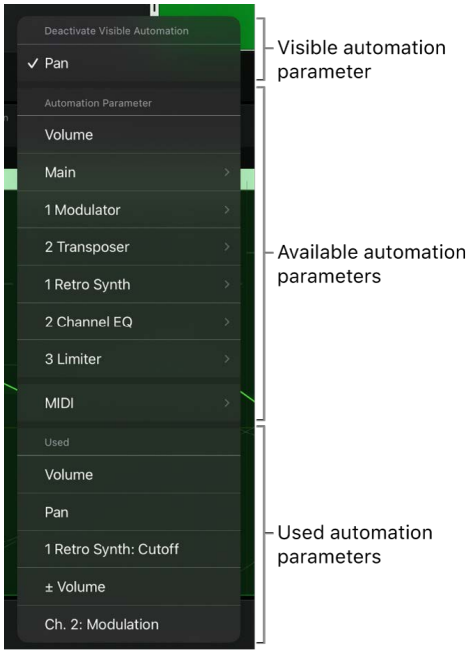
- *Absolute:* The default automation curve for that parameter.
- *Relative (±):* A secondary automation curve that functions as an offset to existing automation in the track or region. See Create relative volume and pan automation.

Extended menu items

The Automation Parameter pop-up menu is highly dynamic, and the listed menu items and submenus depend on various circumstances. There are up to three sections displayed in the menu:

- *Activate/Deactivate Visible Automation:* The only item in this section shows the currently selected (visible) automation parameter. A checkmark indicates that that automation data is active. You can tap it to temporarily deactivate that automation parameter if you want to control that parameter manually.
- *Automation Parameters:* This section is always displayed. It shows all the controls in the track's channel strip that can be automated.
- *MIDI:* The MIDI submenu is part of the Automation Parameter section but visually separated to indicate that these types of automation create MIDI data points and not automation points. The menu lists nine types of MIDI messages plus two submenus containing the MIDI controls 0–127. The first item lets you filter the displayed messages based on their MIDI channel. This MIDI section is only displayed in the Editors area for region automation on MIDI regions and Session Player regions.
- *Used:* This section displays all the automation parameters that have existing automation data on that track or the region.

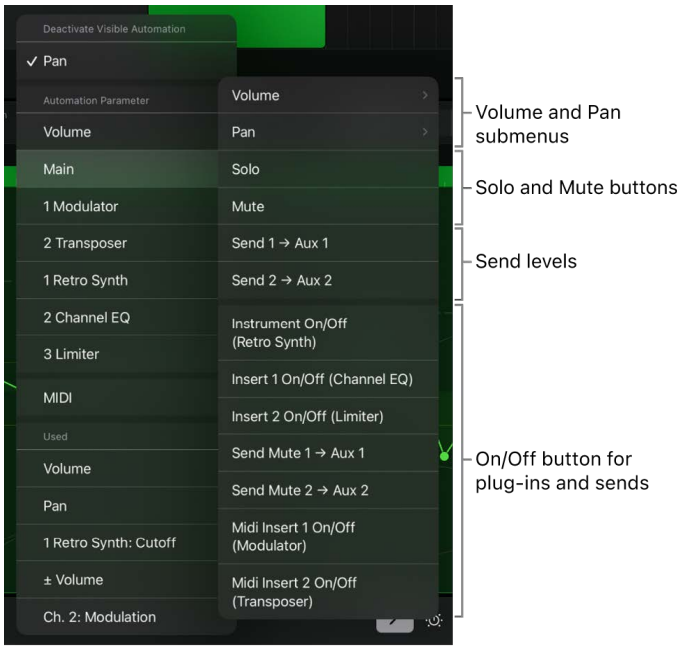
The plug-in submenus are numbered and named after the slot position and plug-in 9for example, 2 Channel EQ).



Main submenu

The Main submenu in the Automation Parameter pop-up menu has its own subsections with more submenus.

- *Volume and Pan submenus:* Both submenus contain the items Absolute and Relative (±).
- *Solo and Mute:* These parameters automate the Mute button and Solo button on the track.
- *Aux Sends:* Each aux send on a track is listed as a separate item in the menu (for automating the corresponding Send knob).
- *On/Off:* The remaining items in the menu represent plug-ins or aux sends on that track. They automate their On/Off button ⏻.

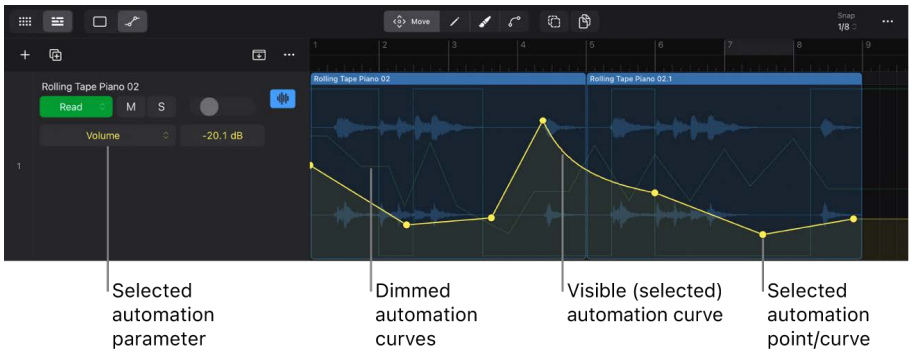


Automation curve appearance

Automation parameters and their corresponding automation curves have a specific appearance:

- In Automation view, the track lane or region displays all active automation curves.
- The automation curve of the currently selected automation parameter is the dominant line, and all other automation curves are dimmed but still visible.
- Automation parameters have different colors used for the automation curve, their automation points, and the text on the Automation Parameter pop-up menu.

- The currently selected automation points and sections of the automation curve are white.



Choose an automation parameter for track automation

1. In the Tracks area menu bar, tap the Automation View button (or press A on your external keyboard).
2. In a track header, tap the Automation Parameter pop-up menu and choose a parameter.

   Make sure to swipe the track list right to reveal the track controls in the track headers.

The track lane of that track will display the automation curve for the selected automation parameter from the beginning to the end of the project.

Tip: Tap any control in a track header, channel strip, or plug-in to automatically select it in the Automation Parameter pop-up menu.

Choose an automation parameter for region automation

1. In the Tracks area menu bar, do one of the following:
   - To select the automation parameter of a region, tap the Tracks View button, tap the Default View button, then tap the Trim button.
   - To select the automation parameter of a cell, tap the Grid View button, then tap the Edit button.
2. Tap the region or cell for which you want to select the automation parameter.
3. Tap the Editors button in the middle of the view control bar (or press E on your external keyboard), then tap the Automation View button in the Editors area menu bar (or press A on your external keyboard).

   Only the Audio Editor, Piano Roll Editor, Session Player Editor, and their corresponding Cell Editors will show the Automation View button (not the Step Sequencer).
4. Tap the Automation Parameters pop-up menu in the Editors area menu bar and choose a parameter.

The automation curve for the selected automation parameter will be displayed in each region that is displayed in the Editors area.

Add automation points in Logic Pro for iPad

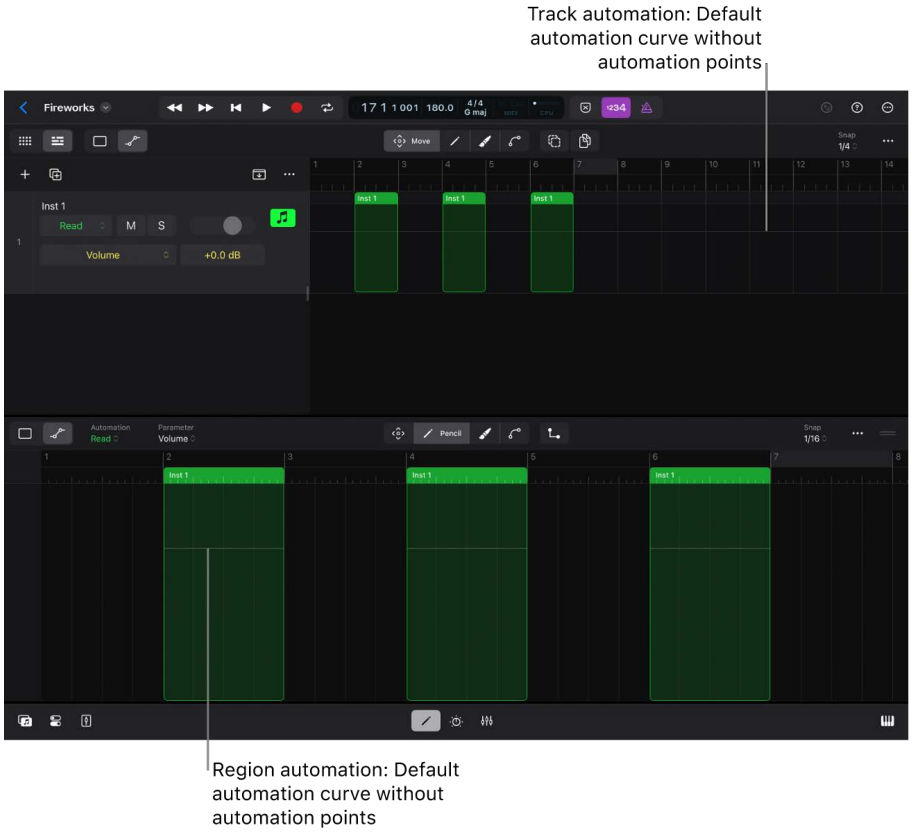
You add automation points to a track's automation curve to create changes over time to volume, pan, and virtually any control in your channel strips and plug-ins. You can adjust automation points by moving them up or down to change their value or by moving them left or right to change their position along the timeline.

Default automation curve in track automation

In Automation view in the Tracks area, selecting an automation parameter with no automation data created yet will show the automation curve as a gray horizontal line from the beginning to the end of the project. It has no automation points. The vertical position of this line represents the current value of the corresponding control, and adjusting the control moves the line up or down accordingly.

Default automation curve in region automation

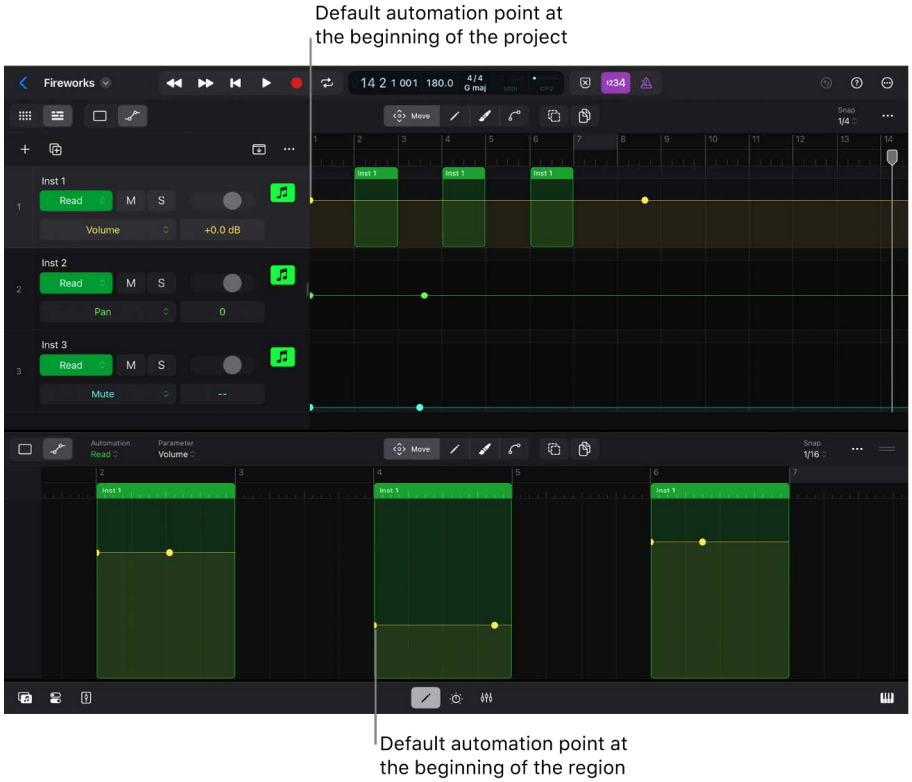
In Automation view in the Editors area with no automation data created yet, a thin horizontal line is displayed without any automation points or MIDI data points from the beginning to the end of each region in the Editors area.



Default automation point

Once you add your first automation point, the following will happen:

- The automation point will be added as a dot on the automation curve at the tap position.
- With track automation, an additional default automation point with the same value will automatically be added at the beginning of the automation curve, which is the beginning of the project.
- With region automation, an additional default automation point with the same value will automatically be added at the beginning of the automation curve, which is the left border of the region.
- The automation curve and the automation points will be displayed in the color of the corresponding automation parameter (for example, yellow = volume, green = pan, and turquoise = mute).



Add single automation points to an automation curve

The steps for creating automation points are the same for track automation and region automation.

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Pencil button, then do any of the following to create a single automation point:
   - Tap a track lane (for track automation), or tap a region in the Editors area (for region automation).

- Touch and hold the track lane (for track automation) or a region in the Editors area (for region automation). Now you can drag up-down or left-right before releasing your finger to adjust the position of the automation point.

  A tag shows its corresponding parameter value, and a vertical line indicates the time position while dragging the automation point. The current Snap value restricts the horizontal movement.

The horizontal position of an automation point determines its position along the timeline, and the vertical position determines the parameter's value. A new automation point will change the shape of the automation curve unless it is placed directly on the line.

Add two automation points at region borders

This command is only available for track automation in the Tracks area, not for region automation in the Editors area.

1. Tap the Automation View button in the Tracks area menu bar, then tap the Move button.
2. Tap a region, then choose Create 2 Automation Points at Region Borders from the shortcut menu.

This command also works with multiple regions selected. When you tap one of the regions and choose Create 2 Automation Points at Region Borders, the first point is placed at the left border of the first selected region, and the second point is placed at the right border of the last selected region.

Draw an automation curve

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Brush button.
3. Touch and hold a track lane (for track automation) or a region in the Editors area (for region automation), then drag left-right and up-down, drawing the shape of the automation curve.

   Once you release your finger, your newly drawn automation curve overwrites the existing automation points in that section.

The following rules apply:

- Automation points are created along the path you draw on the screen.
- Vertical directions determine the parameter values.
- The points are automatically connected, forming the automation curve that resembles your drawing.
- The more slowly you move your finger, the more automation points will be created, and the finer the resolution of the curve will be.
- The value in the Snap pop-up menu restricts the density of the automation points. See Snap automation to grid position.
- The shape of the automation curve depends on the status of the Stepped Automation button. See Stepped automation curve.
- Using Apple Pencil lets you draw the automation curve more precisely.

Add automation points by splitting a region

When splitting a region that contains region automation, an automation point is automatically added to the automation curves of the original region and the new region at the split point. This guarantees the integrity of the automation curve of the two regions when moving them apart or placing other regions in between. For more information, see Split regions in Tracks view.

Stepped automation curve in Logic Pro for iPad

By default, an automation curve between two automation points is a straight line that results in gradually changing parameter values from one point to the next one.

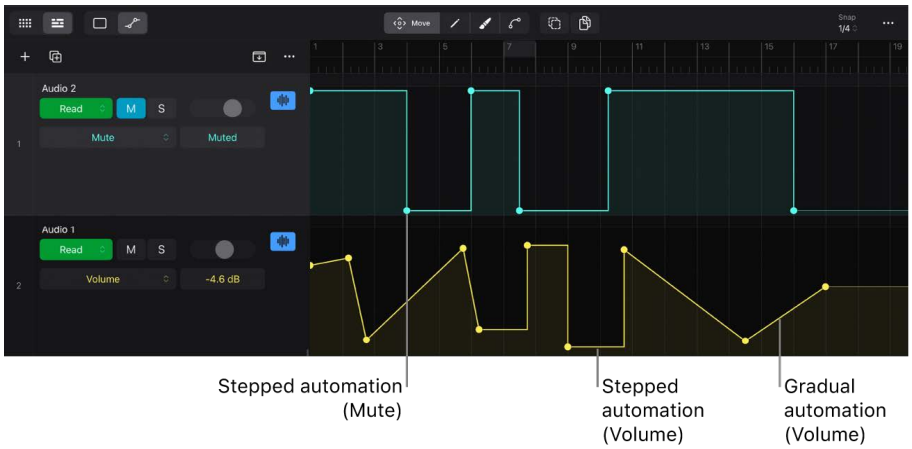
Any controls that represent switches (for example, Mute button, Solo button, On/Off button, or sustain pedal) create automation curves, known as *Stepped Automation*. From any automation point to the next, the automation curve remains a straight horizontal line, not changing its value until that following automation point, where it jumps to that new value, creating a step (a vertical line).

You can create stepped automation curves for any automation parameter using the Stepped Automation button.

Create stepped automation

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Pencil button or the Brush button.
3. Tap the Stepped Automation button to select it, or press and hold the Option key on your external keyboard.
4. Tap the Pencil button or Brush button and create new automation points; any new automation point will be connected to the following automation point with a stepped automation curve.

   Tip: Touch and hold the Stepped Automation button or press and hold the Option key on your external keyboard to engage momentary mode (the button is selected). Draw the automation, and when you release the button or the key, the Stepped Automation button is deselected.



Note: The automation curve of a track or region can be a mixture of both gradual lines and stepped lines.

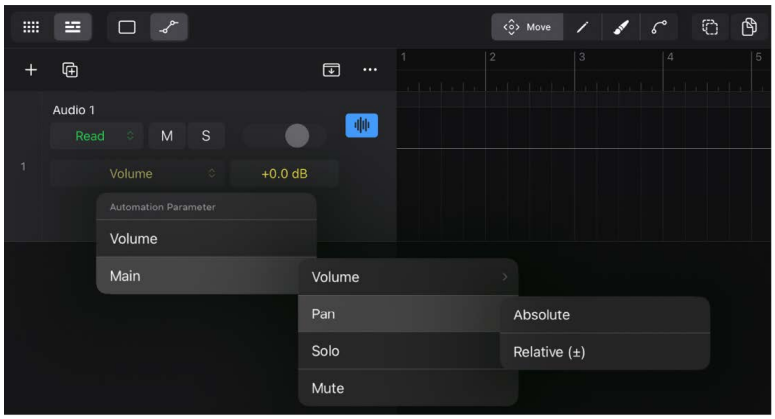
Alternate between stepped and gradual automation

You can have one or multiple segments of an existing automation curve alternate between stepped automation and gradually changing automation (straight or curved lines). See Bend automation curves.

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Curve button, then tap the Stepped Automation button to select both buttons.
3. Touch and hold the background of the automation lane, then drag over the area of the automation curve you want to select.
4. Tap the selected automation curve to switch between stepped automation and gradually changing automation.

Create relative volume and pan automation in Logic Pro for iPad

Volume and Pan controls on a track have two automation parameters, Absolute and Relative (±), that you can choose from the Automation Parameter pop-up menu. They represent two separate automation curves that together produce the combined automation result for that control.



Absolute automation curve

The absolute automation curve is the default automation that determines the value changes for the volume or pan parameter over time.

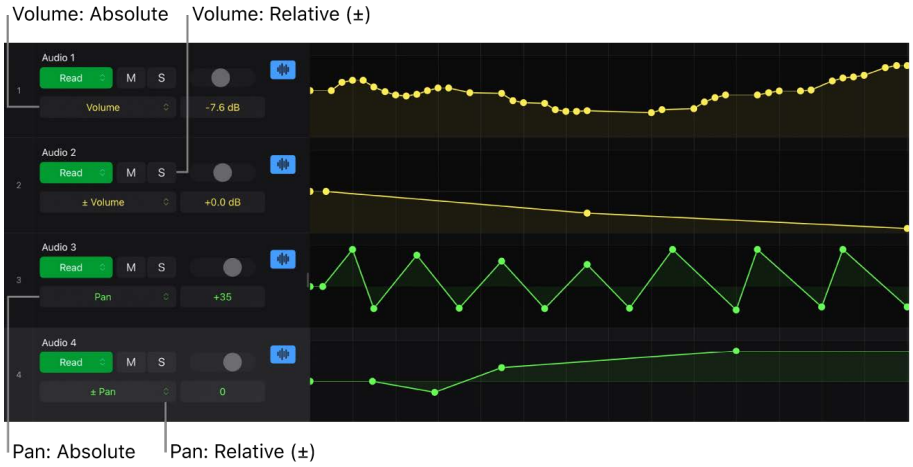
Relative automation curve

The relative automation curve is available as a separate option in the Automation Parameter pop-up menu as “Volume (±)” and “Pan (±).” When selected, it displays its own automation curve. By default, its value is 0, which means it has no effect on the absolute parameter. You can add automation points and edit them the same way as any other automation points. This relative curve then functions as an offset for the corresponding absolute automation curve.

If you’ve created a complex curve to automate the volume of a vocal track, you can create a relative automation curve—for example, a straight line at –3 dB. The result will be the movement of the absolute curve, played back 3 dB lower. Or you can create a fade-out with the relative curve while maintaining the absolute automation curve you might have created for the volume parameter.

Note: Relative volume and pan automation can only be created by adding those points manually. Writing automation in real time will always create absolute volume and pan automation.

Absolute volume and pan parameters, when selected, are displayed in the track header as Volume and Pan, and relative volume and pan parameters are displayed as “± Volume” and “± Pan.”



Add and edit relative automation

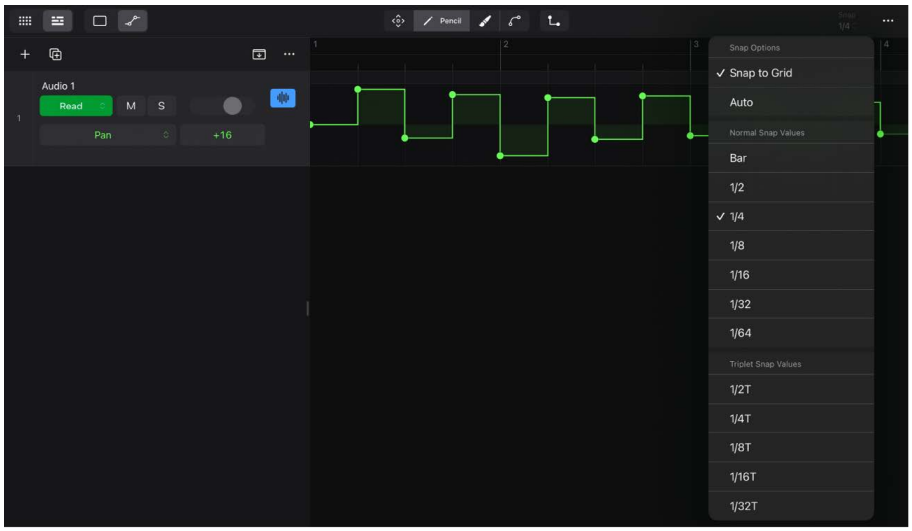
1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Automation Parameter pop-up menu and choose one of the following:
   - Main > Volume > Volume (±)
   - Main > Pan > Pan (±)
3. Add new automation points or edit existing ones for the relative parameter using the same procedures as for absolute parameters.

Snap automation to grid position in Logic Pro for iPad

You can snap automation points to grid positions. When Snap to Grid is turned on, moving automation points horizontally is restricted by the currently selected Snap value. It also affects creating new automation points with the Brush button selected but not with the Pencil button selected.

Snap automation is helpful if you want to reduce the number of automation points created when in Brush mode by setting the Snap value to 1/2 or Bar.

You can also use the snap automation feature creatively. For example, create a stereo ping-pong effect by automating the pan parameter in stepped automation to create alternate left-right values synced to the beat grid or any other musical value.



Snap automation points to a grid value

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Snap pop-up menu in the Tracks area menu bar or the Editors area menu bar, and choose a grid value.

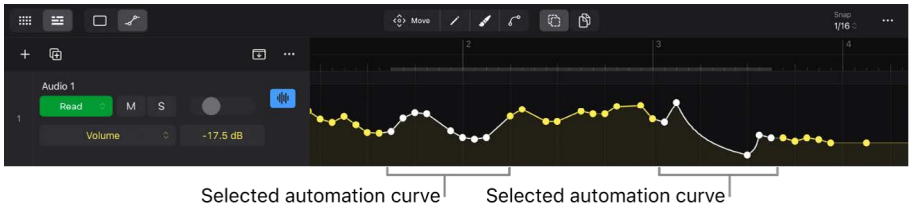
The first option, Snap to Grid, is automatically selected (indicated by a checkmark) when you choose a grid value. You can tap Snap to Grid again to turn off snap while keeping the current Snap value selection. See Snap items to the grid.

Important: The Snap pop-up menu is visible in Default view and Automation view in the Tracks area and Editors area, but you can set each one to its own value. Each value will be remembered when you switch between those views.

Edit automation

Select automation in Logic Pro for iPad

After you create automation points and the resulting curves, you can use move and copy commands and other procedures to edit automation points. For many of those edit tasks, you have to select the automation points first and then apply the various actions.



To better select and edit automation, zoom in using pinch gestures, or use Apple Pencil for more precise editing.

Select automation points

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in the menu bar of one of the two areas, then do one of the following:
   - Tap an automation point.

     That automation point and the line before and after it is highlighted.
   - Tap the automation curve (between two automation points).

     The automation points at the beginning and end of that line segment plus the lines before the first point and after the second point are highlighted.
3. You can also tap the Pencil button, then touch and hold an automation point to select it.

   That automation point and the line before and after it is highlighted.

With the Move button selected, tap outside the automation curve to deselect all automation points.

Select a section on the automation curve

You can select a section of the automation curve and all the automation points in that section.

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in one of the two areas.
3. Touch and hold outside the automation curve (a pulsating gray rectangle appears), then drag to the left or right.

   The gray rectangle extends to follow your movement, and when you release your finger, all automation points in that range are selected. A gray strip appears in the ruler to mark the length of that selection.

To create a new selection, repeat the steps, and the previously selected automation points will be deselected.

Select noncontiguous automation

You can select individual automation points on the automation curve to apply edits to only specific segments of the automation curve.

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Multiple Select button to select it, then do any of the following:
   - Tap any automation point to select or deselect individual points anywhere on the automation curve.
   - Tap any segment of the automation curve to select or deselect the two automation points at the beginning and end of that segment.
   - Touch and hold outside the automation curve, then drag to the left or right to select that range of automation points.
   - Tap outside the automation curve to deselect all automation points.
3. When you're done with the selection, tap the Multiple Select button to deselect it.

Tip: Touch and hold the Multiple Select button or press and hold the Shift key on your external keyboard to engage momentary mode (the button is selected). Select the automation points, and when you release the button or the key, the Multiple Select button is deselected again.

Select the entire automation curve

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in one of the two areas.
3. Tap outside the automation curve to deselect any selected automation points.
4. Tap outside the automation curve again to open its menu, then choose Select All.

Move automation in Logic Pro for iPad

You can move automation points just by dragging them on the track lane, or you can use standard cut-and-paste procedures. The cut-and-paste action places the automation points on the Clipboard, and you can paste them to multiple places on the same track or to other tracks even if you are not in Automation view.

With an external keyboard, you can use the keyboard shortcuts Command-X for cut and Command-V for paste.

In addition, you can move track automation when moving regions on the track lane. See Automation settings.

Move automation on the same track

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in one of the two areas.
3. Select the automation points you want to move and, therefore, the resulting segments of the automation curve.
4. Touch and hold one of the selected automation points, then drag the selection left or right on the track lane.

   The selected automation moves, overwriting any existing automation points at the new position. A vertical line through the automation point that extends to the ruler helps with positioning. The current Snap value applies.

Tip: When you move an automation point or a segment of the automation curve, you can also move the selection vertically to change its values proportionally.

Move automation on a track or between tracks

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in one of the two areas.
3. Select the automation points you want to move and, therefore, the resulting segments of the automation curve.
4. Tap one of the selected automation points to open its menu, then choose Cut (or press Command-X on your external keyboard).

   The selected automation points are moved to the Clipboard.
5. Tap the ruler to place the playhead at the position to where you want to move the automation.
6. On the track lane where you want to paste the automation (on either the same track or a different track), tap the area outside the automation curve once to deselect any automation points, then tap again and choose Paste from the pop-up menu (or press Command-V on your external keyboard).

   The automation curve that was cut is placed at the playhead position on that track lane, with the first automation point aligned to the playhead position. Any existing automation points are overwritten, with a gray strip in the ruler indicating the affected range.

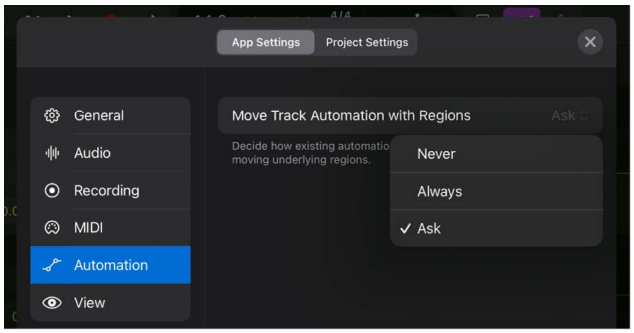
Important: When you move or copy automation points of a specific automation parameter to a different track, that track has to have that same automation parameter available (for example, parameters of a specific plug-in or aux send).

Move automation with regions

When you move a region on the track lane, any track automation in that range (from the left border to the right border of the region) can be moved with that region.

This functionality is determined by the Automation settings:

1. Tap the More button on the right side of the control bar, then tap Settings.
2. Tap App Settings, then tap Automation in the sidebar.
3. Tap the Move Track Automation with Regions pop-up menu, then choose one of the three options:
   - *Never:* Does not move track automation when you move regions.
   - *Always:* Always moves track automation when you move regions. The automation area
     encompassed by the region boundaries is moved.
   - *Ask:* A dialog prompts you to move the track automation—or leave it where it is—whenever you move a region.



Copy automation in Logic Pro for iPad

You copy automation points with the Copy Mode button selected by dragging them on the track lane; you can also use standard copy-and-paste procedures. The copy/paste action places the automation points on the Clipboard, and you can paste them to multiple places on the same track or other tracks even if you are not in Automation view.

With an external keyboard, you can use the standard keyboard shortcuts Command-C for copy and Command-V for paste.

In addition, you can copy track automation to a new track when duplicating tracks.

Copy automation on the same track

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in one of the two areas.

3. Select the automation points you want to copy and, therefore, the section of the automation curve.
4. Tap the Copy Mode button to select it, then touch and hold one of the selected automation points or line segments and drag the selection left or right on the track lane.

   The selected automation is copied, overwriting any existing automation points at the new position. A vertical line through the automation point that extends to the ruler helps with positioning. The current Snap value applies.
5. Repeat from step 3 if you want to copy more automation points, or tap the Copy Mode button to turn it off if you are done.

   When you copy an automation point or a segment of the automation curve, you can also move the selection vertically to change its values proportionally.

Tip: Touch and hold the Copy Mode button, or press and hold the Option key on your external keyboard to engage momentary mode (the button is selected). Drag the automation points to copy them, and when you release the button or the key, the Copy Mode button is deselected again.

Copy automation on a track or between tracks

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button in one of the two areas.
3. Select the automation points you want to copy and, therefore, the section of the automation curve.
4. Tap one of the selected automation points to open its menu, then choose Copy (or press Command-C on your external keyboard).

   The selected automation is copied to the Clipboard.
5. Tap the ruler to place the playhead at the position to where you want to copy the automation.
6. On the track lane where you want to paste the automation (on either the same track or a different track), tap the area outside the automation curve once to deselect the automation points, then tap again and choose Paste from the pop-up menu (or press Command-V on your external keyboard).

   The automation curve that was copied is placed at the playhead position, with the first automation point aligned to the playhead position. Any existing automation points are overwritten, and a gray strip in the ruler indicates the affected range.

Copy automation when duplicating a track

1. In the Tracks area, tap the track icon of a track to select it.
2. Touch and hold the Duplicate Track button above the track headers to open its menu, then choose Duplicate Track with Content.

   The selected track is copied, including all its track automation. Any region automation contained in any regions on that track is also carried over.

Adjust automation in Logic Pro for iPad

You can adjust any automation point by dragging it or by selecting multiple automation points and then dragging them together. Pay attention to the following:

- A help tag appears above the automation point that displays the current value when you drag it up or down.
- A vertical line through the automation point appears that reaches up to the ruler. With this guide you can see where you move the automation point along the timeline when you drag left or right.
- The horizontal movement is restricted by the Snap setting. See Snap automation to grid position.
- Moving automation points left or right overwrites any existing automation point along that path once you release your finger.

Adjust individual automation points

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button or Pencil button .
3. Drag an automation point in any direction.

   Any horizontal movement changes the position of the automation point, and any vertical movement changes the parameter value.

Note: If you select a MIDI event in the Automation Parameter pop-up menu and drag those automation points, a help tag appears, displaying the MIDI values in the resolution you choose in the View settings.

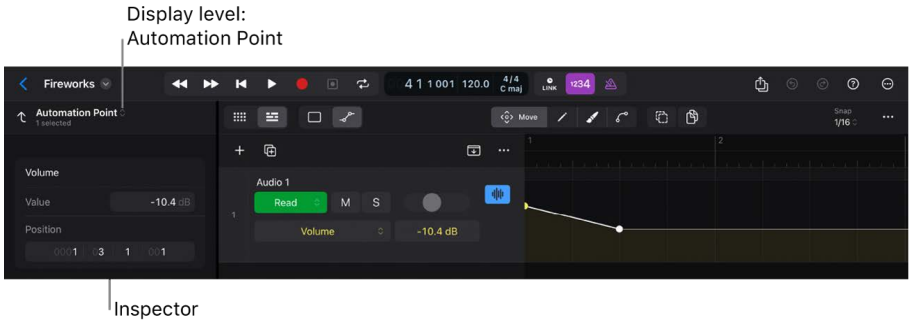
Adjust multiple automation points

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button and make a selection. See Select automation points.
3. Touch and hold one of the selected automation points or lines between points to move the entire section in any direction.

Note: The values of all selected automation points change proportionally when you drag the curve up or down.

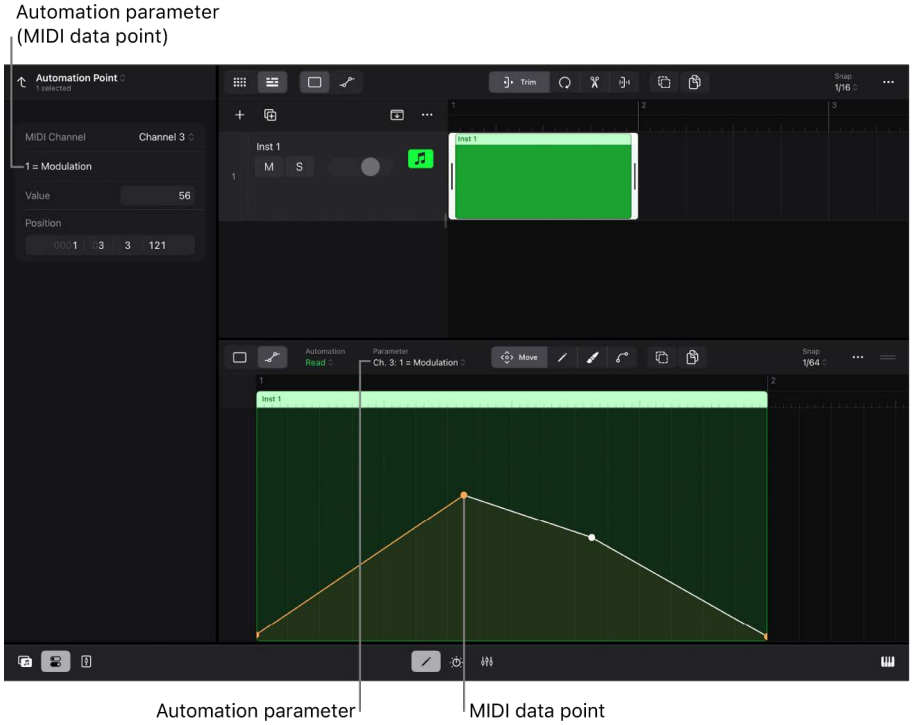
Edit automation in the inspector in Logic Pro for iPad

In addition to adjusting automation points graphically by moving them on the track lane or the region, you can change their value and position numerically using the inspector. When you select an automation point, the Automation Point pop-up menu appears at the top of the inspector.



Edit automation points numerically

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Inspector button in the view control bar, or press I on your external keyboard.
3. Tap an automation point, then do one of the following in the inspector to change the values:
   - Drag the number field of the Value or Position parameter up or down to change it.
   - Tap the number field of the Value or Position parameter to open the numeric input dialog and enter a numeric value.
4. A MIDI data point shows the additional MIDI channel parameter with a pop-up menu where you can choose a different MIDI channel for that MIDI data point.

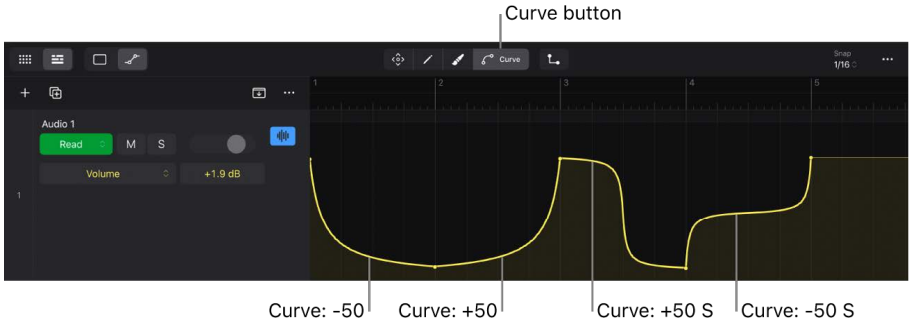


Bend automation curves in Logic Pro for iPad

By default, the automation curve is a series of straight lines that connect one automation point to the next one. However, you can bend each line segment individually to create curved lines.

Change the shape of automation curves

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Curve button in the menu bar, then drag any line between two automation points in a specific direction:
   - Dragging up or down bends the line to an exponential curve. The dragging direction determines whether the "knee" is at the beginning of the line (the help tag displays a negative value during the drag movement) or toward the end of the line (the help tag displays a positive value).
   - Dragging left or right bends the line into an S-shaped curve. The direction determines whether the orientation of the S shape is upright (the help tag displays a positive value and the letter *S*) or the S shape appears sideways (the help tag displays a negative value and the letter *S*).



Note: You can first select a section of the automation curve (even noncontiguous), and then dragging one of the selected lines will apply the same shape to all selected lines.

Tip: When you tap the Curve button and then the Stepped Automation button (to select both buttons), you can tap a selected automation curve to have its shape alternate between curved and stepped automation. See Stepped automation curve.

Use automation with Mixer groups in Logic Pro for iPad

In Logic Pro for iPad, you can create Mixer groups by assigning a group of tracks or channel strips (for example, all drum tracks) to a specific group number. See Create Mixer groups.

When you adjust any control (for example, the Mute button or the Volume slider) on a track belonging to a group, that change applies to all group members. This group functionality also works with automation. Each Mixer group can be configured individually to determine which automation controls are linked between members of a Mixer group. See View and edit group settings.

Automation modes and automation parameters

- *Automation mode:* When you choose an option from the Automation Mode pop-up menu on one track, all tracks in that group change to the same automation mode. See Automation modes.
- *Automation parameter:* When you choose an option from the Automation Parameter pop-up menu on one track, all tracks in that group change to the same automation parameter. See Automation parameters.
- *Auto-select automation parameter:* When you tap a control on one track (for example, the Volume slider), the Automation Parameter pop-up menus in all tracks switch to that automation parameter.

Editing automation graphically

In Automation view in the Tracks area, when you create or edit automation points or modify the automation curve on one track, those edits apply to all tracks in that group. See Automation drawing tools.

Writing automation in real time

When you write real-time automation for one track, that automation data is written to all tracks in that Mixer group. There are a few conditions on how the automation data is applied:

- *Relative change:* When writing automation for a continuous control, such as volume, pan, send, or other sliders, it applies the automation as an offset to the original value.
- *Absolute change:* When writing automation to a switch, such as the Mute button or an On/Off button, that status applies to all member tracks regardless of the original state of their buttons.
- *Existing automation:* New automation overwrites any existing automation on any member tracks, applying it as an offset to the original value at the start of the new automation.

Note: When you write automation in a Mixer group, you create automation data on each member track. That means if you want to remove a track from a group later to further edit it individually, you can do so without affecting its automation data.

Automate cells in Live Loops in Logic Pro for iPad

Automation can also be created in cells when you work in the Live Loops grid. Cells are containers that include one or more regions of any of the four region types (audio region, MIDI region, Step Sequencer pattern region, or Session Player region). Adding and editing automation in cells is technically region automation for the region contained in the cell.

Selecting a cell and opening the Editors area shows the Cell Editor, which can have four different interfaces depending on the region type. It can be an Audio Editor, a Piano Roll Editor, a Step Sequencer, or a Session Player Editor, each one with some cell-specific controls. The Cell Editor also has the Automation View button to view and edit region automation.

Note: A cell that contains region automation shows the automation symbol in the lower-right corner of the cell (visible when zoomed in).



Add cell automation

1. In the Tracks area menu bar, tap the Grid View button.
2. Tap the Edit button in the Live Loops menu bar, then tap a cell to select it.
3. Tap the Editors button in the middle of the view control bar to open the Cell Editor.

   The Cell Editor shows the user interface of the editor related to the region type. For example, if the cell contains a MIDI region, the Cell Editor will show the Piano Roll Editor.
4. Tap the Automation View button in the Editors area (or press A on your external keyboard).

   The Cell Editor doesn't have an Automation View button if it shows a pattern region.
5. Perform any of the graphical automation editing tasks.

Note: You can also write region automation in real time when you record to Live Loops cells.

Undo, turn off, or delete automation in Logic Pro for iPad

You can undo the last step or multiple steps of automation you performed (writing, adding, or adjusting) by tapping the Undo button on the right side of the control bar. To temporarily turn off existing automation, you can turn off individual automation parameters or set a track's automation mode to Off to turn off all automation parameters on a track.

You can delete individual automation points or multiple automation points or simply overwrite existing automation with new automation graphically or in real time.

Undo automation

To undo an automation step, do any of the following:

- Tap the Undo button in the control bar to undo the previous action.
- Tap the Undo button multiple times to undo the previous few actions.
- Touch and hold the Undo button, then choose the Redo command to redo the last step.

With your external keyboard, you can use the standard keyboard shortcuts Command-Z for undo and Shift-Command-Z for redo.

Turn off track automation parameters

If you create automation for a specific control (for example, a left-right movement for the Pan/Balance knob), that control will follow its automation curve during playback, and you will no longer be able to control it manually. To try out different movements, you can temporarily turn off the automation for that parameter without losing the automation data. The automation curve for the parameter that is deactivated will turn gray.

1. In the Tracks area menu bar, tap the Automation View button (or press A on your external keyboard).
2. On the track that contains the automation you want to deactivate, tap the Automation Parameter pop-up menu in its track header and choose that parameter, listed below the Used header.
3. Tap the Automation Parameter pop-up menu again and choose that parameter, which is now listed with a checkmark at the top under the Deactivate Visible Automation header.

   The Automation Parameter pop-up menu in the track header that shows the currently visible automation parameter is dimmed, and the automation curve is gray.
4. To activate the currently selected automation parameter again, tap the Automation Parameter pop-up menu and choose the first item in the menu under the header Activate Visible Automation.

Deactivating or activating an automation parameter is a two-step process because you have to first make that parameter visible by selecting it from the Automation Parameter pop-up menu.

Turn off region automation parameters

1. In the Tracks area menu bar, do any of the following:
   - For track automation, tap the Tracks View button, tap the Default View button, then tap the Trim button.
   - For region automation in a cell, tap the Grid View button, then tap the Edit button in the menu bar.
2. Tap the region or cell you want to edit.
3. Tap the Editors button in the middle of the view control bar (or press E on your external keyboard).
4. Tap the Automation Parameter pop-up menu in the Editors area menu bar and choose the parameter listed below the Used header.
5. Tap the Automation Parameter pop-up menu again and choose that parameter, which is now listed with a checkmark at the top under the Deactivate Visible Automation header.

   The automation curve for that automation parameter is gray.
6. To activate the currently selected automation parameter again, tap the Automation Parameter pop-up menu and choose the first item in the menu under the header Activate Visible Automation.

Turn off all automation on one or more tracks

1. In the Tracks area menu bar, tap the Automation View button (or press A on your external keyboard).
2. Tap the Multiple Select button to select it, tap the track icon of all tracks you want to select, then tap the Multiple Select button again to deselect it.

   If you want to change only a single track, you can skip this step.
3. In the track header, tap the Automation Mode pop-up menu of one of the selected tracks, then choose Off.

   To turn the automation back on, repeat the steps, and this time, choose Read from the Automation Mode pop-up menu.

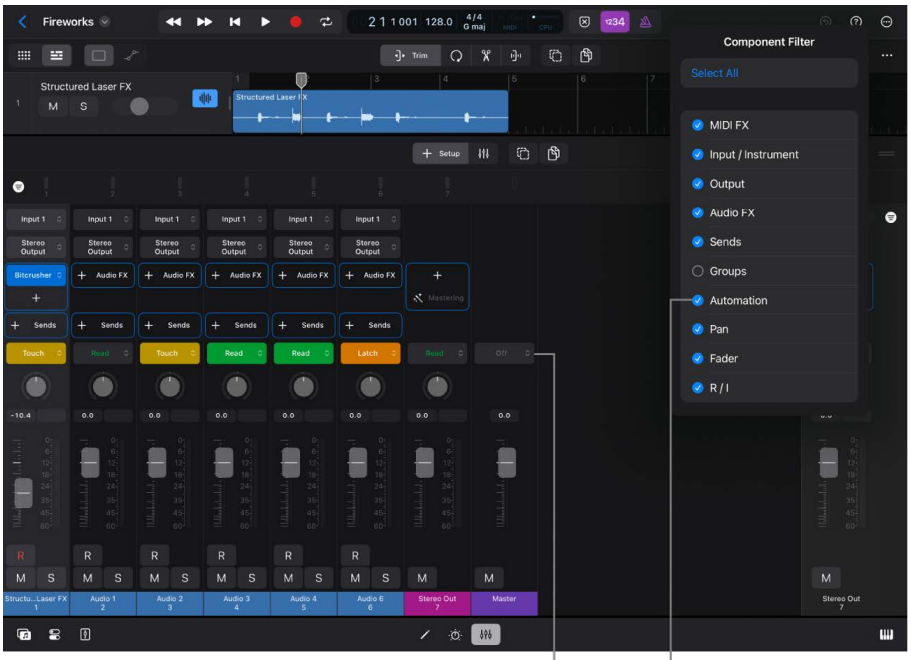
Selecting Read or Off from the Automation Mode pop-up menu on a track applies to track automation and region automation.

Turn off all automation on a track in the Mixer

1. Tap the Mixer button in the middle of the view control bar to show the Mixer.
2. Tap the Filter button at the top of the output track on the far right to open the Component Filter dialog, tap Automation to select it, and then tap the Filter button again to close the menu.

   This button is selected by default to show the Automation Mode pop-up menu in all channel strips.

3. Tap the Automation Mode pop-up menu in the channel strips where you want to turn the automation off, and then choose Off.



To turn automation back on for a track, choose Read from its Automation Mode pop-up menu or the Automation Mode pop-up menu in the track header in the Tracks area.

Turn off all automation on a track in the Plug-ins area

1. In the Tracks area, tap the track icon of the track you want to change.
2. Tap the Plug-ins button in the view control bar (or press B on your external keyboard), tap the Automation Mode pop-up menu in its menu bar, then choose Off.

   You can also double-tap the track icon to open the Plug-ins area.

To turn automation back on for that track, choose Read from its Automation Mode pop-up menu or the Automation Mode pop-up menu in the track header in the Tracks area.

Delete a single automation point

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Do any of the following:
   - Tap the Pencil button, then tap an automation point to delete it.
   - Tap the Move button, tap a single automation point to select it, tap it again to open its menu, then choose Delete.

Delete multiple automation points

1. Tap the Automation View button in the Tracks area menu bar (for track automation) or the Editors area menu bar (for region automation), or press A on your external keyboard.
2. Tap the Move button, then tap the Multiple Select button to select it.
3. Tap all automation points or line segments you want to delete, then tap the Multiple Select button again to deselect it.
4. Tap any of the selected automation points or lines, then choose Delete from the menu.

   You can also touch and hold the Multiple Select button in momentary mode or press and hold the Shift key on your external keyboard, tap the automation points to select them, and then release the button or the Shift key.

Delete all region automation on a track

1. Tap the Automation View button in the Editors area menu bar (or press A on your external keyboard).
2. Tap the Move button, then tap outside the automation curve to deselect any automation point.
3. Tap again outside the automation curve to open its menu, and choose Delete All Region Automation.

Delete track automation for the visible automation parameter

1. Tap the Automation View button in the Tracks area menu bar (or press A on your external keyboard).
2. Tap the Move button, then tap outside the automation curve to deselect any automation point.
3. Tap again outside the automation curve to open its menu, tap Delete Track Automation, and choose On This Track below the label For Visible Parameters.

Delete all track automation on a track

1. Tap the Automation View button in the Tracks area menu bar (or press A on your external keyboard).
2. Tap the Move button, then tap outside the automation curve to deselect any automation point.
3. Tap again outside the automation curve to open its menu, tap Delete Track Automation, and choose On This Track below the label For All Parameters.

Delete all track automation on all tracks

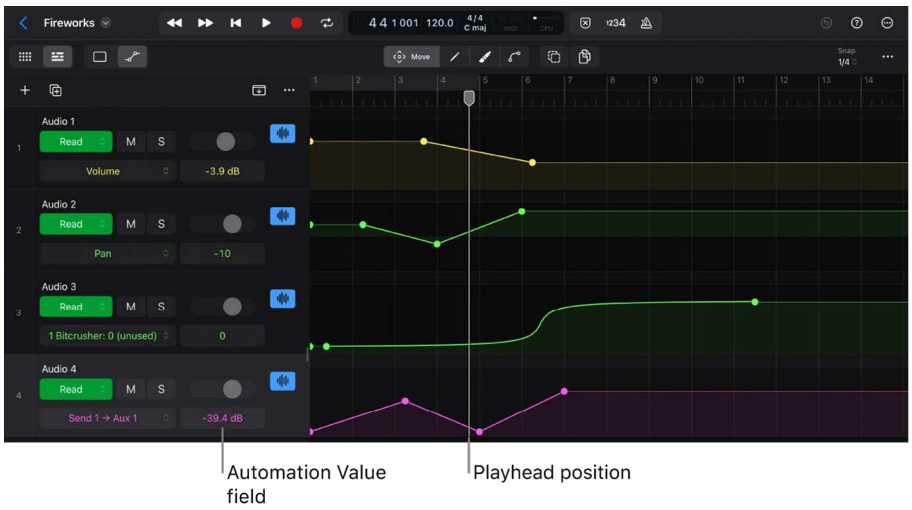
1. Tap the Automation View button in the Tracks area menu bar (or press A on your external keyboard).
2. Tap the Move button, then tap outside the automation curve to deselect any automation point.
3. Tap again outside the automation curve to open its menu, tap Delete Track Automation, and choose On All Tracks below the label For All Parameters.

Play automation in Logic Pro for iPad

Your project will play back with automation as long as you have set the automation mode to Read on all tracks that have automation data, and no individual automation parameters are turned off.

Automation Value field

The Automation Value field, visible on all track headers in Automation view, shows the value of the currently selected automation parameter on a track at the current playhead position. It updates in real time during playback.



Play back your project with automation

1. In the Tracks area menu bar, tap the Automation View button (or press A on your external keyboard).
2. Scroll through the track list to see if the automation mode on all tracks is set to Read.
3. To set all tracks to Read mode, tap the Multiple Select button to select it, tap the track icon of all tracks to select them, and then tap the Multiple Select button again to deselect it.
4. Tap the Automation Mode pop-up menu on one of the tracks and choose Read.

   All tracks are now set to Read mode.
5. Tap the Play button or press the Space bar on your external keyboard to start playback of your project with all the controls on the tracks changing based on the automation data.

   When bouncing your project, all the automation performance will be included the same way as when you play back your project.

Automation will also play back when the automation mode is set to Touch or Latch; however, in that mode, you will also create new or overwrite existing automation when you touch any control in the channel strips or plug-ins.

Bounce in place with volume and pan automation

When you use the Bounce in Place command to bounce single or multiple regions to a track, you have the option to include volume and pan automation.

1. In the Tracks area menu bar, tap the Default button, and then tap the Move button.
2. Tap a single region or select multiple regions with the Multiple Select button.
3. Tap the selected region to open its menu, then choose Bounce and Join > Bounce in Place.

   The Bounce in Place dialog opens with various settings. See Bounce in place.
4. Tap the Include Volume/Pan Automation switch to turn it on.
5. Tap Bounce in the top-right corner of the dialog to perform the bounce.

Create automation with Step Sequencer in Logic Pro for iPad

Instead of creating automation points along a timeline that, connected, form an automation curve, you can create automation in Logic Pro for iPad using Step Sequencer.

The concept of Step Sequencer in Logic Pro is based on classic hardware step sequencers with rows of configurable switches and knobs used to generate repeating musical patterns or drum patterns. Instead of storing notes in a series of steps along the row, you can assign a row to a specific automation parameter, and each step in that row then contains a single value for that automation parameter. See Pattern creation basics.

Creative use of Step Sequencer automation

The steps in a Step Sequencer pattern represent a specific time grid (for example, 1/16 or 1/8 notes), and storing specific values for an automation parameter (for example, pan, volume, or filter cutoff) in those steps makes it easy to create tempo-based automation. That means you can easily change the value of an automation parameter based on the bars/beats grid of your project. You need to create those automation patterns only for one bar and then extend that pattern region to repeat that pattern or move it on the track lane to any other position where you want to perform that automation.

For example:

- Create 1/4 note steps for the Pan parameter to alternate left and right pan positions on the beat.
- Create 1/16 note steps for one bar for the Volume parameter to decrease the level with each step gradually.
- Create 1/8 note steps for two bars for the Resolution parameter of the Bitcrusher plug-in and set each step to a different value.
- Create 1/2 note steps for the cutoff frequency of a synth to close and open the filter over two bars periodically.



Add automation steps to a pattern region

The following steps assume that you already have a pattern region in your project.

1. In the Tracks area, tap the pattern region to select it, and then tap the Editors button in the view control bar.

   The Editors area shows Step Sequencer.

2. Tap the Add button above the row headers to open the Row Assignment menu and choose Automation > Main > Pan.

   You can choose any other automation parameter from the menu.

3. On the new row, for example, tap the 1st, 5th, 9th, and 13th step to turn them on.

4. Tap the Row disclosure arrow to show the Value attribute.

5. Drag the value of the first and third selected step up to +63 and the second and fourth value down to -64.

The pattern region plays back with the pan position jumping left and right on each downbeat.

Control track stacks with an automation pattern region

Placing a pattern region on the main track of a track stack controls its subtracks based on the Step Sequencer automation.

1. Create a track stack.

2. Tap the disclosure arrow in the track header of the track stack.

   All the subtracks are displayed below the main track.

3. Tap the track lane of the main track, then tap again and to open its menu, and choose Create Pattern Region.

4. With the pattern region selected, tap the Editors button in the view control bar.

   The Editors area now shows Step Sequencer.

5. Follow the steps described in Add automation steps to a pattern region.

Work with markers, time and key signatures, and tempo

Work with markers, time and key signatures, and tempo in Logic Pro for iPad

In addition to working with individual tracks, regions, and channel strips, you can manipulate different aspects of an overall project in Logic Pro for iPad.

- You can tag different parts of a project using markers.
- You can add time and key signature changes that affect the ruler.
- You can control the project tempo by adding tempo changes, which affect project playback.
- You can use Smart Tempo to analyze and adjust the tempo of imported audio recordings to match the project's tempo.
- You can add and edit chords, allowing Session Players in your project to play in sync.
- You can control the transposition of regions in a project using the Pitch Source region parameter. Some region types also respond to chords.

Logic Pro features several ways to control aspects of the overall project. A set of global tracks (the Marker track, Time Signature track, Key Signature track, Tempo track, and Chord track) is available in the Tracks area.

You can also add effects to output or aux tracks, and automate effects and other parameters on output or aux tracks, which can affect the overall project.

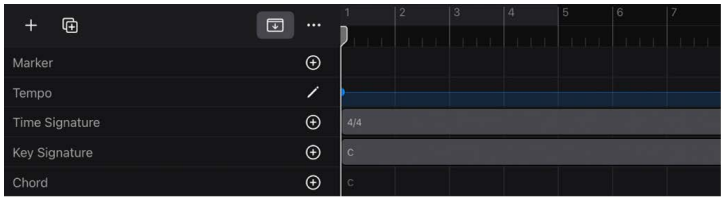
For information about automating project parameters, see Introduction to automation.

Use the global tracks

Intro to global tracks in Logic Pro for iPad

Logic Pro for iPad includes a set of global tracks that you can use to control different aspects of the overall project. You can show global tracks in the Tracks area. When you show the global tracks, they appear at the top of the Tracks area.

The following global tracks are available:



- *Marker track:* Contains markers, which are used to label bar positions and parts of the project. Their length can be edited freely. See Intro to markers.
- *Time Signature track:* Contains the time signature of the project along with any signature changes. See Intro to time signatures.
- *Key Signature track:* Contains the key signature of the project along with any signature changes. See Intro to key signatures.
- *Tempo track:* Contains the project tempo and all tempo changes in the project. See Intro to tempo.
- *Chord track:* Contains chord progressions for the Session Players. See Intro to chords.

Show and hide global tracks in Logic Pro for iPad

Global tracks can be displayed above the tracks in the Tracks area in Logic Pro for iPad. You can select which global tracks you want to see. By default, a single global track is visible when you show the global tracks.

Show or hide the global tracks

- In Logic Pro, tap the Global Tracks button above the track headers.

  In the Tracks area, the global tracks appear above the tracks.

Show a single global track or multiple global tracks

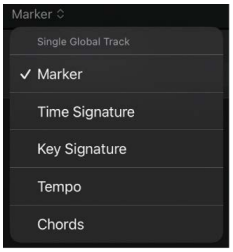
You can choose to show a single global track or multiple global tracks.

1. In Logic Pro, tap the More button ••• above the track headers, then tap Customize Global Tracks.
2. Tap the Show Single Track button to turn it off or on.

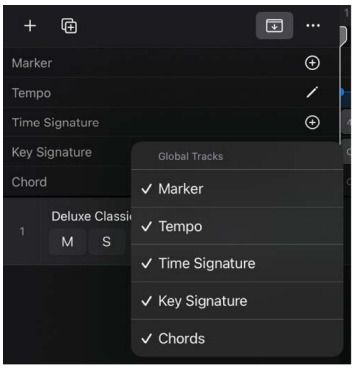
Show or hide individual global tracks

In Logic Pro, tap the More button ••• above the track headers, then do one of the following:

- *When showing a single global track:* Tap the Single Global Track pop-up menu (showing the name of the current global track), then choose the global track you want to display.



- *When showing multiple global tracks:* Touch and hold anywhere in the global tracks header area, then choose the global tracks you want to display.



The tracks you choose to show only affect the open project.

Work with markers

Intro to markers in Logic Pro for iPad

You can use markers to tag different parts of your project in Logic Pro for iPad and quickly set the cycle area from section to section.

Markers are displayed as rectangular sections in the global tracks. You can select, copy, move, or resize markers in the Marker track and edit existing markers in the inspector.



Show the Marker track

- In Logic Pro, tap the Global Tracks button above the track headers.

If the Marker track is not visible, tap the Single Global Track pop-up menu, then choose Marker. For more information, see Show and hide global tracks.

Use markers in Logic Pro for iPad

You can add a marker at any position in your project in Logic Pro for iPad. You can move markers, adjust their lengths, and rename them. You can also set the cycle area in the ruler to a marker. If you no longer want to use markers in your project, you can delete them.

Add a marker

- In the Logic Pro Marker track, place the playhead at the position where you want to create a marker, then tap the Add Marker button +.

Move a marker to a new position

- In the Marker track in Logic Pro, do one of the following:
  - Touch and hold a marker and drag it left or right to a new position.
  - Tap a marker to select it, tap the Inspector button in the view control bar, then drag the Position values up or down or tap a Position value and edit it in the numeric input dialog.

Note: The increments by which markers can be moved in the Marker track depend on the setting in the Snap pop-up menu.

Change the length of a marker

- In the Marker track in Logic Pro, tap a marker to select it, then do one of the following:
  - Drag the left or right edge of the marker to change the length.
  - Tap the Inspector button in the view control bar, then drag the Length values up or down or tap a Length value and edit it in the numeric input dialog.

Markers cannot overlap. Dragging the front of a marker over the previous marker automatically shortens the previous marker.

Rename a marker

1. In the Marker track in Logic Pro, tap a marker to select it.
2. Do one of the following:
   - Tap the marker again, then choose Rename.
   - Tap the Inspector button in the view control bar.
3. Enter a new name in the Marker Name field in the inspector.

Set the cycle area to a marker

- In the Marker track in Logic Pro, double-tap a marker, then do one of the following:
  - Tap Set Cycle to set the cycle area to the length of the marker.
  - Tap Set Cycle Rounded to set the cycle area to the nearest bars at the beginning and at the end of the marker.

Delete a marker

- In the Marker track in Logic Pro, double-tap the marker, then tap Delete.

Work with time signatures

Intro to time signatures in Logic Pro for iPad

Time signatures are global events that affect all tracks in a project in Logic Pro for iPad. When you create a new project, the time signature defaults to 4/4, unless you choose a different time signature. You can view, add, and edit time signatures in the Time Signature track and the display in the control bar.

The initial time signature is a project property. For information on setting the initial time signature, see Set the project time signature.

Time signatures determine the number of beats in each bar (as shown in the ruler), and so define the editing grid in the Tracks area and the time-based editors (including the Audio Editor and Piano Roll Editor). Time signature changes do not affect the playback of audio or MIDI regions.

You can add any number of time signature changes to a project. When you add a time signature change, it changes the time signature from the insertion point forward, until the next time signature change is reached.

Show the Time Signature track

- In Logic Pro, tap the Global Tracks button above the track headers.

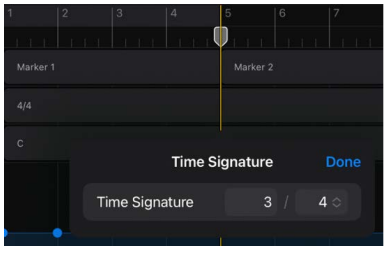
If the Time Signature track is not visible, tap the Single Global Track pop-up menu, then choose Time Signature. For more information, see Show and hide global tracks.

Use time signature changes in Logic Pro for iPad

When you create a new project in Logic Pro for iPad, by default it has one time signature that lasts for the entire project. You can add time signature changes using the Time Signature track. When a project has multiple time signatures, you can edit and move them in the Time Signature track. If a project has only one time signature, you can change the initial time signature in the display. You can delete time signature changes in a project, but you can't delete the initial time signature.

Create a time signature change

1. In the Time Signature track in Logic Pro, place the playhead at the position where you want to add a time signature change, then tap the Add Time Signature button +.
2. Edit the values in the Time Signature dialog, then tap Done.



Edit a time signature

For projects in Logic Pro with multiple time signatures, do one of the following:

- In the Time Signature track, double-tap a time signature, tap edit, then edit the time signature.
- Place the playhead at the start of the time signature that you want to change, tap the Signatures display in the control bar, then choose a new time signature and tap Done.
- Tap a time signature in the Time Signature track, tap the Inspector button in the view control bar, then drag the Signature values up or down or tap a Signature value and edit it in the numeric input dialog.

Move a time signature

- In the Time Signature track in Logic Pro, tap a time signature to select it, then do one of the following:
  - Drag a time signature to a new position.
  - Tap the Inspector button in the view control bar, then drag the Position values up or down or tap a Position value and edit it in the numeric input dialog.

Note: The increments by which time signatures can be moved in the Time Signature track depend on the setting in the Snap pop-up menu in the Tracks area menu bar.

Delete a time signature

- In the Time Signature track in Logic Pro, double-tap the time signature, then tap Delete.

Work with key signatures

Intro to key signatures in Logic Pro for iPad

Key signatures are global events that affect all tracks in a project in Logic Pro for iPad. When you create a new project, the key signature defaults to C major unless you choose a different key signature. You can view, add, and edit key signatures in the Key Signature track and the display in the control bar.

The initial key signature affects the playback of Apple Loops in the project. MIDI, pattern, and Session Player regions in the project can transpose to match the key signature, depending on the Pitch Source parameter in the Region inspector. For information on setting the initial key signature, see Set the project key signature.

You can add any number of key signature changes to a project. When you add a key signature change, it changes the key from the insertion point forward, until the next key signature change is reached.

Show the Key Signature track

- In Logic Pro, tap the Global Tracks button above the track headers.

If the Key Signature track is not visible, tap the Single Global Track pop-up menu, then choose Key Signature. For more information, see Show and hide global tracks.

Use key signature changes in Logic Pro for iPad

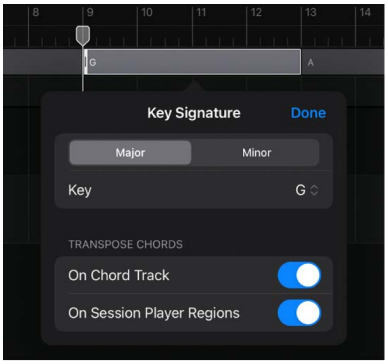
When you create a new project in Logic Pro for iPad, it has one key signature that lasts for the entire project. You can add key signature changes in the Key Signature track. When a project has multiple key signatures, you can edit and move them in the Key Signature track and edit them in the display.

If a project has only one key signature, you can change the initial key signature in the display. After you have added at least one key signature change to a project, you can create additional key signature changes using the Key Signature pop-up menu in the display in the control bar. You can delete key signature changes in a project, but you can't delete the initial key signature.

By default, when you create a key signature change on the Signature track, chords on the Chord track transpose to match the new key signature. You can change this for a key signature event using the On Chord Track and On Session Player Region switches.

Create a key signature change

1. In the Key Signature track in Logic Pro, place the playhead at the position where you want to add a key signature change, then tap the Add Key Signature button +.
2. Edit the values in the Key Signature dialog, then tap Done.



Edit a key signature

For projects with multiple key signatures in Logic Pro, do one of the following:

- In the Key Signature track, double-tap a key signature, tap Edit, then edit the key signature.
- Place the playhead at the start of the key signature you want to change, tap the Signatures display in the control bar, then choose a new key signature and tap Done.
- Tap a key signature in the Key Signature track, tap the Inspector button in the view control bar, then choose a new key from the Key pop-up menu.

Move a key signature

- In the Key Signature track in Logic Pro, tap a key signature to select it, then do one of the following:
  - Drag a key signature to a new position.
  - Tap the Inspector button in the view control bar, then drag the Position values up or down or tap a Position value and edit it in the numeric input dialog.

Note: The increments by which key signatures can be moved in the Key Signature track depend on the setting in the Snap pop-up menu in the Tracks area menu bar.

Delete a key signature

- In the Key Signature track in Logic Pro, double-tap the key signature, then tap Delete.

Control transposition with the Pitch Source parameter in Logic Pro for iPad

In Logic Pro for iPad 2, you can control the transposition of regions and loops in a project using the Pitch Source parameter in the Region inspector. Different region types have different Pitch Source options, including following key signature changes, following the chords on the global Chord track, or following region chords.

The available options in the Pitch Source pop-up menu are:

- *Off:* The region does not respond to the key signature or to chords.

  By setting Pitch Source to Off, you can always return the region or loop to the original key in which it was recorded.
- *Key Signature:* The region changes to match the project key and changes with subsequent key signature changes.
- *Chord Track:* The region follows the chords on the Chord track.
- *Region Chords:* The region follows any region chords it contains.

For projects created in earlier versions of Logic Pro, there is an additional option for some region types:

- *Project Key:* The region changes to match the project key, but not subsequent key signature changes.

This option is available for MIDI regions, MIDI Apple Loops, and audio Apple Loops in projects created in earlier versions of Logic Pro when opened in Logic Pro for iPad 2.

Regions

Audio regions have no Pitch Source setting and do not change with the key signature. MIDI regions and pattern regions are set to Off by default, but they can be set to follow key signature changes. Session Player regions can follow either the Chord track or their region chords. When set to Chord Track, they respond to key signature changes.

When the Pitch Source parameter for a Session Player region is set to Chord Track in the Region inspector, the region follows the Chord track; when set to Region Chords, the region follows its region chords. Changing the Pitch Source parameter changes which item is selected in the Chords menu, and vice versa.

Apple Loops

Audio, MIDI, and pattern Apple Loops with a key signature are set to Key Signature by default, while loops with no key signature (drums, percussion, and other non-pitched loops) are set to Off by default. Session Player Apple Loops can be set to follow either their region chords or the Chord track.

When you add an Apple Loop from the Browser, it follows the selected Loop Chords option in the Browser More menu:

- *Keep Region Chords:* The loop follows the region chords it contains.
- *Replace Global Chords with Region Chords:* The region chords contained in the loop are pasted to the Chord track at the position where you drag the loop.
- *Automatic:* If no chords exist on the Chord track at the position where you drag the loop, the chords in the loop are pasted to the Chord track at that position. If chords exist on the Chord track at the position where you drag the loop, the loop follows its region chords (except for Session Player loops, which follow the Chord track).

Work with tempo

Intro to tempo in Logic Pro for iPad

Every Logic Pro for iPad project has a tempo, which is expressed in beats per minute (bpm). You can set the tempo in the New Project Chooser when you create a project and change it later while you are working. You can set the project tempo in the display in the control bar. By default, the tempo for new projects is 120 bpm.

You can add multiple tempo changes to a project in the Tempo track and create tempo curves to smoothly transition between different tempos.

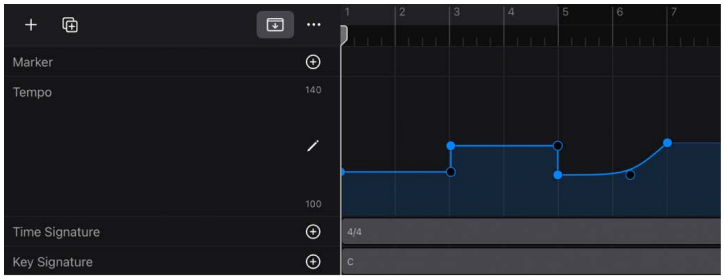
You can also use Smart Tempo to analyze and adjust the tempo of imported audio recordings to match the project's tempo or adapt the project tempo to an audio file.

Work with the Tempo track

Intro to the Tempo track in Logic Pro for iPad

You can add tempo changes to a project using the Tempo track in Logic Pro for iPad. In the Tempo track, tempo changes are represented by tempo points. You create tempo changes by adding tempo points and editing their values.

Tip: You can use Apple Pencil to select and edit tempo points with greater precision.



Show the Tempo track

- In Logic Pro, tap the Global Tracks button above the track headers.

  If the Tempo track is not visible, tap the Single Global Track pop-up menu, then choose Tempo. For more information, see Show and hide global tracks.

Expand the Tempo track

- In the Tempo track in Logic Pro, tap the Expand button, which is located on the right-hand side of the Tempo track.

Use tempo points in Logic Pro for iPad

In the Tempo track in Logic Pro for iPad, tempo changes appear as tempo points. You create tempo changes by adding tempo points and then editing their values. You can create tempo curves, and edit and move tempo points. You can also apply smoothing to tempo points or replace selected tempo points with an average tempo.

Add a tempo point

- In Logic Pro, tap the Pencil button in the global tracks header area, then tap the target time position in the Tempo track.

Change the value of a tempo point

In Logic Pro, do one of the following:

- Drag the tempo point up or down. A help tag displays the tempo value.

  You can also drag the line connecting two tempo points, changing the values of both tempo points.



- With a tempo point selected, tap the Inspector button in the view control bar, then drag the value in the Tempo field in the inspector.

Moving a tempo point to the upper or lower limit of the tempo range extends the tempo range.

Note: To prevent unintentional changes, tempo points are restricted to either vertical or horizontal movement. You can change either the value of a tempo change event or the position of a tempo change event, but not both at once.

Replace selected tempo points with the average tempo

1. In Logic Pro, tap the Multiple Select button in the Tracks area menu bar, then tap tempo points to select them.
2. Tap the Multiple Select button again, tap a selected tempo point, then tap Replace by Average.

Move a tempo point in time

In Logic Pro, do one of the following:

- In the Tempo track, drag the tempo point left or right.
- With a tempo point selected, tap the Inspector button in the view control bar, then drag the values in the Position field in the inspector.

Move the selected tempo point, replacing the previous one

- In the Tempo track in Logic Pro, tap the tempo point to select it, tap it again, then choose Extend Left.

  The selected tempo point is moved left to the position of the previous one, which it replaces.

Delete a tempo point

- In the Tempo track in Logic Pro, tap the tempo point to select it, tap it again, then choose Delete.

Use tempo curves in Logic Pro for iPad

In Logic Pro for iPad, you can create a continuous transition, or *tempo curve*, between two tempo points using curve nodes. Curve nodes appear as small black dots and are located between tempo points.



Create a tempo curve between two tempo points

- In the Tempo track in Logic Pro, touch and hold a curve node between two tempo points, then drag to set and alter the curve shape.

Change the snap value of a tempo curve

- In Logic Pro, choose a value from the Snap pop-up menu in the Tracks area menu bar to define the number of tempo changes that are actually performed when using curves.

Delete a tempo curve

- In the Tempo track in Logic Pro, tap the tempo node to select it, tap it again, then choose Delete.

Use the Tempo track with Ableton Link in Logic Pro for iPad

When Ableton Link is turned on in General Synchronization project settings, the Tempo track is deactivated in Logic Pro for iPad. You can reactivate the Tempo track to add tempo changes.

After you reactivate the Tempo track, any tempo points you add are sent to other Link users in the session when played by the sequencer. The Tempo track is automatically deactivated again if a tempo change is received by another Link user in the session.

- In the Tempo track in Logic Pro, tap anywhere, then tap Reactivate Tempo Track.

  The Tempo track is reactivated, allowing you to make tempo changes to the project.

To deactivate the Tempo track, tap anywhere in the Tempo track, then tap Deactivate Tempo Track.

Intro to Smart Tempo in Logic Pro for iPad

Use Smart Tempo in Logic Pro for iPad to analyze and adjust the tempo of audio recordings to match the project's tempo. This allows for more seamless integration of different recordings, regardless of their original tempo, into a single project. This can be helpful for music production, remixing, and other audio editing tasks.

Here are some practical uses for Smart Tempo:

- *Improved workflow:* Smart Tempo can save you time and effort by adjusting the tempo of audio recordings to match the project’s tempo, so that you don't have to manually adjust the tempo of each recording.
- *Consistency:* Smart Tempo can help maintain a consistent tempo throughout the project, which can be important for creating a cohesive and polished final product.
- *Flexibility:* Smart Tempo also allows you to import loops, samples, and other audio files that have been recorded at different tempos, and use them in your project without the need to manually time stretch them to match your project tempo.
- *Experimentation:* You can use Smart Tempo as a creative tool to experiment with different tempos and grooves to see how they sound in your project.

Open the Smart Tempo menu

1. In Logic Pro, tap an audio region to select it.
2. Tap the audio region again, then tap Tempo.

Smart Tempo Menu

- *Analyze Tempo:* Perform a new tempo analysis of the region. For example, when you import an audio recording into a Logic Pro project, Smart Tempo automatically detects the tempo of the recording and adjusts it to match the project's tempo. If a recording does not contain tempo information, or if the automatic detection is not accurate, you can use Analyze Tempo to edit or reset the tempo of a recording manually.
- *Edit Smart Tempo:* Opens the Smart Tempo pop-up menu with the following options:

  Note: Edit Smart Tempo is only available if the audio file the region refers to contains tempo information. If it's unavailable, tap Analyze Tempo, then open the Smart Tempo pop-up again.

  - *Tempo:* Doubles or halves the tempo of the audio file. This item also shows the detected file tempo; if multiple tempo events are detected (shown as Variable), the bpm value shows the average tempo of the file. You can select the tempo and enter a new file tempo.
  - *Mode:* Select Variable or Constant tempo.
    - *Variable Tempo:* Lets the detected tempo follow the natural fluctuations that may occur in the recording (such as in live recording of drums or a solo musician). This mode is likely more accurate on performances recorded without a metronome.
    - *Constant Tempo:* Forces the detected tempo to find a constant one. This mode will likely be more accurate on recordings involving a drum machine or a sequencer.
  - *Time Signature:* Shows the detected time signature. Drag the time signature values to manually adjust the time signature from the pop-up menu.
  - *Shift Downbeat:* Adjust the timing of the downbeat. For example, if you have a 4/4 time signature with the correct tempo detected, but the upbeat (beat 4) is detected as the downbeat (beat 1), you can use shift downbeat to correct this (move the downbeat from beat 4 to beat 1). Tap the left arrow if the downbeat is ahead, or tap the right arrow if the downbeat is behind.
- *Apply Region Tempo to Project:* Applies the tempo of the selected region to the project tempo. This can be useful when working with recordings that have a consistent tempo throughout, such as electronic drum loops or samples, and you want to use that tempo for the whole project.
- *Apply Project Tempo to Region and Downbeat:* Keeps the project tempo, adapts the region tempo to the project tempo, and aligns the region downbeat with the project. This option can be particularly useful when working with electronic drum loops or samples because they often have a consistent tempo throughout, and aligning them with the project's tempo and downbeat can make it easy to incorporate them into the project. It can also be useful when working with live recordings, where the tempo and downbeat may not be consistent or may not match the project's tempo and downbeat.
- *Write Project Tempo to Audio File:* Save the tempo information of the project into the audio file. This feature is helpful if the project's tempo curve was modified and you want to print that tempo into the file. This option is also beneficial when you are sharing audio files with other musicians or producers, and you want to ensure that the tempo of the audio file will match the tempo of their project.
- *Remove Tempo Information:* Discards all tempo information from the audio file, including the tempo analysis results. Use only when you're sure you don't want to preserve any tempo information in the file.

Export and share projects

Intro to exporting and sharing in Logic Pro for iPad

Logic Pro for iPad provides various options for exporting and distributing your projects. You can export your project to different audio file types, or export tracks as individual audio files and MIDI tracks as a MIDI file. You can also share your project file with others, allowing them to open and work on your project in Logic Pro on another iPad or a Mac.

Export projects and tracks

Export a project to an audio file in Logic Pro for iPad

You can export a project to a single audio file, choosing to export an AIFF, WAVE, or M4A format. All parameters, effects, and automation on the unmuted tracks in the project are recorded as part of the export file.

Stereo Out is the output channel strip used for exports, and it produces an interleaved stereo audio file.

Export files can be reused in Logic Pro for iPad, saving processing resources by replacing or bypassing multiple regions, instruments, and effects. Export files can be saved to storage media, used with other music apps and on other devices, added to playlists, uploaded to the internet, or sent to streaming services and mastering facilities.

Export your project to an audio file

1. In the Mixer in Logic Pro, make sure that the tracks you want to include in the export are routed to the main stereo output and are not muted.
2. Do one of the following:
   - Tap the Projects button in the top-left corner of the screen, then tap Export.
   - Tap the Export button in the control bar.

     Note: If the Export button is not visible in the control bar, you need to add it by customizing the control bar. See Change the controls in the control bar.
3. Enter a name for the export file in the Name field.

4. Choose which file type you want to export the audio file as. There are two options:

   - *Uncompressed:* AIFF or WAVE. See AIFF and WAVE file options.

     Note: Choosing Uncompressed provides an additional option to export all or selected tracks as individual audio files. See Export tracks as individual audio files.

   - *Compressed:* M4A, with two encoding types. See M4A file options. Choose this option if you want to open the export file in Voice Memos.

     Note: Exporting a compressed audio file requires more storage space than the resulting export file size because an uncompressed file is also exported before encoding. The uncompressed file is removed after conversion.

5. Use the Entire Project Length switch to choose whether to export the entire project or part of the project.

   To limit the export file to only a part of the project, turn the switch off, then adjust the values in the Start Position and End Position fields. You can tap the fields and then edit the values in the numeric input dialog.

   Note: If Cycle mode is on when you tap the Projects button and then Export, the part of the project enclosed by the cycle area determines the start and end positions.

6. Tap Processing Details to show and set additional options. See Set the processing details when exporting projects.

7. Tap Export, then wait for the project to export.

   Note: Export is dimmed if you don't have enough storage space on your iPad.

   A progress bar indicates the progress of the export, and the volume is lowered while the export proceeds.

8. In the list of export and sharing destinations that appears, do one of the following:

   - *Save the file to iCloud Drive or your iPad:* Tap Save to Files, choose a destination in the sidebar and a folder on the right, then tap Save.

   - *Share the file with a nearby Apple device:* Tap AirDrop, tap the device you want to share to, then tap Done.

   - *Share the file in an app:* Tap an app icon, provide any requested information, share the file, then tap Done.

     Note: Only apps that support the file type appear in the list.

You can also Bounce (tracks or) regions in place, Export tracks as individual audio files, and Export MIDI tracks as a MIDI file.

Export MIDI tracks as a MIDI file

In Logic Pro for iPad, you can choose to export all or only selected MIDI tracks in a project as a MIDI file.

Export all or selected MIDI tracks as a MIDI file

1. In the Tracks area in Logic Pro, select the MIDI tracks you want to export.

   If you want to export all MIDI tracks, you can skip this step.

2. Do one of the following:

   - Tap the Projects button in the top-left corner of the screen, then tap Export.
   - Tap the Export button in the control bar.

     Note: If the Export button is not visible in the control bar, you need to add it by customizing the control bar. See Change the controls in the control bar.

3. In the Export Options dialog, tap the MIDI file type.
4. Do one of the following:

   - *To export the selected MIDI tracks*: Turn on the Export Selection as MIDI File switch.
   - *To export all MIDI tracks:* Turn off the Export Selection as MIDI File switch.

5. Tap Export, then wait for the file to export.
6. In the list of export and sharing destinations that appears, do one of the following:

   - *Save the file to iCloud Drive or your iPad:* Tap Save to Files, choose a destination in the sidebar and a folder on the right, then tap Save.
   - *Share the file with a nearby Apple device:* Tap AirDrop, tap the device you want to share to, then tap Done.
   - *Share the file in an app:* Tap an app icon, provide any requested information, share the file, then tap Done.

Export tracks as individual audio files in Logic Pro for iPad

In Logic Pro for iPad, you can choose to export all tracks or only selected tracks in a project as individual audio files. The resulting file is a zip file containing an audio file for each track.

When you choose to export tracks as individual audio files, an alternative set of options is shown in the Processing Details dialog.

Note: The option to export all or selected tracks as individual audio files is available only when you choose Uncompressed as the file type in the Export Options dialog.

Export all or selected tracks as individual audio files

1. In the Tracks area in Logic Pro, select the tracks you want to export.

   If you want to export all audio tracks, you can skip this step.

2. Do one of the following:

   - Tap the Projects button in the top-left corner of the screen, then tap Export.
   - Tap the Export button in the control bar.

     Note: If the Export button is not visible in the control bar, you need to add it by customizing the control bar. See Change the controls in the control bar.

3. In the Export Options dialog, use the Entire Project Length switch to choose whether to export the entire length of the tracks or a range of the tracks.

   To limit the audio files to only a range of the tracks, turn the switch off, then adjust the values in the Start Position and End Position fields. You can tap the fields and then edit the values in the numeric input dialog.

4. Turn on the Export Selected Tracks as Individual Audio Files switch.
5. Tap Processing Details to show and set additional options. See Set the processing details when exporting tracks.
6. Tap Export, then wait for the files to export.

   A zip file containing the selected tracks as individual audio files is created.

7. In the list of export and sharing destinations that appears, do one of the following:
   - *Save the file to iCloud Drive or your iPad:* Tap Save to Files, choose a destination in the sidebar and a folder on the right, then tap Save.
   - *Share the file with a nearby Apple device:* Tap AirDrop, tap the device you want to share to, then tap Done.
   - *Share the file in an app:* Tap an app icon, provide any requested information, share the file, then tap Done.

Set the export file type options

AIFF and WAVE file options in Logic Pro for iPad

When you tap the Information button to the right of Uncompressed in the Export Options dialog in Logic Pro for iPad, the following options appear:

- *AIFF:* Audio Interchange File Format, providing high, lossless quality.
- *WAVE:* Waveform audio file format, providing high, lossless quality.
- *Bit Depth:* Define the bit depth of 16-bit, 24-bit, or 32-bit float for the export file.
- *Sample Rate:* Choose the sample rate for your bounce file.

M4A file options in Logic Pro for iPad

When you tap the Information button to the right of Compressed in the Export Options dialog in Logic Pro for iPad, the following options appear:

- *M4A:* An audio file type with two encoding options.
- *Encoding:* Choose Advanced Audio Codec (AAC) or Apple Lossless (ALAC) to set the encoding for your M4A file. Although both encoding algorithms provide high-quality audio, the AAC format uses a higher compression ratio, resulting in smaller file sizes.
- *Bit Rate:* Choose a rate from 64 kbit/s to 320 kbit/s.
- *Encode with variable bit rate (VBR):* Variable bit rate encoding compresses simpler passages more heavily than passages that are harmonically rich, generally resulting in higher-quality files.

  Note: The options bit rate and encode with variable bit rate are not available when choosing ALAC.

Set the processing details

Set the processing details when exporting projects in Logic Pro for iPad

When you choose to export a project as an uncompressed or compressed file in Logic Pro for iPad, the following processing details are available:

- *Mode:* Choose from three options for the export process:
  - *Automatic:* Logic Pro determines whether the bounce can be made offline or must be made in real time.
  - *Offline:* Bouncing offline can be faster than real time for more complex projects and can perform bounces not possible in real time (because they might exceed the processing power of your iPad).

    Note: Only internal sources (audio or software instrument tracks) can be bounced offline—not MIDI tracks or audio channel inputs.
  - *Realtime:* Performs the bounce in real time. Use this setting when you want to bounce audio and software instrument tracks, or external MIDI sound sources that are routed to the Mixer via aux channels.
- *Bounce 2nd Cycle Pass:* The bounce process takes two repetitions of the cycle range into account, with the creation of the bounce file starting at the second repetition. This is useful if you want effect tails (from the first cycle pass) to be added to the start of the bounce file.

  Note: This option is available when Realtime is selected as the export mode.
- *Include Audio Tail:* When this is turned on, the export file is extended as far as necessary to include any instrument release and effect tail.

  Note: Some plug-ins, including plug-ins used for mastering and the test oscillator plug-in, can add noise to the signal. Include Audio Tail should not be selected when using these plug-ins, because the resulting bounce file would be too long.
- *Include Mastering Assistant:* Choose to include or bypass Mastering Assistant for the export file.

  Note: This option is available only if you have used Mastering Assistant in your project. For more information, see Mastering Assistant overview.
- *Normalize:* Choose from three options:
  - *Off:* No normalization is applied.
  - *On:* The project (incoming audio) is scanned for the highest amplitude peak, then the level is increased so that the peak is at the maximum possible level (without clipping).
  - *Overload Protection Only:* Downward normalization takes place only for overloads (levels above 0 dB, which would lead to clipping), but no normalization takes place for lower levels.

    Note: Normalize is not available if you have turned on Include Mastering Assistant.

- *Include Master Effect Plug-ins:* Choose whether to include or bypass all plug-ins inserted on the output channel strip.
- *Write Song Information:* When this is turned on, you can add song information to the export file, including song title, artist, composer, and an International Standard Recording Code (ISRC) for song identification.

  Note: This switch is available only when you have chosen to export a compressed file.

Set the processing details when exporting tracks in Logic Pro for iPad

When you choose to export all or selected tracks as individual audio files in Logic Pro for iPad, the following processing details are available:

- *Include Audio Tail:* When this is turned on, the audio files are extended as far as necessary to include any instrument release and effect tail.
- *Normalize:* Choose from three options:
  - *Off:* No normalization is applied.
  - *On:* The project (incoming audio) is scanned for the highest amplitude peak, then the level is increased so that the peak is at the maximum possible level (without clipping).
  - *Overload Protection Only:* Downward normalization takes place only for overloads (levels above 0 dB, which would lead to clipping), but no normalization takes place for lower levels.
- *Include Effect Plug-ins:* Choose whether to include or bypass all plug-ins inserted on the tracks' channel strips.
- *Include Volume/Pan Automation:* Choose whether to include any automation for volume and panning.

Share a Logic Pro for iPad project

You can share a Logic Pro for iPad project so that you or others can open and work on it in Logic Pro for iPad on another iPad or in Logic Pro for Mac.

Share your project

1. In the Logic Pro Projects Browser, touch and hold the project, then tap Share.
2. In the list of export and sharing destinations that appears, do one of the following:
   - *Save the project to iCloud Drive or your iPad:* Tap Save to Files, choose a destination in the sidebar and a folder on the right, then tap Save.
   - *Share the project with a nearby Apple device:* Tap AirDrop, tap the device you want to share to, then tap Done.
   - *Share the project in an app:* Tap an app icon, provide any requested information, share the file, then tap Done.

Best practices for working with projects from Logic Pro for Mac

You can open and edit projects in Logic Pro for iPad that were created in Logic Pro for Mac. There are best practices to be aware of when sharing projects from Logic Pro for Mac to Logic Pro for iPad.

You can consolidate your project in Logic Pro for Mac, which combines the assets used and copies them into the project. This helps you avoid attempting to load projects with missing files.

Tip: If you want to regularly exchange projects or work on a project on another device, all assets and files used in a project need to be available for the project to open correctly. So before sharing to your iPad, be sure to save all assets into your project in Logic Pro for Mac. To do this, make sure you select all checkboxes for “Copy the following files into your project” when saving your project in Logic Pro for Mac.

Depending on what content is used in your project, Logic Pro for iPad might ask you to download the relevant content packs if they are not already installed.

If your project in Logic Pro for Mac uses Audio Units plug-ins or Audio Unit Extensions that are not installed as Audio Unit Extensions on your iPad, you can bounce or freeze any tracks that use these before you share and open the project in Logic Pro for iPad. This is also true for tracks using Drummer multi-channel kits. For more information about Audio Unit Extensions, see Work with Audio Unit Extensions.

Tip: For Audio Unit instruments, you can also use Auto Sampler in Logic Pro for Mac to create a sampler instrument that you can play in Logic Pro for iPad.

Some instruments and effects featured in Logic Pro for Mac are not included in Logic Pro for iPad. You can still load projects in Logic Pro for iPad that use these plug-ins; however, you can’t edit their parameters.

Projects created in Logic Pro for Mac with any of the following features can’t be opened in Logic Pro for iPad (in such cases, a dialog appears telling you which features are present when trying to load the project):

- Surround and spatial audio
- Binaural panning
- Projects saved in folders (not as packages)
- Sample rates greater than 96 kHz
- Drummer multi-channel kits
- Projects in which the primary ruler is set to time instead of bars and beats
- Projects starting at a position other than 1 1 1 1
- Arrange folders (with multiple tracks)
- External MIDI tracks
- No output tracks

For more information about the individual features and how to remove them, see the Share projects chapter in the Logic Pro for Mac User Guide.

Note: Projects created and last saved in Logic Pro for Mac version 9 or earlier (with the filename extension .logic) don’t appear in the Projects Browser in Logic Pro for iPad and can’t be opened.

Settings, gestures, and keyboard shortcuts

App settings

Overview of app settings in Logic Pro for iPad

In Logic Pro for iPad, you can define and modify settings to customize the app to suit your workflow. There are three types of settings:

- *App settings:* These configurations apply to all projects and are automatically saved whenever you quit Logic Pro.
- *Project settings:* These configurations are specific to an individual project. They are saved with the project and are restored whenever you open that project.
- *Settings app:* Use the Settings app to set a few more options for Logic Pro, such as resetting it to its default settings or turning on MIDI 2.0.

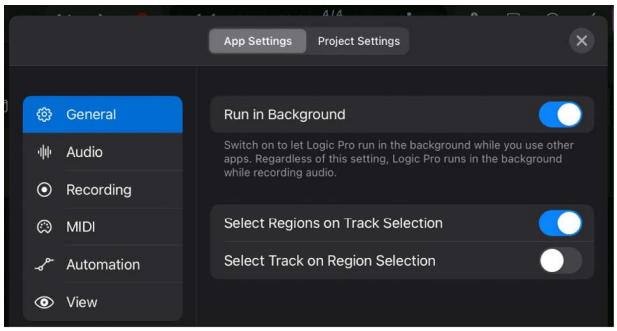
Open and configure app settings

1. Tap the More button on the right side of the control bar, then tap Settings.
2. Tap App Settings, then tap one of the six buttons on the left to display app settings options.
3. Tap the Close button in the upper-right corner or swipe down to close the settings.

   The next time you open the settings, the view you last opened is shown.

Tip: You can tap Project Settings at the top to display the project settings and change the configurations that apply only to the current project. See Overview of project settings.

General settings in Logic Pro for iPad



- *Run in Background:* When this is turned on, Logic Pro can continue to play or record while you use other apps.

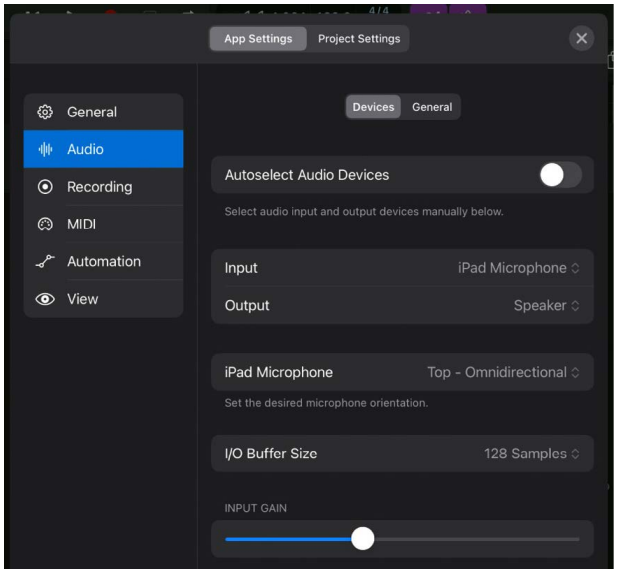
Tip: If another app is active and Logic Pro is running in the background, you can tap the orange microphone in the top-right corner of your screen to switch back to Logic Pro.



- *Select Regions on Track Selection:* Selecting a track selects all regions on that track lane.
- *Select Track on Region Selection:* Selecting a region also selects its corresponding track and channel strip.

Audio settings

Audio Devices settings in Logic Pro for iPad



Audio devices

These settings determine what audio device Logic Pro for iPad uses to record audio signals in your project and what audio device it uses to play back the audio signal from your project.

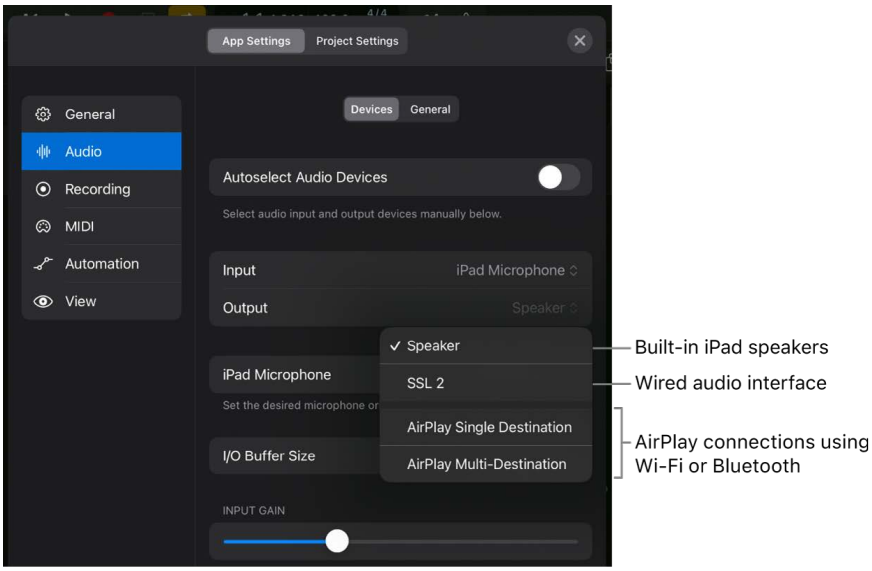
The visibility of these settings depends on what audio devices are connected to your iPad via cable, Bluetooth, or Wi-Fi and what you've selected.

- *Autoselect Audio Devices:* Tap the switch to turn autoselect on or off. The status of the switch determines how audio devices are selected:
  - *On:* Connecting an audio device to your iPad automatically selects that device as the input and output device.

    The Input and Output pop-up menus below the switch are read-only, listing the devices that are in use.
  - *Off:* You can choose any device from the Input and Output pop-up menus.

    If a previously selected audio device is disconnected, the Input and Output pop-up menus switch to iPad Microphone and Speaker respectively, displayed in parentheses.
- *Input pop-up menu:* Choose one of the available options as the audio input device:
  - *iPad Microphone:* Uses the iPad's built-in microphones with the microphone orientation selected in the iPad Microphone pop-up menu.
  - *Connected audio interface:* If a supported audio interface is connected to your iPad, its name is listed in the menu.

  Note: The Input option is not displayed if AirPlay Multi-Destination is selected as the Output device.



- *Output pop-up menu:* Choose one of the available options as the audio output device to play back your project.
  - *Speaker:* The built-in iPad speakers are selected by default.
  - *Connected audio interface:* If a supported audio interface is connected to your iPad, its name is listed in the menu.

    Note: A connected Bluetooth headset, such as AirPods Pro, is not listed as an output device in the Output pop-up menu if the Autoselect Audio Devices switch is deactivated. You have to choose AirPlay Single Destination or AirPlay Multi-Destination from the menu, tap the Select AirPlay Device button, and select the Bluetooth device from there.
  - *AirPlay Single Destination:* When you tap the Select AirPlay Device button, you can choose one available AirPlay destination (for example, your AirPods Pro) to play back your project.
  - *AirPlay Multi-Destination:* When you tap the Select AirPlay Device button, you can choose multiple AirPlay destinations (for example, your AirPods Pro and Apple HomePod speakers) to play back your project simultaneously on those devices.

Important: The audio output selection in Control Center on your iPad is restricted when Logic Pro is in the foreground (or in the background when Run in Background is turned on in General settings). When the iPad speaker or a non-AirPlay device is selected in Audio Devices settings in Logic Pro, you can only switch to an AirPlay device in Control Center.

- *iPad Microphone pop-up menu:* Choose one of the five options that determine the microphone orientation and polar pattern. The available options depend on the iPad model.
  - *Top - Omnidirectional:* Mono signal.
  - *Back - Subcardioid:* Mono signal.
  - *Back - Stereo:* Stereo signal.
  - *Front - Cardioid:* Mono signal.
  - *Front - Stereo:* Stereo signal.

  The selection is saved when you switch to an external audio device and then back to your iPad microphone.

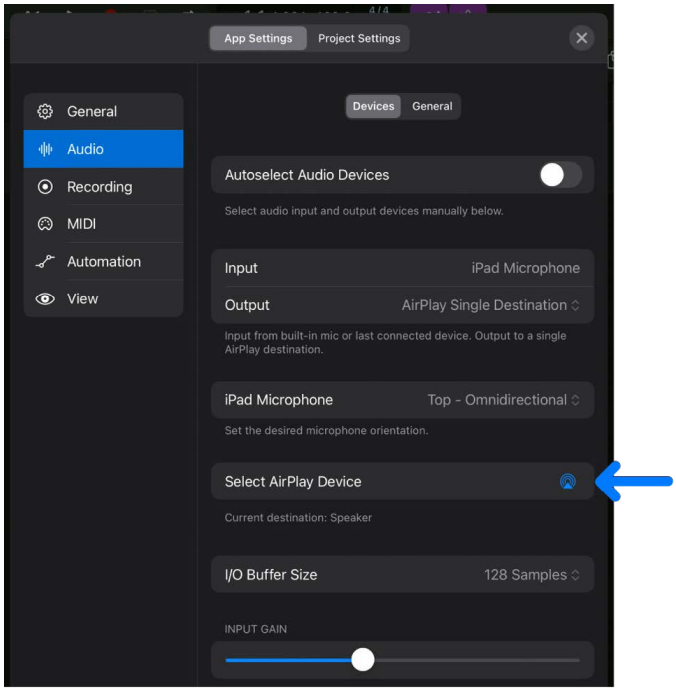
  Note: Changing the microphone orientation can affect the input format of the channel strips that use an iPad microphone as their input. If you need to adjust the selection, you can open the Audio Devices settings directly from the Input dialog of a channel strip using the Microphone Orientation Setup command. See Set channel strip input format.
- *Input Gain slider:* Set the input level of the currently selected audio input device.

  The Input Gain slider is not displayed if AirPlay Multi-Destination is selected as the Output device or any audio device that provides its own input gain control.

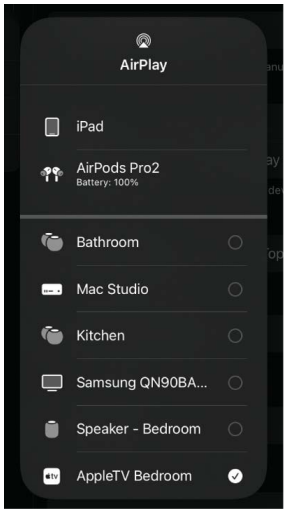
  Tip: Have the Mixer with the record-enabled channel strip visible in the background to see the channel strip meter while adjusting the Input Gain slider.

AirPlay devices

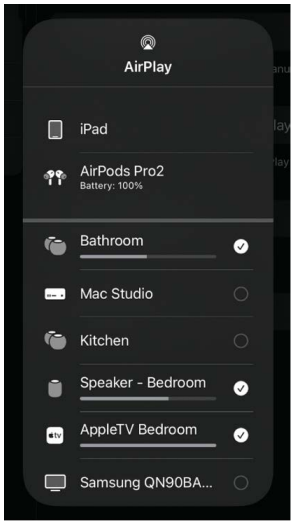
When playing back your project, you can send the audio signal wirelessly from your iPad to any device that supports AirPlay (computer, speakers, TV, and so on). When you choose AirPlay Single Destination or Airplay Multi-Destination from the Output pop-up menu, a button appears that lets you select one or multiple AirPlay destinations.



- *Select AirPlay Device button:* Tap the blue AirPlay button to open the AirPlay dialog, where you can choose any available AirPlay destinations on your network.

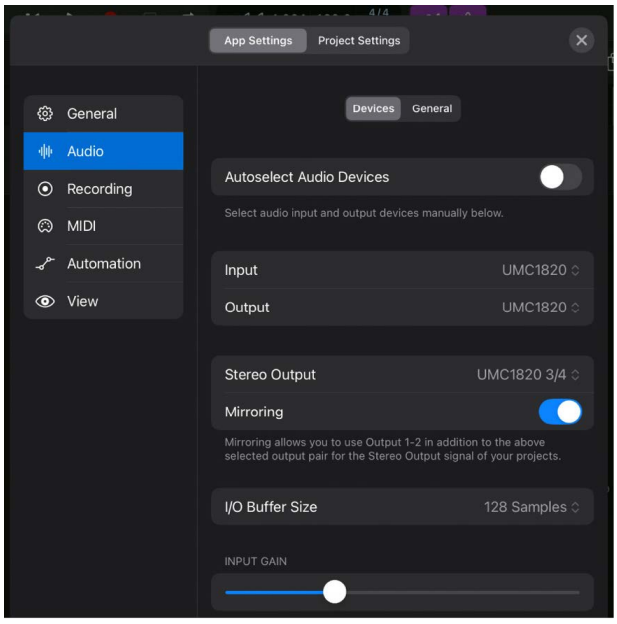


Note: With AirPlay Multi-Destination selected, you can tap multiple destinations in the AirPlay dialog. Each selected device shows a checkbox and a volume slider to adjust the playback volume for each destination (if supported by the device).

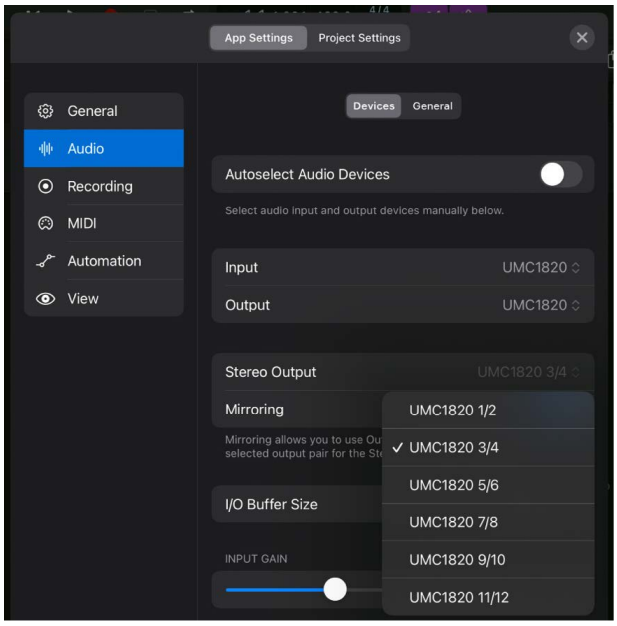


Multichannel audio devices

When you select a connected audio interface in the Output pop-up menu that has more than one stereo output channel, two additional options become available.



- *Stereo Output pop-up menu:* The menu lists all the stereo output channels available on the selected device. The stereo output channel strip in your project is routed to the output channel you choose from this menu.
- *Mirroring:* When you choose an output channel other than channel 1/2 from the Stereo Output pop-up menu, this switch becomes available. When you turn on mirroring, the stereo output channel strip is routed to output channel 1/2 in addition to the output channel you choose from the Stereo Output pop-up menu.



I/O buffer size

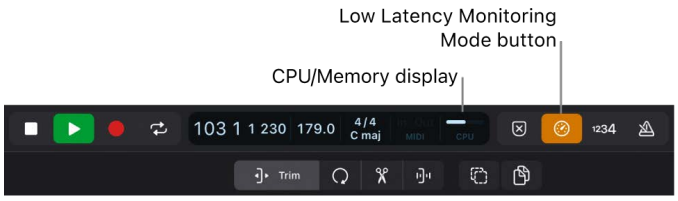
The I/O buffer size setting represents a compromise between CPU performance and low latency (delay). You might change those settings during the production, depending on whether you're recording or mixing.

- *I/O Buffer Size pop-up menu:* Determines the size of the buffer used by the audio device for both input and output.

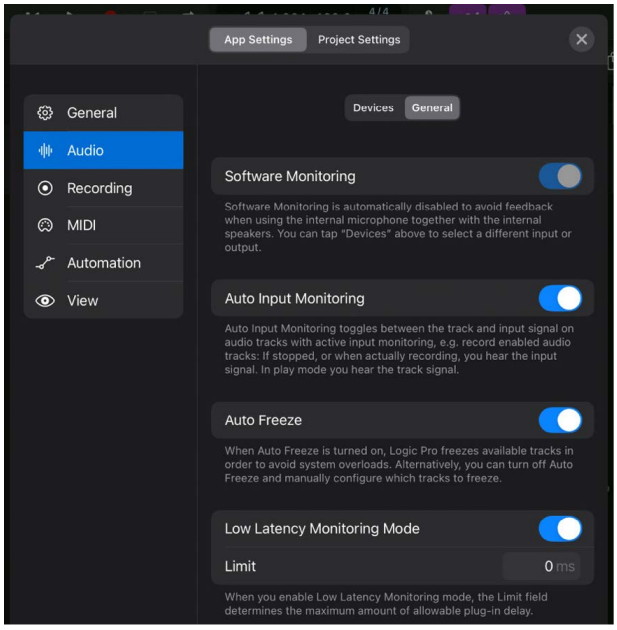
Tip: Considerations for choosing the I/O buffer size:

- During recording of audio tracks and software instrument tracks, the musician is monitoring through Logic Pro (with software monitoring turned on), and any noticeable delay caused by latency can negatively impact their performance. Setting the I/O buffer to the smallest amount minimizes the monitoring delay but also places a higher strain on your iPad's processor.
- The more processor-intensive plug-ins you use in your project, the higher the demand on your iPad's processor during playback, which begins to affect playback in the form of clicks, pops, and crackles in your audio. Setting the I/O buffer to a higher value allows you to use more plug-ins during mixing without overpowering the CPU.
- The CPU display in the control bar indicates how high the demand on your processor is when you play back or record in your project.

  Tap the CPU/Memory display to show either CPU usage or memory usage.
- You can tap the Low Latency Monitoring Mode button in the control bar to automatically turn off plug-ins in your project that cause high latency. See General Audio settings.



General Audio settings in Logic Pro for iPad



- *Software Monitoring:* Tap to turn software monitoring on or off. It is automatically turned off to avoid feedback when you use the internal microphone together with the internal speakers on your iPad.

  When software monitoring is on, you can monitor the incoming audio signal through any effects that are inserted on that track, and a certain amount of audible delay (commonly referred to as *latency*) is inevitable. If you're listening to the recorded signal through your mixing console or your audio interface that supports hardware monitoring, you can turn this option off.

  The following happens when software monitoring is turned off:

  - The Input Monitoring buttons (with the "I" icon) in the track headers and channel strips are not displayed.
  - The Input Monitoring switch in the Customize Track Header dialog is not available.

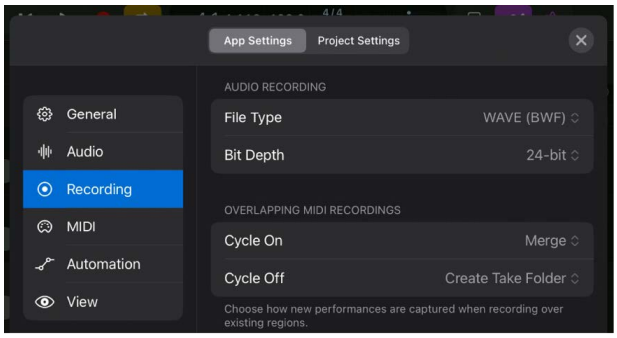
- *Auto Input Monitoring:* This setting only affects a record-enabled audio track during playback. When Auto Input Monitoring is turned on, Logic Pro automatically turns off the track's input signal during playback, so that you hear only the regions on that track. When Auto Input Monitoring is turned off, you hear the track's regions and its input signal during playback.

  You can use Auto Input Monitoring when you want to punch in on an existing region of a track. While playing back, you hear only the region, and when you press record, that track automatically switches to its input signal so you hear what you are performing as the new recording. However, you might want to turn Auto Input Monitoring off if you want to hear both, the region and your input signal on a record-enabled track during playback leading up to the punch-in point (or when practicing while playing along).

- *Auto Freeze:* When Auto Freeze is on, Logic Pro automatically freezes a track if the iPad can't process all audio in time. This could happen when a project has many channel strips with processor-intensive plug-ins. Auto Freeze also unfreezes frozen tracks when a track is being edited.
- *Low Latency Monitoring Mode switch and Limit:* When you tap the switch to turn on Low Latency Monitoring mode, the Limit field appears below it, determining the maximum amount of allowable latency (delay) caused by a plug-in. Low Latency Monitoring mode bypasses latency-inducing plug-ins that would surpass that limit to ensure that all delays (across the entire signal flow of the current track) remain under the Limit value. This is useful when you want to play a software instrument with several latency-inducing plug-ins inserted in the channel strip. Low Latency Monitoring mode is automatically turned off when you close a project. See Record with Low Latency Monitoring mode.

  Tip: Low Latency Monitoring mode can also be turned on and off with the Low Latency Monitoring Mode button in the control bar. See Customize the control bar.

Recording settings in Logic Pro for iPad



You can use Recording settings to determine how Logic Pro for iPad responds while in record mode.

Audio recording

The following settings determine the file type and bit depth of newly recorded audio files. You can change those settings in an existing project if needed, and all new audio files are then created in that format without altering any previously recorded audio files in that project.

- *File Type pop-up menu:* Select the audio file format for recording.
  - *AIFF:* Audio file format mainly used on the Mac platform.
  - *WAVE (BWF):* Most compatible audio file format.
  - *CAF:* Allows for exceptionally long recordings if you plan on recording continuous, half-day or longer audio files.
- *Bit Depth pop-up menu:* Set the bit depth for newly recorded audio files. A higher bit depth has the ability to capture a wider dynamic range.

  Note: Choose the recording bit depth in Logic Pro to match the bit depth of your audio device. Each audio device either has a fixed bit depth or lets you choose a specific bit depth to send its digital audio signal to Logic Pro.

- *16-bit:* Use only if you want to keep audio file sizes small or if your audio device supports 16-bit. Because 16-bit audio files only have a dynamic range of 96 dB (without dithering), they produce quantization distortion at very low signal levels.
- *24-bit:* The most commonly used bit depth. Its file size is 50 percent larger than 16-bit audio files, but it has a better dynamic range of 144 dB with virtually no quantization distortion.

  With proper external gain staging, 24-bit is sufficient for any acoustic recording because the dynamic range of even the best microphone doesn't exceed 140 dB.
- *32-bit float:* Uses 32-bit floating point calculations to create audio files 33 percent larger than 24-bit audio files.

Tip: The advantage of using 32-bit float for recording is that you can remove digital clipping that occurred during the recording simply by lowering the gain of the audio region. You can also increase the gain of recordings with levels that are too low without increasing the noise floor.

Overlapping MIDI recordings

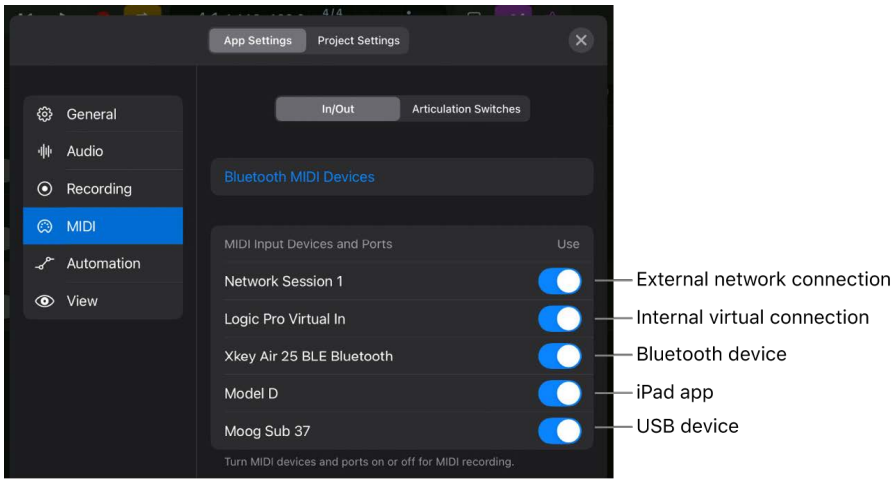
This setting determines the behavior when recording over existing MIDI regions. You can choose from two options, independently, when Cycle mode is turned on or off during recording:

- *Create Take Folder:* A new take folder is created containing the existing MIDI region and a MIDI region for each cycle repetition. See Intro to takes.
- *Merge:* Merges newly recorded MIDI data with the existing MIDI data in the same MIDI region. The region extends the length of the existing MIDI region when recording beyond its boundaries.

Important: The Overlapping MIDI Recordings settings are ignored when the Replace button is turned on in the control bar. In Replace mode, any existing MIDI data is overwritten.

MIDI settings

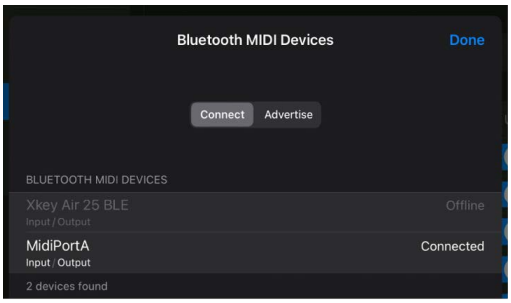
MIDI In/Out settings in Logic Pro for iPad



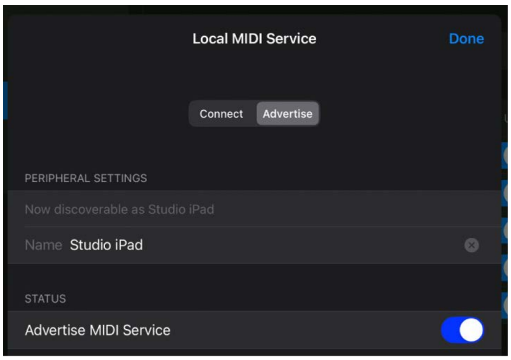
Bluetooth MIDI Devices

Tap Bluetooth MIDI Devices to open a dialog for setting up your external Bluetooth MIDI controllers to use with Logic Pro. There are two pages for settings, Connect and Advertise:

- *Connect:* Use the Connect settings to configure your external Bluetooth MIDI controllers to send and receive MIDI signals to and from Logic Pro. Each device is listed along with its status, for which there are three options:
  - *Not Connected:* Logic Pro receives a pairing signal from the device, and you can tap Not Connected to connect the device.
  - *Connected:* The device is currently connected (paired), and you can tap Connected to disconnect it.
  - *Offline:* This is a previously connected device that is currently not available. Once a pairing signal is detected, the status changes to Not Connected.



- *Advertise:* Use the Advertise settings to configure how Logic Pro is recognized by other Bluetooth devices.
  - *Name field:* The name of your iPad is displayed by default, but you can tap the field and enter a different name that other Bluetooth devices will see.
  - *Advertise MIDI Service switch:* Turn Advertise on or off to have your iPad be discoverable by other MIDI Bluetooth devices.



MIDI Input Devices and Ports

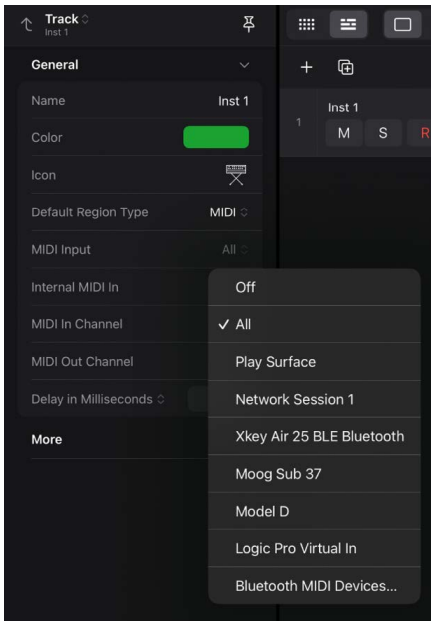
Any MIDI device that can send MIDI messages and is recognized by Logic Pro is listed under MIDI Input Devices and Ports with a switch to activate the device as a MIDI source. Only devices that are activated are displayed in the MIDI Input pop-up menu in the Track inspector.

Note: You can choose a MIDI device as a destination in the Track inspector MIDI Output pop-up menu even if it's not activated as a MIDI source.

Various types of MIDI devices are recognized in Logic Pro:

- *Network Session 1:* This option represents the network connection you create in the Audio MIDI Setup app on a Mac to send MIDI between Logic Pro for Mac and Logic Pro for iPad.
- Logic Pro Virtual In: Receive MIDI data from any app on your iPad that supports this virtual MIDI bus, such as GarageBand for iPad. Third-party iPad music apps might display this option as a selectable MIDI output.
- *Internal app:* Most iPad music apps that can send MIDI data internally between apps are listed automatically when you open them on your iPad.
- *Bluetooth connection:* Any Bluetooth MIDI device needs to be added manually in Logic Pro in the Bluetooth MIDI Devices dialog.
- *Physical connection:* A MIDI device that is Core MIDI compliant is automatically displayed in the MIDI Input Devices and Ports list if you connect it to the iPad's Lightning or USB-C port.

The MIDI Input pop-up menu in the Track inspector lets you choose which MIDI device to use as the input for an individual software instrument track. See Record multiple MIDI devices to multiple tracks.



Note: The Play Surface option is always available in the MIDI Input pop-up menu. To connect and disconnect Bluetooth devices, tap Bluetooth MIDI Devices to open the Bluetooth MIDI Devices dialog.

Add Bluetooth MIDI devices

1. In Logic Pro for iPad, tap the More button on the right side of the control bar, then tap Settings.
2. Tap App Settings, tap MIDI on the left, tap In/Out, and then tap Bluetooth MIDI Devices to open the Bluetooth MIDI Devices dialog.

   Tip: You can also tap the MIDI Input pop-up menu in the Track inspector of a MIDI track and choose Bluetooth MIDI Devices to open the dialog.
3. Tap Connect at the top (if it's not already selected), then tap a row with the status Not Connected, indicating a device ready to be connected.

   The status next to the device name changes to Connected; tap Connected when you want to disconnect the device.
4. Tap Done or swipe down to return to the MIDI In/Out settings.

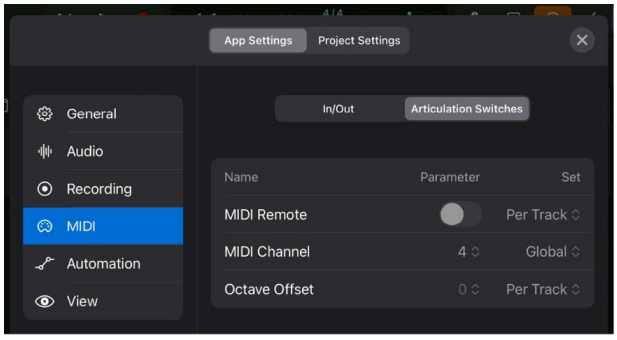
   The MIDI In/Out settings now lists the connected devices.

Remove offline Bluetooth MIDI devices

You can remove any previously connected device (marked as Offline) from the list.

1. In Logic Pro for iPad, tap the More button on the right side of the control bar, then tap Settings.
2. Tap App Settings, tap MIDI on the left, tap In/Out, and then tap Bluetooth MIDI Devices to show that dialog.
3. Tap Connect at the top (if it's not already selected), then do either of the following:
   - Swipe left on an offline device, then tap the red Forget button that appears.
   - Swipe all the way to the left on an offline device to remove it immediately.

Articulation Switches MIDI settings in Logic Pro for iPad



You can set the following three parameters for articulation switches:

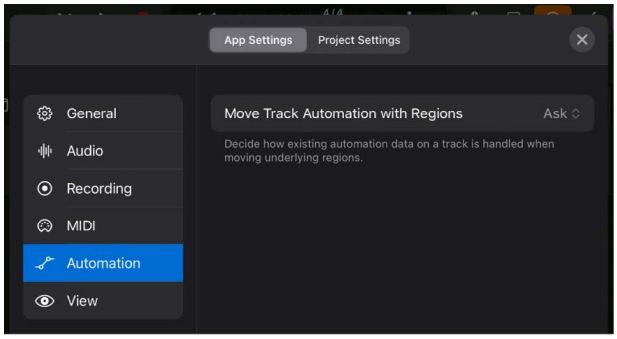
- *MIDI Remote Parameter switch:* Determines whether articulation switching is on or off.
- *MIDI Channel Parameter pop-up menu:* Sets the MIDI channel for articulation switches.
- *Octave Offset Parameter pop-up menu:* Sets the octave offset for articulation switches. You can choose between –10 and +10 octaves.

Each parameter can be set to one of two conditions:

- *Global:* Apply the parameter value to every track.
- *Per Track:* Set the parameter value individually on each track (the parameter is dimmed).

  This only applies to imported Logic Pro for Mac projects containing tracks that use a configured Articulation Set Editor.

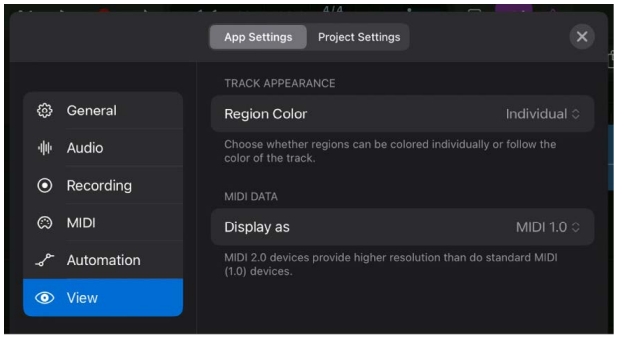
Automation settings in Logic Pro for iPad



- *Move Track Automation with Regions pop-up menu:* Determines what happens to track automation data when you move regions on the track lane.
  - *Never:* Does not move track automation when you move regions.
  - *Always:* Always moves track automation when you move regions. The automation data area
    encompassed by the region boundaries is moved.
  - *Ask:* A dialog prompts you to move the track automation data—or leave it where it is—whenever you move a region.

Note: All Copy or Move actions include the automation trails. That means the value of an automation parameter at the right border of the region quickly ramps up/down to the automation value at that position instead of creating a sudden value jump.

View settings in Logic Pro for iPad



Track appearance

- *Region Color pop-up menu:* Set whether you can color regions individually or whether they follow the track color. Choose from two options:
  - *Individual:* You can color regions individually independent from the track color.
  - *As Track Color:* Regions conform to the color of the track they are on, but they remember the individual color of a region if you switch back to Individual.

    This option hides the Automatically Colorize Takes switch in the Recording project settings.

MIDI data

- *Display as pop-up menu:* Choose with what resolution MIDI data is displayed in the editors, the inspector, and automation. The second and third options provide a higher data resolution introduced with MIDI 2.0—16-bit for velocity and 32-bit for pitch bend, aftertouch, and continuous controllers.
  - *MIDI 1.0:* Values are shown in a 7-bit range from 0 to 127 as in previous versions (based on the MIDI 1.0 standard).
  - *0.0 - 127.9:* The value before the decimal separator maps to the MIDI 1.0 value. The decimals represent the resolution of the additional bits.
  - *Percent:* Values are represented as percentages from 0% to 100% with varying decimals, depending on the parameter.

The MIDI data display settings affect the following areas:

- *Note inspector:* The Velocity and Release Velocity fields in the Note inspector show the MIDI data value of the MIDI notes selected in the Piano Roll Editor.
- *Automation Point inspector:* The Continuous Controller, Aftertouch, Polyphonic Aftertouch, and Pitch Bend fields in the Automation Point inspector show the MIDI data value of the automation points selected in the Piano Roll Editor.

Note: Settings other than "MIDI 1.0" are only recommended if you're using MIDI 2.0–compatible devices and plug-ins that can take advantage of the higher data resolution.

Project settings

Overview of project settings in Logic Pro for iPad

In Logic Pro for iPad, you can define and modify settings that apply to the current project. You do this in the project settings. These settings are automatically saved with a project, meaning that different projects can have different settings. You can save your preferred settings in a default template, which can be used to automatically create a new project when you open Logic Pro.

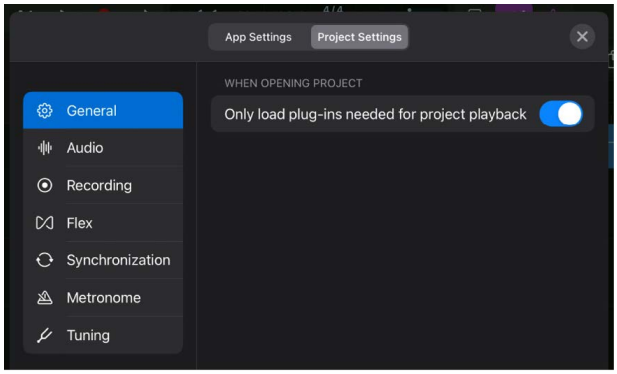
Open and configure the project settings

1. Tap the More button on the right side of the control bar, then tap Settings.
2. Tap Project Settings, then tap one of the seven buttons on the left to display project settings options.
3. Tap the Close button in the upper-right corner or swipe down to close the settings.

   The next time you open the settings, the view you last opened is shown.

You can tap App Settings at the top to display the Logic Pro for iPad settings and change the configurations that apply to all projects. See Overview of app settings.

General project settings in Logic Pro for iPad



Only load plug-ins needed for project playback switch: When turned on, only plug-ins needed to establish the full signal flow for playback (including auxes and outputs) are loaded when a project is opened. This includes:

- The focused track
- Audio tracks containing audio regions (not including frozen tracks)
- Software instrument tracks containing MIDI regions, pattern regions, or Session Player regions (not including frozen tracks)
- Audio tracks with input monitoring active
- Audio and software instrument tracks with plug-ins that automatically generate sound without requiring any input
- Any other tracks required for the complete signal flow

Plug-ins on tracks that are not required for project playback are dimmed, which indicates that they are currently inactive.

When you open a project with this setting turned on, all inactive plug-ins on a channel strip load any time you:

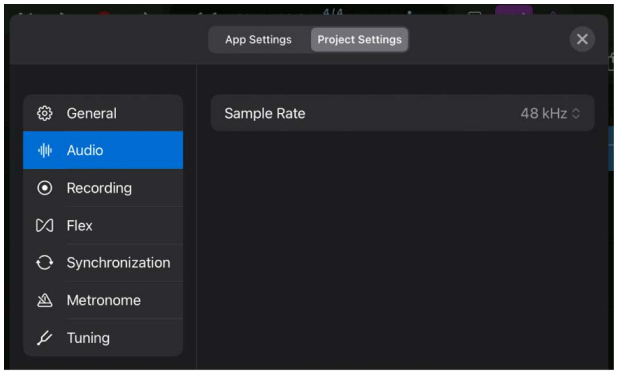
- Select a track or channel strip with inactive plug-ins
- Add a region to a track with inactive plug-ins
- Unfreeze a frozen track
- Add a plug-in to a channel strip with inactive plug-ins
- Tap an inactive plug-in
- Add an additional output to a multi-output software instrument on a channel with inactive plug-ins
- Record enable one or more channel strips with inactive plug-ins
- Set or change an input on an audio or aux channel

Note: Inactive plug-ins do not load for tracks that are turned off.

Loading the plug-ins only as needed can be a significant time-saver when opening complex projects with a large number of tracks and plug-ins, only some of which are used. It also more efficiently allocates your iPad's resources, which can help guard against audio dropouts or other glitches.

To learn more about opening projects, see Open and close projects. To learn more about working with plug-ins, see Intro to plug-ins.

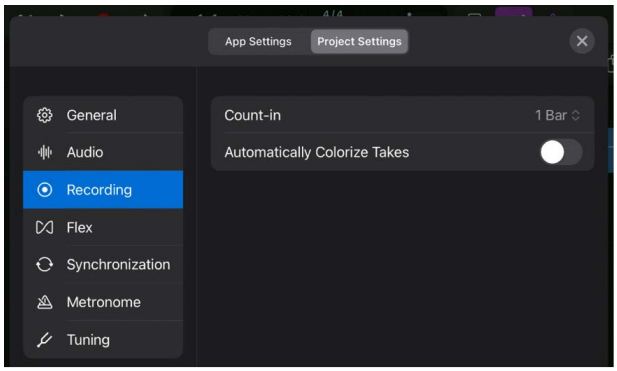
Audio project settings in Logic Pro for iPad



- *Sample Rate pop-up menu:* Choose the sample rate for the project.

Important: You cannot import Logic Pro for Mac projects with a sample rate higher than 96 kHz.

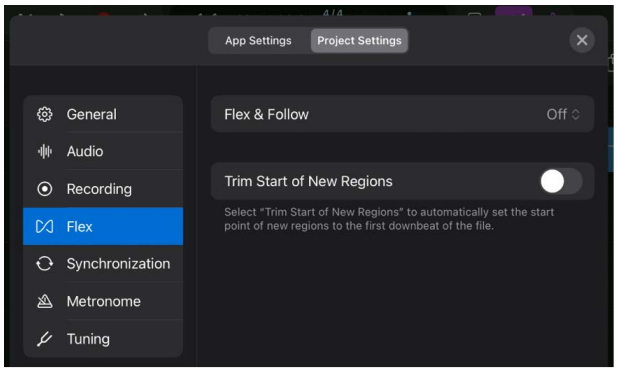
Recording project settings in Logic Pro for iPad



- *Count-in pop-up menu:* Sets the length of the count-in that precedes a recording.
  - *None:* The recording begins with no count-in.
  - *x Bars:* The recording begins with a count-in of between one bar and four bars.
  - *x/4:* The recording begins with a count-in of between one beat (1/4) and nine beats (9/4). These settings are useful when the count-in falls across a bar change.
- *Automatically Colorize Takes switch:* When turned on, each take region in a take folder is assigned a different color. See Record multiple audio takes.

  Note: The switch is only available in the Recording project settings if Region Color is set to Individual in the View settings.

Flex project settings in Logic Pro for iPad

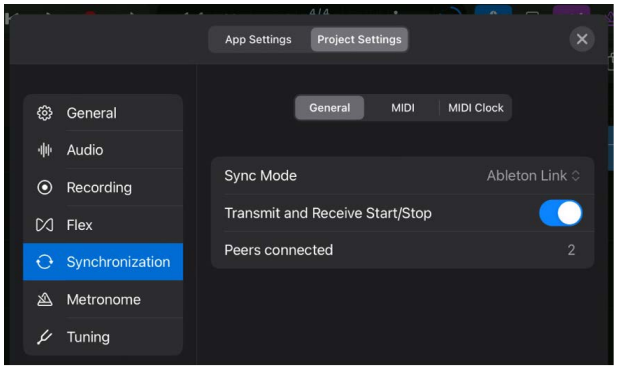


- *Flex & Follow pop-up menu:* Sets the Smart Tempo behavior when recording or importing new audio.
  - *Off:* Smart Tempo does not analyze the tempo of new recordings.
  - *On:* Smart Tempo analyzes the tempo of the recorded audio and places tempo markers at each point a tempo change is detected.
  - *On + Align Bars:* Smart Tempo analyzes the tempo of the recorded audio and places a tempo marker at each bar a tempo change is detected.
  - *On + Align Bars and Beats:* Smart Tempo analyzes the tempo of the recorded audio and places a tempo marker at each beat a tempo change is detected.

  The selected option is displayed in the Flex & Follow parameter in the Region inspector.
- *Trim Start of New Regions switch:* Automatically sets the start of newly recorded regions to the first downbeat of the file.

Synchronization project settings

General Synchronization project settings in Logic Pro for iPad



- Sync Mode pop-up menu: Defines how the tempo in Logic Pro for iPad syncs with other devices.
  - *Internal:* Selects the internal timer of Logic Pro, with Logic Pro transmitting MIDI clock to synchronize external devices.
  - *Ableton Link:* Selects Ableton Link mode, which uses a technology that synchronizes the musical beat, tempo, and phase of Logic Pro with multiple applications running on one or more devices on the same network.

Two additional options become available once you choose Ableton Link from the Sync Mode pop-up menu:

- *Transmit and Receive Start/Stop switch:* When turned on, transport start and stop commands are shared between all Link users in a session who have the feature turned on.

  The status of this switch is saved as an app setting.
- *Peers connected display:* The number shows how many other devices (on your iPad and on the local network) are participating in the Ableton Link session.

  This is the same number inside the circular progress bar shown in the control bar display.

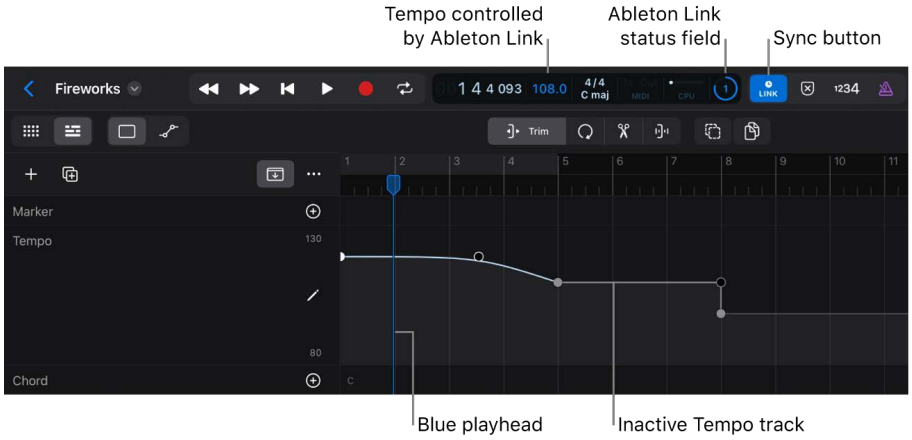
Ableton Link

Choosing Ableton Link in the Sync Mode pop-up menu results in the following changes in your project:

- The Sync button LINK appears in the control bar next to the display.

  You can tap the button to switch the sync mode between Ableton Link (blue button) and Internal (gray button), which is linked to the Sync Mode setting in the General Synchronization project settings.
- The Ableton Link status field is added to the right side of the display; it shows a circular progress bar that represents one measure with a full rotation, with the 12 o'clock position indicating the downbeat. The number inside the ring shows the number of other participants in your Ableton Link session.

- The tempo digits in the display are blue to indicate that the Ableton Link session controls the project tempo.
- The Tempo track in your project is turned off. Tap the Tempo track to open its menu with a new option, Reactivate Tempo Track. See Use the Tempo track with Ableton Link.
- The playhead turns blue.



Turn on Ableton Link in the project settings

1. Tap the More button on the right side of the control bar, then tap Settings.
2. Tap Project Settings, then tap Synchronization.
3. Tap the Sync Mode pop-up menu and choose Ableton Link.
4. Tap the Done button or swipe down to close the settings.

   The Sync button LINK appears in the control bar, indicating by its blue color that Ableton Link is turned on.

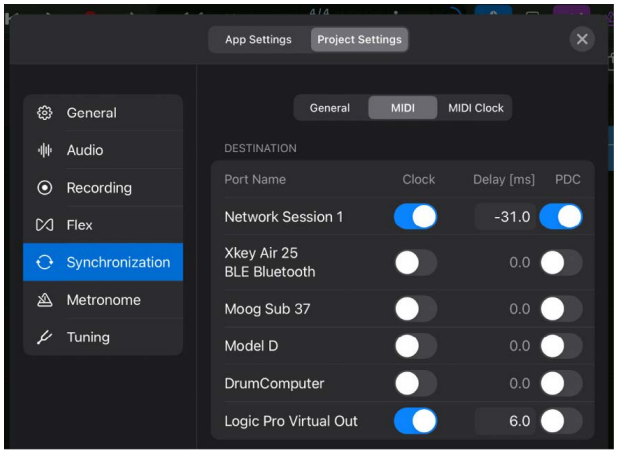
Turn on Ableton Link with the Sync button

1. Tap the More button on the right side of the control bar, then tap Customize Control Bar.
2. Tap Modes, then tap the Sync switch to activate it.

   The Sync button LINK appears in the control bar.
3. Tap outside the Customize Control Bar dialog to close it.
4. Tap the Sync button in the control bar to select it.

   The Sync button turns blue to indicate that Ableton Link is on.

MIDI Synchronization project settings in Logic Pro for iPad



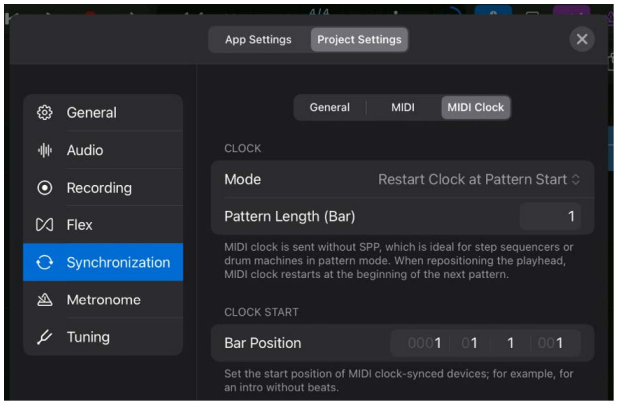
Destination

Configure the MIDI clock signal that Logic Pro for iPad sends to other MIDI devices.

- *Port Name column:* Lists the MIDI output ports and devices that can receive the MIDI clock signal from Logic Pro.
  - *Network Session 1:* This option represents the network connection you create in the Audio MIDI Setup app on a Mac (available on the same network as the iPad) to send MIDI between Logic Pro for Mac and Logic Pro for iPad.
  - Logic Pro Virtual Out: Send MIDI clock to any app on your iPad that supports this virtual MIDI bus. Third-party iPad music apps might display this option as a selectable MIDI input.
  - Any MIDI device connected to the iPad is listed. See MIDI In/Out settings.
- *Clock switch:* Activates MIDI clock transmission for the MIDI output port of that row.

  MIDI clock can easily be sent with other MIDI messages, such as notes and controllers.
- *Delay field:* This value (ranging from –200 ms to 500 ms) delays the transmission of MIDI clock signals for the MIDI output port of that row. Negative values mean that the MIDI clock signal is transmitted earlier. This allows you to compensate for any reaction delays in external devices receiving MIDI clock.
- *PDC switch:* Activates plug-in delay compensation (PDC) for the MIDI output port of that row. This compensates for delays (latency) that can be introduced when using software plug-ins.

MIDI Clock Synchronization project settings in Logic Pro for iPad



Clock

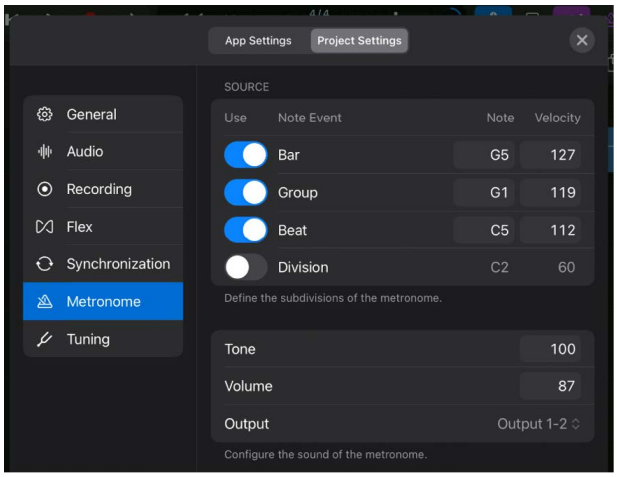
- *Mode pop-up menu:* Determines the MIDI clock transmission mode for synchronized MIDI devices.
  - *Send Song Position Pointer:* MIDI clock is sent with a Song Position Pointer and a Continue command to begin sequencer playback, so that clock receivers with their own song structure can follow your project's playhead position.
  - *Restart Clock at Pattern Start:* MIDI clock is sent without a Song Position Pointer command, which is ideal for step sequencers or drum machines in pattern mode. When repositioning the playhead, MIDI clock restarts at the beginning of the next pattern.
- *Pattern Length (Bar) field:* Determine the length of the pattern by the number of bars.

  This parameter is only displayed when you choose Restart Clock at Pattern Start from the Mode pop-up menu.

Clock start

- *Bar Position field:* Defines the musical position at which the MIDI clock output should start. Every time you start playback, a Song Position Pointer (SPP) message is also sent. Because not all devices can process SPP, the MIDI system real-time Continue message is also sent. The exception is when you start at position 1 1 1 1. In this situation, the real-time Start message is sent.

Metronome project settings in Logic Pro for iPad



The Metronome project settings let you configure two components for the click, which is generated when the metronome is turned on. You determine when the metronome produces a click (for example, only on the downbeat or on every beat) and also how the click sounds.

The click sound in Logic Pro for iPad is generated by a software instrument plug-in called Klopfgeist, loaded on a hidden channel strip. The metronome uses your settings to generate MIDI notes that it sends to the Klopfgeist plug-in, which generates the actual click sounds. See Use the metronome.

Note: You can adjust the metronome settings while playing back your project with the metronome turned on to hear the results.

Source

The four note events listed represent the timing in each bar where the click will sound. You can turn them on or off independently using their corresponding switches.

- *Bar:* Generates a click at the downbeat.
- *Group:* Projects created in Logic Pro have compound and composite signatures turned off by default. In that case, the Group note event produces a click on each beat.

  Logic Pro for iPad supports beat grouping when importing a Logic Pro for Mac project that uses such a time signature. For example, a beat grouping of 2 + 3 for a 5/4 time signature produces a click on the first and third beat of each bar when you turn on the Group note event. Grouping also allows you to get a usable quarter-note pulse in "triplet"-based time signatures such as 6/8 (group click on 1 and 4) or 12/8 (group click on 1, 4, 7, and 10).
- *Beat:* Generates a click on each beat.
- *Division:* Generates a click on each 16th note.

Sound

Note and velocity are the parameters of the MIDI notes generated by the metronome and sent to the Klopfgeist plug-in that produces the sound. They can be set individually for each of the four note events and determine the sound of the clicks. See Klopfgeist plug-in.

- *Note field:* Defines the MIDI note number of the corresponding notes and, therefore, the pitch of the note events.
- *Velocity field:* Defines the velocity of the corresponding MIDI notes.

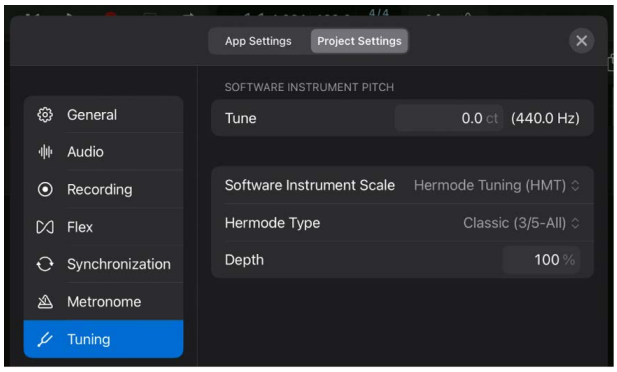
  Using a higher velocity for the Bar than the Beat events creates accents on the downbeat.

The following parameters adjust the controls of the Klopfgeist plug-in and the channel strip it is loaded on. The adjustments affect the sound of all clicks.

- *Tone field:* Adjusts the tonality parameter of the Klopfgeist plug-in on the Click channel strip to change the sound from a short click to a pitched percussion sound, similar to a wood block or claves.
- *Volume field:* Sets the output level of the click sound.
- *Output pop-up menu:* Allows you to route the click sound to a different set of output channels if the audio hardware has more than two outputs. See Multichannel audio devices.

Tip: Touch and hold the Metronome button in the control bar and choose Metronome Settings to open the Metronome project settings.

Tuning project settings in Logic Pro for iPad



Logic Pro for iPad includes a real-time tuning system for use with the included software instruments. You can change the tuning system in the Tuning project settings.

Software instrument pitch

- *Tune field:* Determines the global tuning of all software instruments. Detuning is in ± cent (1/100 of a semitone) steps. The default value of 0 cents refers to the concert pitch A (440 Hz).
- *Software Instrument Scale pop-up menu:* Choose from two different tuning scales:
  - *Equal Tempered:* Equal tempered is the most commonly used scale in classical music and Western music today.
  - *Hermode Tuning (HMT):* A microtonal tuning system that adjusts 3rd, 5th, and 7th intervals to make them sound harmonically richer.

- *Hermode Type pop-up menu:* Only displayed when you choose Hermode Tuning (HMT) from the Software Instrument Scale pop-up menu.
  - *Pop/Jazz (3/5/7-All):* 3rds, 5ths, and 7ths are changed in this mode. It's great for pop and jazz styles, especially when using sustained chords. It's less suitable for polyphonic music because the detuning of the natural 7th is significant. This mode should always be used with a Depth of 90% or 100% because other values render the natural 7th acoustically ineffective.
  - *Classic (3/5-All):* This mode provides a broad and regular tuning of pure 3rds and 5ths. In cases of conflict, the degree of purity is temporarily reduced. This mode can be used for all types of music. The value of the Depth parameter indicates the degree of the 3rd and 5th purity. A setting of 100% determines maximum purity. A 10% value is the lowest purity setting. Off sets the tuning to an equal tempered scale.
  - *Baroque (3/5-Adaptive):* This mode tunes pure 3rds and 5ths (with changing characteristics). In tonal music, with a clear harmonic center, the middle chords are tuned very purely, whereas more distant chords are tuned with less purity. If the harmonic center becomes unclear, all chords are tuned with equal purity. As with the other mode parameters, a Depth value of 100% determines the highest purity, and a value of 10%, the lowest purity.
- *Depth field:* Only displayed when you choose Hermode Tuning (HMT) from the Software Instrument Scale pop-up menu. It allows you to set the degrees of 3rd and 5th purity between 0% and 100%.

Logic Pro for iPad settings in the Settings app

In addition to the settings in Logic Pro for iPad, you can configure a few more options in the Settings app on your iPad.

Allow Logic Pro to access the microphone

Use the Settings app to allow Logic Pro to access various software and hardware components on your iPad. For example, to use your iPad's built-in microphone to record in Logic Pro, you have to allow it with the Settings app.

Logic Pro settings

- *MIDI 2.0 switch:* Turn on to receive, record, and play back MIDI data using the newer MIDI 2.0 protocol. This applies to MIDI 2.0 capable software instruments and external MIDI hardware.
- Reset Logic Pro switch: Tap the switch to reset Logic Pro to its original settings the next time you open it.

Privacy

- *Reset Identifier switch:* Tap the switch to reset the identifier used by Logic Pro to report statistics to Apple. The identifier resets the next time you open Logic Pro.

Access the Logic Pro for iPad settings in the Settings app

1. On the iPad Home Screen, tap the Settings app to open it.
2. Do any of the following:
   - In the sidebar, scroll through the list until you see Logic Pro, then tap it.
   - Scroll up in the sidebar, tap the search field, enter “Logic Pro,” then close the keyboard.
   - In the sidebar, tap the Microphone button in the search field, say “Logic Pro,” then close the keyboard.

Note: You should turn off Low Power mode on your iPad when using Logic Pro for iPad, especially with projects that use many tracks and plug-ins. See Use Low Power Mode to save battery life on your iPhone or iPad.

Gestures

Overview of gestures in Logic Pro for iPad

Gestures let you directly manipulate onscreen objects with your fingers to interact with an app without needing any additional input devices, such as a keyboard, mouse, or trackpad.

You control Logic Pro for iPad using the same simple gestures you use with any iPad app.

Gesture	Function
Tap	Quickly touch and release to select a control or item; equivalent to clicking on a Mac.
Double-tap	Tap an item twice.
Touch and hold	Touch an item on the screen until something happens.
Swipe	Move one or more fingers across the screen quickly. The gesture requires a specific start position but no particular end position.
Scroll	Move one finger across the screen without lifting.
Drag	Move one finger across the screen to drag items or controls, or pan around items. The gesture has a specific start and end position.
Pinch	Place two fingers on the screen near each other. Spread them apart to zoom in, or move them toward each other to zoom out.

You can use additional gestures to interact with the Logic Pro interface.

Multi-Touch gestures

Logic Pro supports Multi-Touch gestures, using two or more fingers on the screen to move multiple objects or use multiple gestures at the same time:

- *Momentary buttons:* To momentarily switch to a specific edit mode, touch and hold a function button or modifier button with one finger, perform a task with another gesture, then release the button. See Work with function buttons.
- *Play Surfaces:* You can use Multi-Touch gestures when playing the various Play Surfaces, such as keyboards, strings, or drums. See Intro to Play Surfaces.
- *Mixer:* Use multiple fingers to control faders, knobs, and buttons in the Mixer at the same time, the way you would operate a hardware mixing console.
- *Plug-ins:* You can also use Multi-Touch gestures to create a live performance with effect plug-ins (such as Remix FX) in a more intuitive and interactive way.

External input devices

Although you can fully operate Logic Pro for iPad by using only your fingers on the screen, you can add external input devices to your iPad that work similarly to gestures or extend their functionality and add precision.

- *Trackpad:* Use the same gestures as on your touchscreen.
- *Apple Pencil:* You can use Apple Pencil for one-finger gestures, which allows for more precise tap and drag operations. See Automation drawing tools. You can also use it as a text input device with handwriting for naming tracks or regions in the inspector.
- *External alphanumeric keyboard:* Use it for text and number input and triggering keyboard shortcuts.
- *External hardware MIDI controller (wired or wireless):* Record MIDI regions or use to write automation.
- *iPad apps:* You can use other apps running on the iPad as input devices to record MIDI or control Logic Pro.

Gestures tables

Drag gestures in Logic Pro for iPad

Logic Pro for iPad has a few special gestures that you use when dragging items, such as regions, MIDI notes, automation points, and tracks in the tracks list.

Gesture	Function
Drag a selected item	Tap an item to select it, then drag it.
Drag an unselected item	When you touch an unselected item, you have to wait a split second for it to be selected (or for an alignment guide to appear) before you drag it. If the item is not selected, you scroll the working area when dragging.
Touch and hold a region, then drag it	When you wait for a second between touching the region and dragging it, it changes to a different gesture (touch and hold, then drag.) Instead of dragging the region along the track lanes, you can only drag the region over a track header in the track list to add it to a sampler instrument. A banner appears over the control bar indicating the actions, and a waveform icon separates from the region to follow your finger movement.
Touch and hold a trim handle, then drag it	If you wait for one second after you touch and hold the trim handle of a region or a MIDI note, the working area zooms in so that you can perform the drag gesture more precisely. Once you release the region or note, the working area zooms out again.

Main gestures in Logic Pro for iPad

Gesture	Function	Remarks
Swipe down on dialog	Close dialog	Examples include the Settings dialog and Export dialog.
Double-tap view control bar	Close all views except Tracks area/ Live Loops grid	
Drag resize handle ═ or menu bar	Vertically resize area	Drag all the way up to hide the Tracks area completely. Drag all the way down to close the area.
Tap resize handle ═	Switch the vertical size of the area between the default position and the maximum position	The maximum position reduces the Tracks area to a single mini track, or when dragged all the way up, hides the Tracks area completely.
Drag up the view control bar	Open the Play Surfaces area	Once the Play Surfaces area is open, you can also drag the view control bar to resize the Play Surfaces area vertically or drag it all the way down to close it.
Tap double arrow ⇕	Open the pop-up menu	

Gesture	Function	Remarks
Tap left arrow	Step up display level	The exception is the Projects Browser button, in the top-left corner of the screen, which closes the project.
Tap disclosure arrow	Show or hide items	Examples include inspector categories, track stack, and Step Sequencer subrows.
Tap name field	Highlight the text field to enter a new name	Examples include the track name and region name in the inspector.
Tap color well	Show or hide the Color palette	Examples include the track color in the inspector.
Drag up/down in number field	Increase or decrease numeric value	With multiple selected items, values increase or decrease proportionally.

Shortcut menu gestures in Logic Pro for iPad

Gesture	Function	Remarks
Touch and hold control bar buttons	Open shortcut menus	The gesture works for Play, Record, Cycle, Count-in, and Metronome buttons.
Touch and hold selected item	Open shortcut menu of selected item	The gesture works on regions, MIDI notes, automation points, and track icons.
Touch and hold working area background	Open shortcut menu of working area	All items (such as regions, notes, or automation points) must be deselected.

Tracks area gestures in Logic Pro for iPad

Gesture	Function	Remarks
Pinch Tracks area or Live Loops grid vertically	Zoom vertically in the Tracks area or Live Loops grid	
Double-tap a track icon in the track header	Open and close the Plug-ins area and Play Surfaces	On audio tracks, only the Plug-ins area opens.
Tap the icon of the selected track	Open the Select Track menu to choose a track	Available if the Tracks area is resized to show only one track.
Double-tap the ruler	Start playback at the tap position or stop playback	Also works in the Audio Editor, Piano Roll Editor, and Cell Editor.
Touch and hold a region trim handle	Automatically zoom in on the region (release to automatically zoom back out)	Also works on note events in the Piano Roll Editor.

Mixer gestures in Logic Pro for iPad

Gesture	Function	Remarks
Double-tap slider or knob	Reset to default position	Also works on plug-in controls and track header Volume sliders.
Multi-Touch gestures on objects	Use multiple fingers to adjust more than one fader or knob at the same time	

Plug-ins area gestures in Logic Pro for iPad

Gesture	Function
Tap an unselected plug-in tile	Select the plug-in tile
Tap a selected plug-in tile	Open the plug-in Details view
Double-tap a plug-in tile	Open the plug-in Details view
Touch and hold a plug-in tile	Open the plug-in shortcut menu
Drag down the Plug-ins area menu bar	Close the Plug-ins area

Beat Breaker gestures in Logic Pro for iPad

Gesture	Function
Swipe up or down on a Pattern slot in Pattern Edit mode	Load next or previous pattern

Special gestures in Logic Pro for iPad

Gesture	Function
Touch and hold the Logic Pro for iPad app on the Home Screen	Display menu to tap a recently opened project to open it

External input devices

Use external input devices with Logic Pro for iPad

You can operate Logic Pro for iPad using just your fingers without external input devices, such as a trackpad or a keyboard. However, you can enhance the user experience by connecting external devices to control various aspects of your project.

Logic Pro for iPad supports the following type of devices:

- *Apple Pencil:* Check the Apple website to find out which iPad model supports which Apple Pencil model and what features.
- *Keyboard:* You can use a Bluetooth or USB keyboard connected to your iPad, or turn on Universal Control to use the keyboard of your nearby computer as an input device for your iPad.
- *Trackpad:* You can use a trackpad connected to your iPad or use the trackpad of your nearby computer via Universal Control to move the trackpad pointer between your computer screen and the iPad screen.

See Pair a third-party Bluetooth accessory with your iPhone or iPad.

Use Apple Pencil with Logic Pro for iPad

You can use Apple Pencil with Logic Pro for iPad for various tasks.

Key focus

Similar to an external keyboard, when Apple Pencil is connected, Logic Pro displays a frame around the working area that currently has key focus.

Basic one-finger gestures

Any gesture you perform with one finger (tap, double-tap, touch and hold, or drag) can also be performed with Apple Pencil. This provides more precise editing when you're drawing automation curves or adjusting regions and note events.

Handwriting

Instead of using your keyboard to enter text in a text field, you can write with Apple Pencil in that field, and Scribble automatically converts your handwriting into typed text. You can use it to name tracks in the Tracks area and in Step Sequencer, or to name tracks, regions, cells, and Mixer groups in the inspector.

Important: Scribble has to be turned on in the Apple Pencil settings of the iPad Settings app.

Double-tap on Apple Pencil side

A double-tap on the side of Apple Pencil toggles between two edit modes, automatically selecting the corresponding button in the menu bar. This function is supported in the Tracks area, Live Loops grid, Editors area, and Mixer.

Logic Pro uses two memory locations to dynamically store two edit modes, and by double-tapping, you recall one or the other.

- *Active edit mode:* This is the currently selected function button. Tapping a different button (with your finger or the Apple Pencil), changes the edit mode reflected by the highlighted button.
- *Previous edit mode:* This memory location stores the edit mode that was previously active when you used the double-tap on Apple Pencil.

Apple Pencil hover

Apple Pencil (2nd generation) and Apple Pencil Pro can interact with Logic Pro by hovering over the screen without touching it. Apple Pencil hover works with iPad Pro 13-inch (M4), iPad Pro 12.9-inch (6th generation), iPad Pro 11-inch (M4), iPad Pro 11-inch (4th generation), iPad Air 13-inch (M2), and iPad Air 11-inch (M2).

Use an external keyboard with Logic Pro for iPad

Logic Pro for iPad utilizes the iPad's onscreen keyboard for any text input. In addition, you can connect an external keyboard via Bluetooth or USB, or turn on Universal Control to use the keyboard of your nearby computer. See Universal Control: Use a single keyboard and mouse between Mac and iPad.

You can use the external keyboard for the following tasks:

- *Text input:* Whenever a step in Logic Pro requires text input, you can start typing on your external keyboard. The onscreen keyboard is not displayed.
- *Numeric input:* You can use the keyboard to type in numbers whenever the numeric input dialog is visible.
- *Modifier keys:* You can use the external keyboard together with Multi-Touch gestures on your iPad. Pressing the Shift key on the keyboard turns on the Multiple Select button , and pressing the Option key turns on the Copy button (or the Stepped Automation button in Automation view or the On/Off button in the Mixer).
- *Keyboard shortcuts:* Logic Pro for iPad supports many keyboard shortcuts that you can trigger with your external keyboard. See Overview of keyboard shortcuts.

Use a trackpad with Logic Pro for iPad

Using a trackpad with Logic Pro for iPad feels like working on a desktop computer because you have a visible pointer on the iPad screen that you control by moving your finger on the trackpad.

Standard trackpad gestures are supported:

- *Click an item:* Select or deselect an item, such as a region, cell, note event, or automation point. In a Play Surface, you click keys, strings, pads, or strips to play them.
- *Control-click an item (secondary click):* Opens the shortcut menu of an item, such as a region, cell, note event, or automation point.

  You can click with two fingers on a trackpad as a secondary click, and with Universal Control, you can configure macOS System Settings to also use the gesture "Tap with Two Fingers."
- *Drag and drop:* Move items, such as regions, note events, loops, or patches; draw items, such as note events or automation points; and adjust controls, such as knobs and sliders.
- *Two-finger scroll:* Drag with two fingers to scroll areas horizontally and vertically.
- *Pinch*: Whereas the pinch gesture on the iPad lets you zoom areas both horizontally and vertically, the pinch gesture on the trackpad only supports horizontal zoom. You can press and hold the Shift key on your external keyboard while pinching on the trackpad to zoom vertically in the Tracks area and Editors area.
- *External modifier keys:* If you have an external keyboard and a trackpad connected, you can use the various modifier keys to change the functionality of the trackpad gestures. For example, you can Option-drag to copy items or Shift-click to select multiple items.

Keyboard shortcuts

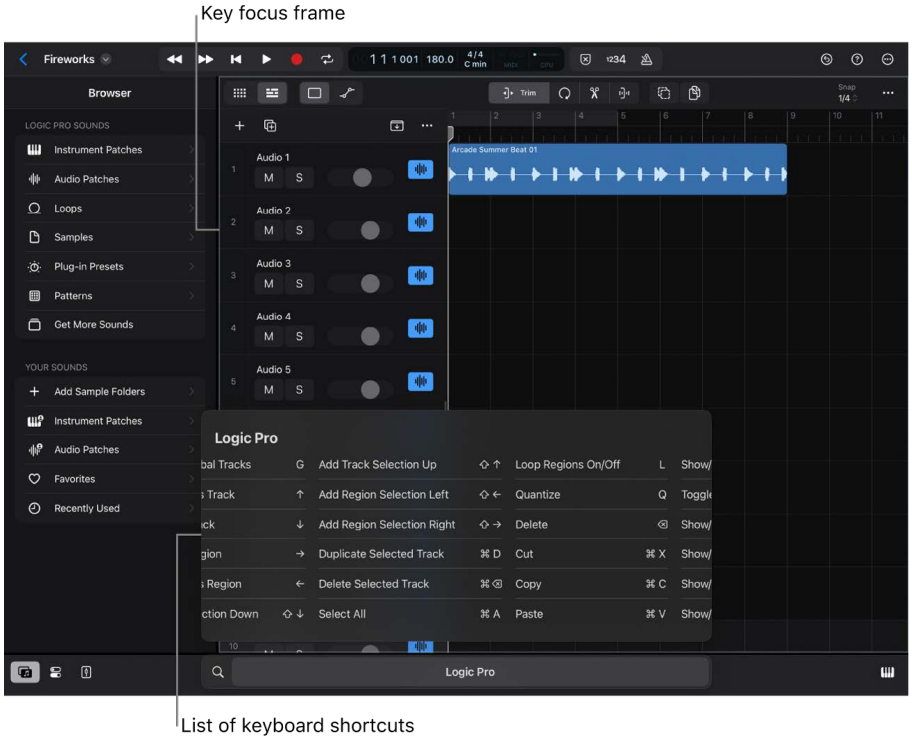
Overview of keyboard shortcuts in Logic Pro for iPad

You can perform various functions in Logic Pro for iPad using an external computer keyboard with your iPad. Keyboard shortcuts may consist of either a single alphanumeric key or an alphanumeric key and one or more modifier keys (Fn, Shift, Control, Option, and Command). The keyboard shortcuts show the symbols for the corresponding modifier keys.

Tip: With the Universal Control feature in macOS, you can use the keyboard and trackpad on your desktop or laptop computer to control Logic Pro on your iPad. Move your mouse pointer against the edge of your computer screen, and it appears on your iPad screen.

Modifier key	Symbol
Command	⌘
Shift	⇧
Option	⌥
Control	⌃
Function	Fn (🌐)

A gray frame around an area or view in Logic Pro indicates that the area has key focus. This is the target of the keyboard shortcut.



Show the keyboard shortcuts

1. Press and hold the Command key ⌘ on your external keyboard until the page appears.

   Only keyboard shortcuts that are relevant to the area that has focus are displayed.

2. Swipe left or right on the iPad to browse through the list.
3. Press the arrow keys on your keyboard to navigate the list, then press Return to execute the selected command.

To close the keyboard shortcuts, do one of the following:

- Press the Command key ⌘ on your external keyboard.
- Press the Esc key on your external keyboard.
- Tap outside the list.

Search for a keyboard shortcut

1. Press and hold the Command key ⌘ on your external keyboard until the keyboard shortcuts appear.
2. Press Shift-Command-/.

   You can also tap the Search button.
3. Start typing the first few letters of the shortcut's name. As you type, the matching keyboard shortcuts are listed.
4. To proceed, do any of the following:

   - Press the Esc key to close the search field and return to the keyboard shortcuts. You can also tap Cancel next to the search field.
   - Tap outside the search field or press Esc twice to close the keyboard shortcuts.

Keyboard shortcuts tables

Keyboard shortcuts for the main views in Logic Pro for iPad

Function	Keyboard shortcut
Show/Hide Logic Pro for iPad Keyboard Shortcuts	Command (press and hold)
Show/Hide System Keyboard Shortcuts	Fn (press and hold)
Close Menu or Dialog	Esc
Quit Logic Pro for iPad	Command-W
Show/Hide Browser	Y
Show/Hide Inspector	I
Show/Hide Fader	V
Show/Hide Editor	E
Show/Hide Plug-ins Area	B
Show/Hide Mixer	X
Show/Hide Play Surface	P
Change Focus to Next Area	Tab
Change Focus to Previous Area	Shift-Tab
Play/Pause	Space bar
Go to Beginning	Return
Forward (1 bar)	Period (.)
Fast Forward (8 bars)	Shift-Period (.)
Rewind (1 bar)	Comma (,)
Fast Rewind (8 bars)	Shift-Comma (,)
Record	R
Solo	S
Mute	M
Toggle Cycle Mode	C
Metronome Click	K
Toggle Count In	Shift-K
Learn MIDI	Command-L
Search and Add Plug-in	Control-Command-P
Search and Select Track	Control-Command-T
Select All	Command-A

Function	Keyboard shortcut
Delete	Delete
Cut	Command-X
Copy	Command-C
Paste	Command-V
Undo	Command-Z
Redo	Shift-Command-Z
Turn on Multiple Select Mode Momentarily	Shift (press and hold)
Turn on Copy Mode Momentarily	Option (press and hold)
Turn on Stepped Automation Mode Momentarily (Automation view)	Option (press and hold)
Turn on On/Off Mode Momentarily (Mixer)	Option (press and hold)
Mute Playback Volume	F10
Decrease Playback Volume	F11
Increase Playback Volume	F12

Keyboard shortcuts for the Tracks area in Logic Pro for iPad

Function	Keyboard shortcut
Show/Hide Automation	A
Show/Hide Global Tracks	G
Select Previous Track	Up Arrow
Select Next Track	Down Arrow
Add Track Selection Up	Shift-Up Arrow
Add Track Selection Down	Shift-Down Arrow
Select Previous Region	Left Arrow
Select Next Region	Right Arrow
Add Region Selection Left	Shift-Left Arrow
Add Region Selection Right	Shift-Right Arrow
Loop Regions On/Off	L
Quantize	Q
Duplicate Selected Track	Command-D
Delete Selected Track	Command-Delete

Function	Keyboard shortcut
Toggle Live Loops and Tracks Area	T
Move Highlighted Name Field to Next Track	Tab
Move Highlighted Name Field to Previous Track	Shift-Tab
Select next chord when Chord Editor is open	Tab
Select previous chord when Chord Editor is open	Shift-Tab

Keyboard shortcuts for the Live Loops grid in Logic Pro for iPad

Function	Keyboard shortcut
Select Upper Cell or Previous Track	Up Arrow
Select Lower Cell or Next Track	Down Arrow
Select Previous Cell or Scene	Left Arrow
Select Next Cell or Scene	Right Arrow
Add Cell or Track Selection Up	Shift-Up Arrow
Add Cell or Track Selection Down	Shift-Down Arrow
Add Cell or Scene Selection Left	Shift-Left Arrow
Add Cell or Scene Selection Right	Shift-Right Arrow
Trigger Cells or Scene	Return
Switch to Cell Play Mode	Command-1
Switch to Cell Recording Mode	Command-3
Repeat Cell	Shift-Command-D
Toggle Live Loops and Tracks Area	T

Keyboard shortcuts for Step Sequencer in Logic Pro for iPad

Function	Keyboard shortcut
Select Step Above	Up Arrow
Select Step Below	Down Arrow
Select Previous Step	Left Arrow
Select Next Step	Right Arrow
Repeat Step	Command-R
Clear Row	Control-Command-Delete

Function	Keyboard shortcut
Copy Row	Control-Shift-C
Paste Row	Control-Shift-V
Paste Steps	Shift-Command-V
Paste Row Config	Option-Shift-V
Duplicate Row	Command-D
Delete Row	Command-Delete
Clear Pattern	Control-Shift-Command-Delete
Preview	Option-Space bar
Live Record	Shift-R

Keyboard shortcuts for the Mixer in Logic Pro for iPad

Function	Keyboard shortcut
Select Previous Channel Strip	Left Arrow
Select Next Channel Strip	Right Arrow
Add Channel Selection Left	Shift-Left Arrow
Add Channel Selection Right	Shift-Right Arrow
Enable/Disable Groups	Shift-G
Move Highlighted Name Field to Next Channel Strip	Tab
Move Highlighted Name Field to Previous Channel Strip	Shift-Tab
Search and Add Plug-in	Control-Command-P

Keyboard shortcuts for the Browser in Logic Pro for iPad

Function	Keyboard shortcut
Select Previous Item	Up Arrow
Select Next Item	Down Arrow

Keyboard shortcuts for the Projects browser in Logic Pro for iPad

Function	Keyboard shortcut
Create Document (Logic Pro project)	Command-N
New Folder	Shift-Command-N
New Folder with Selection	Control-Command-N
Select Item Above	Up Arrow
Select Item Below	Down Arrow
Select Time to the Right	Right Arrow
Select Time to the Left	Left Arrow
Show/Hide Sidebar	Control-Command-S
Swap Focus Between Sidebar and Browser	Tab
Open	Command-O
Save	Command-S
Get Info	Command-I
Rename	Return
Duplicate	Command-D
Show in Enclosing Folder	Command-R
Favorite	Control-Command-T
Delete	Command-Delete
Eject	Command-E
Find	Command-F
Undo	Command-Z
Redo	Shift-Command-Z
Copy	Command-C
Paste	Command-V
Select All	Command-A
View as Icons	Command-1
View as List	Command-2
View as Column	Command-3
Use Groups	Control-Command-0
Sort by Name	Control-Option-Command-1
Sort by Kind	Control-Option-Command-2
Sort by Date	Control-Option-Command-5

Function	Keyboard shortcut
Sort by Size	Control-Option-Command-6
Sort by Tags	Control-Option-Command-7
Group by Kind	Control-Command-2
Group by Date	Control-Command-5
Group by Size	Control-Command-6
Group by Shared by	Control-Command-8
Go to Enclosing Folder	Command-Up Arrow
Go Back	Command-Left Bracket ([)
Go Forward	Command-Right Bracket (])
Go to Recents	Shift-Command-F
Go to Documents	Shift-Command-O
Go to Desktop	Shift-Command-D
Go to Downloads	Option-Command-L
Go to Shared	Shift-Command-S
Go to iCloud Drive	Shift-Command-I
Go to Folder…	Shift-Command-G
Connect to Server…	Command-K

Keyboard shortcuts for the numeric input dialog in Logic Pro for iPad

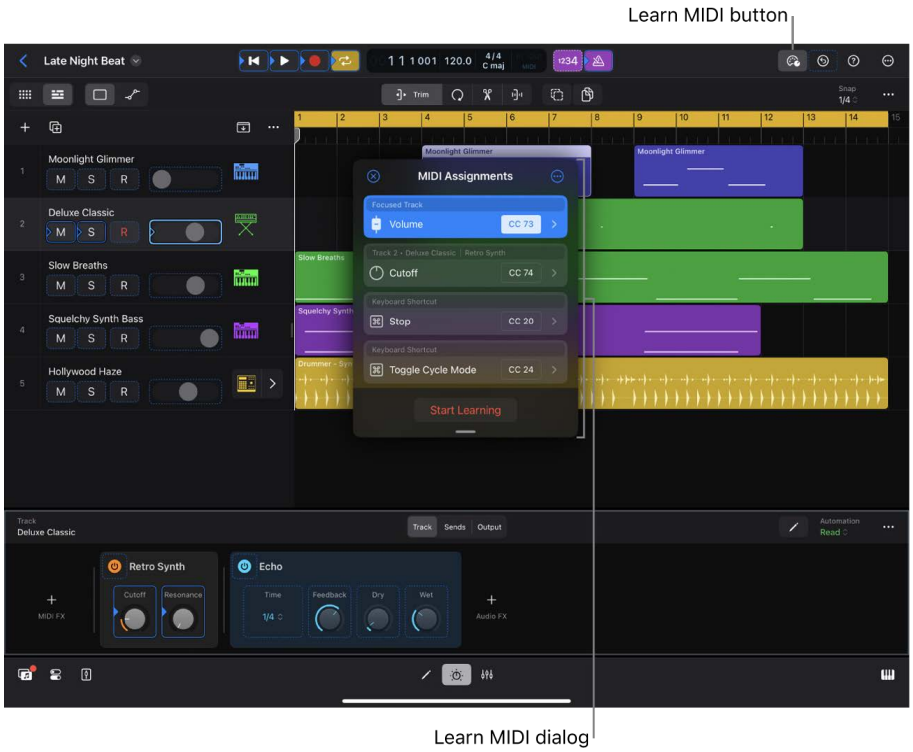
Function	Keyboard shortcut
Select Previous Value	Left Arrow
Select Next Value	Right Arrow
Select Next Value	Tab
Increase Selected Value by 1	Up Arrow
Decrease Selected Value by 1	Down Arrow
Enter Numeric Value	0 to 9
Switch Between Positive and Negative Values	Minus
Delete Rightmost Digit or Set to 1	Delete
Apply Value	Return
Close Dialog (if onscreen Return button is inactive)	Return

Use Learn MIDI to assign hardware controls

Intro to Learn MIDI in Logic Pro for iPad

Assigning hardware controls to Logic Pro for iPad lets you use faders, knobs, switches, and other physical controls to remotely adjust functions and plug-in parameters in Logic Pro.

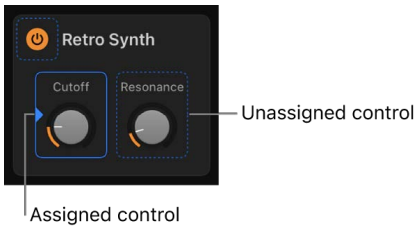
You create assignments using a manual process called Learn MIDI, in which MIDI messages sent from a controller are assigned to controls and parameters in Logic Pro. To use Learn MIDI, first connect a MIDI controller to your iPad. You can use any controller capable of generating MIDI messages. See Connect external devices.



The Learn MIDI dialog is where you create, delete, and edit assignments. Each assignment is displayed in a control row, along with additional information about the assignment. For more information, see Create an assignment, Delete a Learn MIDI assignment, and Intro to editing an assignment.

When the Learn MIDI dialog is open, outlines appear around all learnable Logic Pro controls to indicate their state. Unassigned controls have a dotted outline, and assigned controls have a solid outline with an arrow. The outline's color indicates the control's current state:

- *Dark blue:* The control is not selected.
- *Bright blue:* The control is selected.
- *Red:* Learning is active and the control or parameter is selected for assignment.



Open the Learn MIDI dialog

- In Logic Pro, do one of the following:
  - Tap the More button in the control bar, then tap Learn MIDI.

    If you don't see this option, you already have the Learn MIDI button in the control bar.
  - Tap the Learn MIDI button in the control bar.

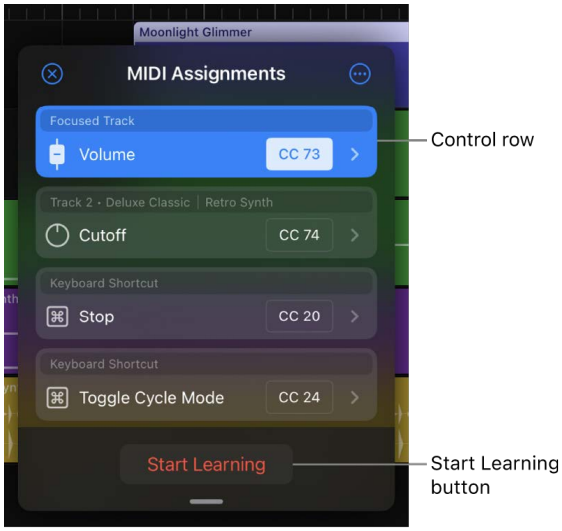
    Note: If the Learn MIDI button is not visible in the control bar, you can customize the control bar to add it. See Change the controls in the control bar.

The Learn MIDI dialog opens and learning is active.

Create an assignment with Learn MIDI in Logic Pro for iPad

With Learn MIDI, you move a physical control on your MIDI controller and tap or move a learnable function or plug-in parameter in Logic Pro for iPad—in either order—to create an assignment between the two. Learn MIDI features three types of assignments: plug-in assignments, channel strip assignments, and keyboard shortcut assignments.

You create assignments using the Learn MIDI dialog. When you move or touch a control in Logic Pro or on your controller, the Learn MIDI dialog displays a control row containing the control's name or the MIDI message sent by the controller. You complete an assignment by touching a control on your MIDI controller or a learnable control in Logic Pro while learning is active. For each completed assignment, the control row displays the assignment type, the Logic Pro control name, and the controller's MIDI message, as well as additional information along the top.

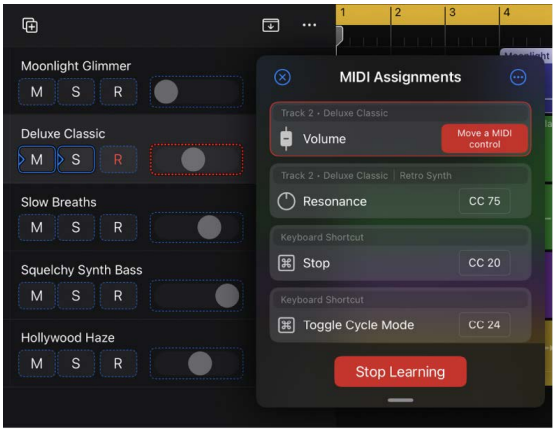


After creating an assignment, you can reassign the onscreen control or MIDI message, edit the assignment's settings, and delete an assignment.

To use Learn MIDI, first connect a MIDI controller. See Connect external devices.

Create an assignment

1. In the Learn MIDI dialog, tap the Start Learning button, if it isn't already on.
2. Touch or move a control in Logic Pro or on your MIDI device.



3. Touch or move a control on your MIDI device or in Logic Pro.
4. Tap the Stop Learning button to complete the assignment.

   If you don't tap the Stop Learning button, learning remains active, allowing you to make further assignments.

To make another assignment after you've ended learning, tap the Start Learning button again, then repeat steps 2 through 4.

Create an assignment for a keyboard shortcut

You can perform various functions in Logic Pro using keyboard shortcuts assigned to your MIDI controller. Some of these, such as play, are assigned using the onscreen control; others, such as copy and paste, are assigned using a menu in the Learn MIDI dialog.

1. In the Learn MIDI dialog, tap the Start Learning button, if it isn't already on.
2. Tap the More button in the Learn MIDI dialog, tap Create Assignment to Keyboard Shortcut, then choose a keyboard shortcut.
3. Touch or move a control on your MIDI device.
4. Tap the Stop Learning button to complete the assignment.

Create an assignment with a MIDI note message

Learn MIDI ignores note messages while learning is active, which allows you to play software instruments while making assignments. However, you can change this setting so that you can create assignments for buttons that send note messages, or for knobs and faders that use note messages for touch and release messages.

- In the Learn MIDI dialog, tap the More button, then turn off Ignore MIDI Notes While Learning.

You can then assign note messages to controls in Logic Pro in the same way that you assign other hardware controls.

Create an assignment for controls with multiple parameters

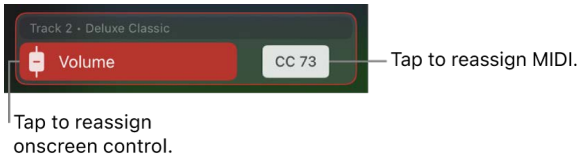
You can create assignments for controls that have multiple parameters, such as the XY pad in Phat FX or the EQ band for Channel EQ.

1. In the Learn MIDI dialog, tap the Start Learning button, if it isn't already on.
2. Tap or drag the control point or EQ band in Logic Pro.

   A control row for each parameter is shown in the Learn MIDI dialog.
3. For each parameter, tap the MIDI value in its control row, then touch or move a control on your MIDI device.
4. Tap the Stop Learning button to complete the assignment.

Reassign an assignment

1. In the Learn MIDI dialog, tap the Start Learning button.
2. Do one of the following:
   - Tap the control name in the control row that you want to reassign.
   - Tap the MIDI value in the control row that you want to reassign.



3. Touch or move a control in Logic Pro or on your MIDI device.
4. Tap the Stop Learning button to complete the reassignment.

Assignments are saved automatically during the learning process. Focused-track assignments are saved globally with the app, allowing you to use assignments in all your projects. Pinned assignments are saved locally with the current project. For information about focused-track assignments and pinned assignments, see Set a Learn MIDI assignment to pinned or focused.

If you delete the Logic Pro app and its data, you also delete any focused-track assignments you made.

Delete a Learn MIDI assignment in Logic Pro for iPad

You can delete a single Learn MIDI assignment, all project assignments, and all assignments in Logic Pro for iPad. You can't restore assignments after you've deleted them.

Delete an assignment

- In the Learn MIDI dialog, do either of the following:
  - Swipe a control row left.
  - While the learning process isn't active, tap a control row to select it, tap it again, tap Delete Assignment in the Edit Assignment view, then tap Delete.

Delete all project assignments

You can delete all project (pinned) assignments for the currently open project. For more information about project assignments, see Set a Learn MIDI assignment to pinned or focused.

- In the Learn MIDI dialog, tap the More button ⋯, tap Delete All Project Assignments, then tap Delete.

Delete all assignments

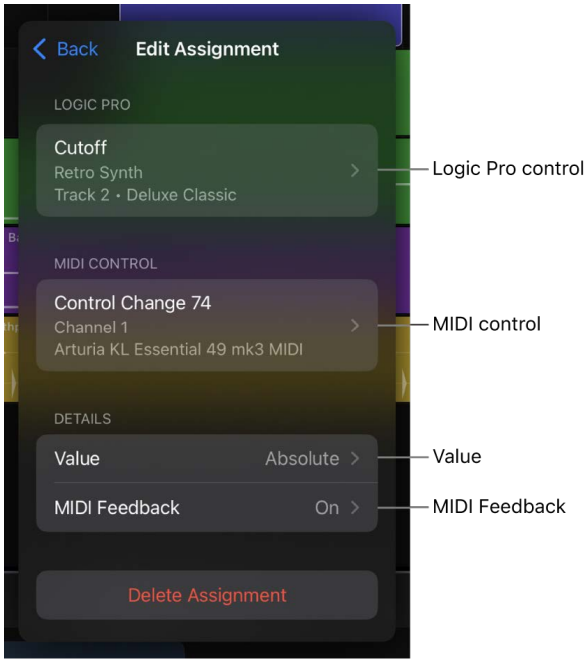
You can delete all globally and locally saved assignments.

- In the Learn MIDI dialog, tap the More button ⋯, tap Delete All Assignments, then tap Delete.

Edit an assignment in Learn MIDI

Intro to editing an assignment in Learn MIDI in Logic Pro for iPad

With Learn MIDI in Logic Pro for iPad, you can edit an assignment's details to make advanced control assignments. You do this in the Edit Assignment view of the Learn MIDI dialog.



The Edit Assignment view contains the following settings for the selected assignment:

- Logic Pro *control:* Displays the name of the assigned control in Logic Pro. For channel strip and track header assignments, track information is also shown. See Set a Learn MIDI assignment to pinned or focused.
- *MIDI control:* Displays the MIDI message, the MIDI channel, and the name of the MIDI device for the assignment. See Edit the MIDI control settings with Learn MIDI.
- *Value:* Displays the value behavior of the assignment. Logic Pro automatically detects the behavior of certain MIDI controls and applies a default configuration depending on the assignment's control. You can change the detected behavior by editing the value behavior. See Edit the behavior of continuous control assignments, Edit the behavior of relative encoder assignments, and Edit the behavior of button and switch.
- *MIDI Feedback:* Send visual feedback for supported MIDI controllers. See Visual feedback for MIDI devices.
- *Delete Assignment button:* Delete the assignment. See Delete a Learn MIDI assignment.

View an assignment's details

- While the learning process isn't active, tap a control row to select it, then tap it again.

Set a Learn MIDI assignment to pinned or focused in Logic Pro for iPad

In Learn MIDI in Logic Pro for iPad, assignments for track header and plug-in controls can be pinned to a specific track or plug-in control in a project, or they can apply to the currently focused track in any project.

Pinned assignments work only with a specific track or plug-in instance in the project. You can use pinned assignments regardless of the current focus. This can be useful if you have a controller with columns of controls, such as a mixer, that you want to assign to specific tracks. Pinned assignments are saved locally with the project and can be used only in the project where the assignment was made.

Focused-track assignments apply to the currently focused track, if the track or plug-in contains the parameter. For example, if you set an assignment for the Mute button in a track header to apply to the focused track, you can use the assignment to mute any track by selecting the track to give it focus, then using the assigned MIDI control to mute the track. If a track or plug-in that doesn't have the parameter is given focus, you can't use the assignment. Focused-track assignments are saved globally with the app and can be used in all your projects.

Set an assignment to pinned or focused

- In the Edit Assignment view in the Learn MIDI dialog, tap the Logic Pro control, then choose Pinned to Track or Focused Track.

  When you choose Focused Track, the arrow in the outline around the assigned onscreen control changes from solid to outlined.

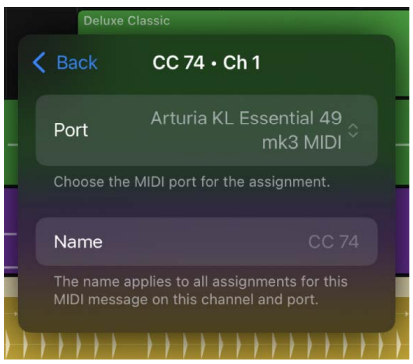
Prefer Focused Track mode when creating assignments

You can change the default setting for new assignments from Pinned to Track to Prefer Focused Track.

- In the Learn MIDI dialog, tap the More button ⋯, then tap Prefer Focused Track Mode for New Assignments.

Edit the MIDI control settings with Learn MIDI in Logic Pro for iPad

In the MIDI control settings, you can change the MIDI port and set a name for the MIDI control in Learn MIDI in Logic Pro for iPad.



MIDI control settings

- *Port pop-up menu:* Choose another MIDI input port for the assignment.

  Note: Changing the port may cause the assignment to function incorrectly.

- *Name field:* Enter a name for the MIDI control. This name is displayed in the control row of the assignment and any other assignment that uses this MIDI message on the same channel and port. Renaming the MIDI control makes it easier for you to identify which controls are used on your MIDI device for the assignment. For example, if your MIDI device has labels for its knobs, you can enter the names in the Name fields of each assignment for quicker identification.

Edit value behaviors

Intro to editing value behaviors in Learn MIDI in Logic Pro for iPad

When you create a Learn MIDI assignment, Logic Pro for iPad automatically detects the type and behavior of the MIDI control, such as a fader that sends absolute MIDI messages, a relative encoder, or a button. However, you can change the behavior manually.

Some MIDI controllers use control change (CC) messages to encode relative rotary encoder data, or to represent buttons, which only have on and off states. In Learn MIDI, you can manually set the MIDI behavior of these kinds of controls to correct instances where Logic Pro has incorrectly detected the behavior.

You can also choose a different press-and-release behavior for button assignments. For example, in a scenario where you're recording a Live Loops performance or automation for a region, you might want to unmute a track by releasing a button instead of pressing it.

Change the behavior for a MIDI hardware control

1. In the Edit Assignment view of the Learn MIDI dialog, tap Value.
2. Tap the MIDI Behavior pop-up menu. Different options appear depending on the type of MIDI control that's assigned:
   - *Absolute (Knob/Fader):* This is used for controls that send absolute MIDI messages, such as knobs, faders, wheels, and touch strips. See Edit the behavior of absolute (knob/fader) assignments.
   - *Relative (Encoder Knob):* This is used for endless rotary encoders. See Edit the behavior of relative encoder assignments.
   - *Toggle (Button)*: This is used for buttons and switches. See Edit the behavior of button and switch assignments.
   - *Trigger:* This is used for buttons and switches that send a MIDI message only when pressed.

When you open a project with assignments made in Logic Pro for Mac, some assignments show a custom option in the MIDI and Logic Pro Behavior pop-up menus in Logic Pro for iPad. To edit these assignments, open the project in Logic Pro for Mac. See the Controller Assignments Expert view section in the Logic Pro for Mac User Guide.

Edit the behavior of absolute (knob/fader) assignments in Logic Pro for iPad

The Absolute (Knob/Fader) option in the MIDI Behavior pop-up menu is designed for continuous controls (such as knobs, faders, and wheels) that send absolute MIDI messages.

Logic Pro

Depending on the type of Logic Pro control that's assigned, the following settings are available:

- *Range fields:* Enter minimum and maximum values for the range of the parameter in Logic Pro. The value of the MIDI message is scaled onto the range. This setting is available for continuous plug-in parameters, such as a cut-off frequency knob.
- *Invert switch:* Invert the behavior. This setting is available when you assign a MIDI device's fader or knob to toggle switches and buttons in Logic Pro, such as the Mute button in a track header.
- *Trigger:* MIDI values other than zero trigger the keyboard shortcut. This setting is available when you assign a MIDI device's fader or knob to a keyboard shortcut that toggles on and off, such as play or count-in.

Edit the behavior of relative encoder assignments in Logic Pro for iPad

MIDI controllers use relative encoders to send messages indicating that the current value should be increased by the incoming value when turned clockwise and decreased by the incoming value when turned counterclockwise.

MIDI controllers that use endless rotary encoders as the mechanism for their knobs often support multiple modes of operation. Some controllers support customization so that the endless encoder can transmit either relative change messages or absolute value messages. The Relative (Encoder Knob) option in the MIDI Behavior pop-up menu is designed to accommodate encoders that send relative change messages.

Note: Check the manufacturer's user guide or editing software for your controller to find out more about the device's behavior.

MIDI

- *Format pop-up menu:* Most relative encoders use standard MIDI control change (CC) messages; however, because MIDI CC values are only specified to be between 0 and 127, these devices use custom number encodings to represent negative numbers. Logic Pro attempts to detect them automatically for you. If turning an assigned knob on your controller isn't working as expected, choosing a different format may solve the problem. The choices are:
  - *Two's Complement:* Interprets MIDI value 1 as +1 and MIDI value 127 as –1.
  - *One's Complement:* Interprets MIDI value 1 as +1 and MIDI value 126 as –1.
  - *Sign-Magnitude:* Interprets MIDI value 1 as +1 and MIDI value 65 as –1.

Logic Pro

- *Range fields:* Enter minimum and maximum values for the range of the parameter in Logic Pro. The interpreted values of the MIDI CC message adjust the Logic Pro parameter in steps over the range.
- *Use Global Resolution switch and Global Resolution field:* See Resolution for relative controls.
- *Trigger:* Moving the encoder triggers the keyboard shortcut. This setting is available when you assign a MIDI device's encoder to a keyboard shortcut that toggles on and off, such as play or count-in.

Edit the behavior of button and switch assignments in Logic Pro for iPad

Buttons and switches on MIDI controllers may send MIDI note messages or use control change messages to indicate when the button is pressed or released, or when the switch is moved from one position to the other. The Toggle and Trigger options in the MIDI Behavior pop-up menu allow you to choose how your MIDI device's buttons and switches control parameters and functions in Logic Pro for iPad.

Logic Pro toggle settings

Depending on the type of Logic Pro control that's assigned, the following settings are available for the Toggle option in the MIDI Behavior pop-up menu.

- *Behavior pop-up menu:* Choose a toggle behavior for the Logic Pro control. The choices are:
  - *Toggle (Momentary):* Pressing the toggle on your MIDI device sets the Logic Pro parameter to the on value, and releasing the toggle sets it to the off value.
  - *Toggle on Press:* Pressing the toggle on your MIDI device sets the Logic Pro parameter to the on value, and pressing the toggle again sets it to the off value.
  - *Toggle on Release:* Releasing the toggle on your MIDI device sets the Logic Pro parameter to the on value, and releasing the toggle again sets it to the off value.
  - *Increment:* Pressing the toggle on your MIDI device increases the Logic Pro parameter in increments specified in the Increment By field.
  - *Set Value on Press:* Pressing the toggle on your MIDI device sets the Logic Pro parameter to the value set in the Value field.
  - *Set Value on Release:* Releasing the toggle on your MIDI device sets the Logic Pro parameter to the value set in the Value field.

Different settings appear when you choose a toggle option from the Logic Pro Behavior pop-up menu. All the available settings are listed below.

- *Value field:* Set a value for the Logic Pro parameter.
- *On Value and Off Value fields:* Set the on and off values for the Logic Pro parameter.
- *Range fields:* Enter minimum and maximum values for the range of the Logic Pro parameter.
- *Invert switch:* Invert the behavior.
- *Trigger on Press:* Pressing the toggle triggers the keyboard shortcut.
- *Repeat Until Released switch:* Pressing and holding the hardware control repeats the increment or decrement, or the keyboard shortcut, until the control is released.

The following options are also available when you choose Increment in the Logic Pro Behavior pop-up menu.

- *Increment By field:* Set the amount by which the Logic Pro parameter increases. Set a negative value to decrement.
- *Wrap Around switch:* If you increase a parameter value beyond the maximum range, the value returns to the minimum range value.

Logic Pro trigger settings

- *Trigger:* Pressing the button or switch triggers the keyboard shortcut.

Resolution for relative controls in Logic Pro for iPad

Resolution is used for relative encoders. It allows you to have finer or coarser control when changing a parameter value. Global resolution applies to all relative assignments that use it. You can turn off global resolution for individual assignments so that you have finer or coarser control of a parameter without affecting other assignments.

- *Use Global Resolution switch:* Turn on to use the global resolution, which is used by all relative assignments. Turn off to ignore the global resolution.
- *Global Resolution field:* Set a resolution. This value applies to all relative assignments that use global resolution.
- *Resolution field:* Available when global resolution is turned off for the assignment. Set a resolution that applies only to this assignment.

Visual feedback for MIDI devices in Logic Pro for iPad

The MIDI Feedback option automatically appears for supported controllers that define both an input and an output port for sending and receiving MIDI messages. Logic Pro for iPad can send MIDI values back to these controllers when you change an assigned parameter value, allowing the device to illuminate a control or to show the value on a visual display. The feedback is sent to the output port of the MIDI device, using the same channel and MIDI message as the input.

Turn visual feedback on or off for supported MIDI controllers

- In the Edit Assignment view in the Learn MIDI dialog, tap MIDI Feedback, then tap the Send Value switch.

Use VoiceOver with Logic Pro for iPad

Intro to VoiceOver with Logic Pro for iPad

VoiceOver is an advanced screen reader that lets you use your iPad without seeing the screen. After you turn on VoiceOver in the Settings app, you can use VoiceOver gestures and rotor actions to navigate within Logic Pro, use and change the Play Surface, add items from the Browser, edit your performance, and arrange your projects.

Tip: You can use grouped navigation to move quickly through groups of items in the Logic Pro interface. You can also triple-tap with two fingers to open the Item Chooser and find and select items on the screen.

See Turn on and practice VoiceOver, Learn VoiceOver gestures, Control VoiceOver using the rotor, and Use flat or grouped navigation in the iPad User Guide.

The following topics provide information about using VoiceOver to perform specific tasks within different areas of Logic Pro:

- Use VoiceOver with Play Surfaces
- Navigate in Tracks view with VoiceOver
- Use VoiceOver to arrange and edit regions
- Use VoiceOver in the Browser
- Use VoiceOver to edit notes in the Piano Roll Editor

Use VoiceOver with Play Surfaces in Logic Pro for iPad

In Logic Pro for iPad, you can use the Direct Touch accessibility feature in the Play Surfaces area to play a software instrument. You can also change the size of the Play Surfaces area, start and stop recording, and adjust the value of knobs and sliders.

Open or close the Play Surfaces area

1. Swipe repeatedly to the right in the view control bar until you hear “Play Surfaces Switch Button.”

   VoiceOver announces whether the button is on or off.

2. Double-tap to open or close the Play Surfaces area.

Change the size of the Play Surfaces area

1. In the Play Surfaces area, navigate to the resize handle.
2. Do one of the following:
   - *Change the size of the Play Surfaces area:* Swipe up or down anywhere outside of the Play Surfaces area.
   - *Change the size of the Play Surfaces area in smaller increments:* Double-tap and hold anywhere outside of the Play Surfaces area until you hear three rising tones, then drag up or down.
   - *Maximize the size of the Play Surfaces area:* Double-tap.

Turn on Direct Touch

When the Direct Touch accessibility feature is on, you can interact with the Play Surface and side controls in real time, just as you would when VoiceOver is off.

1. Navigate inside the Play Surfaces area until you hear the name of the Play Surface (for example, “Keyboard” or “Drum Pads”).

   If Direct Touch is off, the name of the Play Surface is followed by “Use the Rotor to Enable Direct Touch for This App.”
2. Turn the VoiceOver rotor to Direct Touch, then swipe up or down until you hear “Direct Touch On for Logic Pro.”

Choose a different Play Surface

1. In the Play Surfaces area, navigate to the Surface Types button, then double-tap.

   VoiceOver appends the name of the currently active Play Surface to the Surface Types button (for example, “Surface Types Keyboard”).
2. Swipe left or right to navigate through the list of Play Surfaces, then double-tap to select a Play Surface.

Start and stop recording

You can use a VoiceOver gesture to start and stop recording on the currently selected track.

1. In the Tracks area, move the playhead to where you want to start recording.
2. Double-tap with two fingers to start recording.
3. Double-tap with two fingers again to stop recording.

   Recording stops, and Logic Pro continues playing.

Tip: You can also use Learn MIDI to assign the transport controls to your external MIDI device. See Intro to Learn MIDI.

Navigate in Tracks view with VoiceOver in Logic Pro for iPad

In Logic Pro for iPad, you can use standard VoiceOver gestures to navigate through the interface. When you navigate to a track, the track icon is the first selected item, followed by any regions on the track. However, if the track headers are open, any other buttons in the track headers, such as the Mute and Solo buttons, are selected after the track icon, followed by the Volume slider, and then the regions. When you navigate past the last region on a track, the VoiceOver cursor moves to the track icon of the next track.

You can use additional gestures to zoom in and out, move the playhead, scroll tracks to the left and right, select the previous or next track, open track headers, and change the order of tracks.

Ruler position announcements

- When you navigate to items that have a ruler position, such as regions, notes, or the playhead, VoiceOver announces the full ruler position.
- When you move an item forward or backward in time, VoiceOver announces only the part of the time position that changes.

For example, if you navigate to the playhead at the beginning of the second bar, VoiceOver announces its position as “Bar 2, Beat 1.” If you move the playhead to the second beat of the same bar, only the beat is changed, and VoiceOver announces “Beat 2.” As you move the playhead further in time, VoiceOver announces each following beat. When the playhead reaches the next bar, VoiceOver announces “Bar 3, Beat 1.”

When you move an item while zoomed in, VoiceOver also announces smaller time divisions like ticks and divisions.

Zoom in and out

- Navigate to any region, turn the VoiceOver rotor to Zoom, then swipe down to zoom in or swipe up to zoom out.

Scroll tracks to the left or right

When you zoom in on a region, you can scroll tracks to the left or right.

- Navigate to any item in a zoomed track, then use three fingers to swipe left or right.

  The visible range of the ruler is announced as you scroll.

Move the playhead

Do any of the following:

- Navigate to the playhead, double-tap and hold until you hear three rising tones, then drag left or right to move the playhead according to the current Snap value.
- Navigate to the playhead, then swipe up or down to move the playhead to the next or previous bar.
- Navigate to a track icon or region, turn the VoiceOver rotor to Playhead, then swipe up or down to move the playhead to the next or previous bar.

Each time you move the playhead, VoiceOver announces the new position.

For more information about setting the Snap value, see Snap items to the grid.

Open or close track headers

When track headers are open, you can select and adjust various track controls, including the volume, mute, and solo controls. Do one of the following:

- Navigate to a track icon, turn the VoiceOver rotor to Toggle Track Headers Controls Visibility, then swipe up or down.
- Navigate to the Track Headers button, then double-tap.

If the track headers are open, you can close them by navigating to a Solo button, Mute button, or Volume slider in the track header, then turning the VoiceOver rotor to Toggle Track Headers.

Select the next or previous track

- Navigate to a track icon or a region, turn the VoiceOver rotor to Tracks, then swipe up or down.

Change the order of tracks

1. Navigate to the track icon of the track you want to move.
2. Double-tap and hold until you hear three rising tones.
3. Drag vertically to move the track up or down.

   When you drag the track, VoiceOver announces the new position in relation to the other tracks.

Use VoiceOver to arrange and edit regions in Logic Pro for iPad

You can use VoiceOver gestures to select, arrange, and edit regions in Logic Pro for iPad.

Select a region

- Navigate to the region you want to select, then double-tap.

Create regions at the playhead position on a software instrument track

1. Navigate to the track icon of the software instrument track where you want to add a region.
2. Turn the VoiceOver rotor to Actions, swipe up or down until you hear “Create MIDI Region at Playhead,” “Create Pattern Region at Playhead,” or “Create Session Player Region at Playhead.”
3. Double-tap when you hear the option for the kind of region you want to create.

Trim a region

1. In the Tracks area menu bar, navigate to the Trim button, then double-tap to activate it.

   If you're using the grouped navigation style, the Trim button is located in the Function Buttons group in the Tracks area menu bar.

2. In the Tracks area, navigate to the region you want to trim, then double-tap to select it.
3. Swipe right until you hear "Left Resize Handle" or "Right Resize Handle" to select the left or right resize handle.
4. To move the selected resize handle, do one of the following:
   - Swipe up or down.
   - Double-tap and hold until you hear three rising tones, then drag left or right.

Loop a region

1. In the Tracks area menu bar, navigate to the Loop button, then double-tap to activate it.

   If you're using the grouped navigation style, the Loop button is located in the Function Buttons group in the Tracks area menu bar.

2. In the Tracks area, navigate to the region you want to loop, then double-tap to select it.
3. Swipe right until you hear "Loop End Resize Handle."
4. To move the Loop End resize handle, do one of the following:
   - Swipe up or down.
   - Double-tap and hold until you hear three rising tones, then drag left or right.

Split a region

1. In the Tracks area menu bar, navigate to the Split button, then double-tap to activate it.

   If you're using the grouped navigation style, the Split button is located in the Function Buttons group in the Tracks area menu bar.

2. In the Tracks area, navigate to the region you want to split, then double-tap to select it.

   The VoiceOver cursor moves to the Split marker that appears in the region.

3. To move the Split marker to where you want to split the region, do one of the following:
   - Swipe up or down.
   - Double-tap and hold until you hear three rising tones, then drag left or right.
4. Double-tap to split the region at the Split marker.

   After you split a region, the VoiceOver cursor remains on the Split marker. If you want to make additional splits, move the Split marker to a new location and repeat step 3.

Stretch a region

1. In the Tracks area menu bar, navigate to the Stretch button, then double-tap to activate it.

   If you're using the grouped navigation style, the Stretch button is located in the Function Buttons group in the Tracks area menu bar.

2. In the Tracks area, navigate to the region you want to stretch, then double-tap to select it.
3. Swipe right until you hear "Left Resize Handle" or "Right Resize Handle" to select the left or right resize handle.
4. To move the selected stretch handle, do one of the following:
   - Swipe up or down.
   - Double-tap and hold until you hear three rising tones, then drag left or right.

Move a region

1. Navigate to the region you want to move, then double-tap to select it.
2. Swipe right until you hear "Move Region Handle."
3. To move the region, do one of the following:
   - Swipe up or down.
   - Double-tap and hold until you hear three rising tones, then drag left or right.

Access additional region functions and settings

You can access additional editing functions and region settings using a using a shortcut menu (also called a context menu).

1. Navigate to the region you want to edit, then double-tap to select it.
2. Double-tap again to open the menu.
3. Swipe left or right to scroll through the menu items.
4. Double-tap to choose an item or open a submenu.
5. To close the menu without choosing an item, do one of the following:
   - Move a finger back and forth three times quickly, making a "z," then double-tap after you hear "Dismiss Context Menu."
   - Navigate past the last item in the menu until you hear "Dismiss Context Menu," then double-tap.
   - Tap anywhere outside the menu, then double-tap after you hear "Dismiss Context Menu."

Use VoiceOver in the Browser

You can use VoiceOver gestures to preview items in the Browser, add them to your favorites, and add them to your project. In order to avoid navigating through long lists of filters and other items, you can use the grouped navigation style.

Listen to previews

You can listen to previews in the Browser for audio and instrument patches, Apple Loops, samples, and contents of sample folders.

1. Navigate to the item you want to preview.
2. Turn the VoiceOver rotor to Actions, swipe up or down until you hear “Preview,” then double-tap.
3. Double-tap again to stop the preview.

Create a new track with a selected audio or instrument patch

1. Navigate to the audio or instrument patch in the Browser.
2. Turn the VoiceOver rotor to Actions, swipe up or down until you hear “New Track with Patch,” then double-tap.

   A new track is created containing the audio or instrument patch.

Add a loop or sample at the playhead position in the Tracks area

1. Position the playhead at the point in the ruler where you want to add the loop or sample.
2. Create or select a track where you want to add the loop or sample.

   Note: You can add audio loops and samples only to audio tracks. You can add MIDI, pattern, and Session Player loops only to software instrument tracks.
3. At the top level of the Browser, navigate to Loops or Samples, depending on what you want to add to the Tracks area, then navigate to the loop or sample you want to add.
4. Turn the VoiceOver rotor to Actions, swipe up or down until you hear “Place Loop at Playhead” or “Place Sample at Playhead,” then double-tap.

Add an item in the Browser to favorites

1. In the Browser, navigate to the item you want to add to your favorites.
2. Turn the VoiceOver rotor to Actions, swipe up or down until you hear “Add to Favorites,” then double-tap.

To access your favorites, navigate to Favorites at the top level of the Browser.

To remove an item from your favorites, swipe up or down until you hear “Remove from Favorites,” then double-tap.

Use VoiceOver to edit notes in the Piano Roll Editor in Logic Pro for iPad

In Logic Pro for iPad, you can use VoiceOver gestures to edit MIDI notes in the Piano Roll Editor.

To learn more about editing notes, see Piano Roll Editor overview.

Open the Piano Roll Editor

1. Navigate to the MIDI region you want to edit, double-tap to select it, then double-tap again to open the shortcut menu (also called context menu).
2. Swipe right until you hear “Edit,” then double-tap.

   The submenu opens with “Show in Editor” as the first item.
3. Double-tap when you hear “Show in Editor.”

   The Piano Roll Editor opens.

Move notes

1. In the Piano Roll Editor menu bar, navigate to the Trim button, then double-tap.

   If you’re using the grouped navigation style, the Trim button is located in the Function Buttons group in the Editors area.
2. Navigate to the note you want to move, double-tap and hold until you hear three rising tones, then do one of the following:
   - Drag horizontally to move the note to the previous or next beat or division.
   - Drag vertically to change the pitch.

     If you’re editing the notes for a drum kit, dragging vertically changes the kit piece.

Change the length of a note

1. In the Piano Roll Editor menu bar, navigate to the Trim button, then double-tap.

   If you’re using the grouped navigation style, the Trim button is located in the Function Buttons group in the Editors area.
2. Navigate to the note you want to edit, then swipe up or down to increase or decrease its length.

Change note velocity

1. In the Piano Roll Editor menu bar, navigate to the Velocity button, then double-tap.

   If you’re using the grouped navigation style, the Velocity button is located in the Function Buttons group in the Editors area.
2. Navigate to the note you want to edit, then do one of the following:
   - Swipe up or down to increase or decrease the velocity in increments of 10.
   - Double-tap and hold until you hear three rising tones, then drag up or down to make precise changes.

Logic Pro Effects

Effects overview

Effect plug-ins in Logic Pro for iPad

Logic Pro for iPad provides an extensive suite of software effect plug-ins that can be used in your productions. See Intro to plug-ins.

Effects categories include both insert effects and processors that are principally designed for mastering use. Because you're free to use almost all plug-ins as you see fit, there are few restrictions on the use of effects anywhere in the signal path. See Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Most effects can be used in mono, stereo, or dual mono channels.

Effects categories cover essential studio processors, such as compression, gating, limiting, equalization, and metering utilities. Both vintage and modern style compressors are emulated, making it easy to attain the sonic characteristics you need. See dynamics processors and metering tools.

EQ options are extensive. The Channel and Linear Phase EQ's are perfect for sculpting your primary vocal and instrument parts. Match EQ analyzes existing audio and allows you to impose an analyzed sonic "fingerprint" on other audio parts. The vintage EQ collection delivers emulations of three classic analog EQ units known for their distinctive sonic coloration. See Equalizers overview.

A comprehensive collection of reverb, delay, and modulation effects is available to enhance your productions. Among these are the unique ChromaVerb, the Quantec Room Simulator, and the sophisticated and highly configurable Delay Designer and Space Designer plug-ins. Delay Designer lets you create precise, complex, and, rhythmic delays. Space Designer is a convolution reverb that uses recordings of real-world spaces, such as concert halls and canyons, that you can impose on your audio, effectively placing your instrument or vocal in the space. See reverb effects and delay effects.

Modulation processors include phasing, flanging, ring modulation, vintage rotary speaker emulation, and rich chorus effects. See modulation effects.

If you're a guitarist or are using the included vintage B3 organ, Rhodes, Clavinet, or Mellotron emulations, you can choose from a vast collection of retro and modern effect pedals and amplifier simulations. See Amps and pedals overview.

A number of powerful distortion effects and filter effects further expand your options. The filters include vocoder-like utilities and the Spectral Gate plug-in that offer control over the formant and spectral characteristics of your sounds.

Adding a further string to your bow are the flexible, powerful, and fun multi effects units that combine a collection of processors and modulators in one place. These are ideal for use with urban and dance floor-oriented tracks, but can truly transform any sound you want to run through them.

You can manipulate pitch with the Pitch Correction, Pitch Shifter and Vocal Transformer effects. These can be used for subtle corrections or for heavy Cher-like processing of vocals and instruments. See pitch effects.

A selection of MIDI plug-ins includes a flexible arpeggiator, chord memorizer, transposer, and more. These can be inserted in instrument channels and process MIDI data in real time. The Scripter plug-in lets you run a range of MIDI processing and generation utilities created with JavaScript. See MIDI plug-ins overview.

Rounding out the collection are spatial and frequency enhancement plug-ins, and useful studio utilities such as a test oscillator. See imaging processors, specialized effects, and utility plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Amps and pedals

Amps and pedals in Logic Pro for iPad

Logic Pro for iPad features an extensive collection of guitar and bass amplifiers and classic pedal effects. You can play live—or process recorded audio and software instrument parts—through these amps and effects.

The amplifier models recreate vintage and modern tube and solid-state amps. Built-in effect units, such as reverb, tremolo, or vibrato, are also reproduced. The modeled amplifiers can be paired with a number of emulated speaker cabinets. These amplifiers and speaker cabinets can be used as a matching set or combined in other ways to create interesting hybrids.

Also emulated are a number of “classic” foot pedal effects—or stompboxes—that were, and remain, popular with guitarists and keyboardists. As with their real-world counterparts, you can chain pedals in any order to create your sound.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Amp Designer

Amp Designer in Logic Pro for iPad

Amp Designer emulates the sound of more than 20 famous guitar amplifiers and the speaker cabinets used with them. Each preconfigured model combines an amp, a cabinet, and EQ that recreates a well-known guitar amplifier sound. You can process guitar signals directly, reproducing the sound of your guitar played through these amplification systems. You can also use Amp Designer for experimental sound design and processing. You can use it with other instruments as well, applying the sonic character of a guitar amp to a trumpet or vocal part, for example.

The amplifiers, cabinets, and EQs emulated by Amp Designer can be combined in numerous ways to alter the tone. Virtual microphones are used to pick up the signal of the emulated amplifier and cabinet. You can choose from, and position, seven different microphone types. Amp Designer also emulates classic guitar amplifier effects, including spring reverb, vibrato, and tremolo.

To add Amp Designer to your project, choose Amps and Pedals > Amp Designer in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

The Amp Designer interface is divided into several parameter sections.



- *Combo parameters:* The Model pop-up menu at the top is used to choose a preconfigured model, consisting of an amplifier, a cabinet, an EQ type, and a microphone type. Individual pop-up menus let you independently choose the type of amplifier, cabinet, and microphone. See Build a custom Amp Designer combo.
- *Amp parameters:* These parameters are used to set the input gain, presence, and output level of an amp. See Amp Designer amplifier controls.
- *EQ parameters:* These parameters are used to set the equalization parameters. See Amp Designer EQ.

- *Effects parameters:* These parameters control the integrated reverb effect and tremolo and vibrato.
- *Microphone parameters:* These parameters set the type and position of the microphone that captures the amplifier and cabinet sound. See Amp Designer microphone parameters.
- *Output Gain slider:* The Output Gain slider serves as the final level control for Amp Designer output that is fed to ensuing effect slots in the channel strip or directly to the channel strip output.

  Note: This is different from the Master knob in the Amp parameters, which serves the dual purpose of sound design and level control of the Amp section.

Choose an Amp Designer model

You can use the Model pop-up menu to choose a preconfigured model, or you can build a customized model using the Amp, Speaker, and Mic Type pop-up menus. See Build a custom Amp Designer combo. Your choices remain visible in the pop-up menu fields.

- *Model pop-up menu:* Choose a preconfigured model, consisting of an amplifier, a cabinet, an EQ type, and a microphone type.

Amp Designer models in Logic Pro for iPad

You can learn about different Amp Designer models, their tone and sonic character, and the musical styles they have traditionally been associated with.

Tweed Combos

The Tweed models are based on American combos from the 1950s and early 1960s that helped define the sounds of blues, rock, and country music. They have warm, complex, clean sounds that progress smoothly through gentle distortion to raucous overdrive as you increase the gain. Even after half a century, Tweeds can still sound contemporary. Many modern boutique amplifiers are based on Tweed-style circuitry.

Model	Description
Small Tweed Combo	A 1 x 12″ combo that transitions smoothly from clean to crunchy, making it a great choice for blues and rock. For extra definition, set the Treble and Presence controls to a value around 7.
Large Tweed Combo	This 4 x 10″ combo was originally intended for bassists, but it was also used by blues and rock guitarists. It is more open and transparent-sounding than the Small Tweed Combo, but it can deliver crunchy sounds.
Mini Tweed Combo	A small amp with a single 10″ speaker, used by countless blues and rock artists. It is quite punchy-sounding and can deliver the clean and crunch tones that Tweed combos are known for.

Tip: Tweed combos are responsive to playing dynamics. Adjust the knobs to create a distorted sound, then reduce the level of your guitar volume knob to create a cleaner tone. Turn up your guitar volume knob when soloing.

Classic American Combos

The Black Panel, Brown Panel, and Silver Panel models are inspired by American combos of the mid 1960s. These tend to be loud and clean with a tight low-end and restrained distortion. They are useful for clean-toned rock, vintage R & B, surf music, twangy country, jazz, or any other style where strong note definition is essential.

Model	Description
Large Black Panel Combo	A 4 x 10″ combo with a sweet, well-balanced tone favored by rock, surf, and R & B players. Great for lush, reverb-saturated chords or strident solos.
Silver Panel Combo	A 2 x 12″ combo with a loud, clean tone. It has a percussive, articulate attack that is suitable for funk, R & B, and intricate chord work. It can be crunchy when overdriven, but most players favor it for clean tones.
Mini Black Panel Combo	A 1 x 10″ combo that is bright and open-sounding, with reasonable low end impact. It excels at clean tones with a minimal overdrive.
Small Brown Panel Combo	A 1 x 12″ combo that is smooth and rich-sounding, but retains a level of detail.
Blues Blaster Combo	A 1 x 15″ combo that has a clear top end with a tight, defined low end. This model is favored by blues and rock players.

Tip: Although these amps tend toward a clean and tight sound, you can use a distortion stompbox to attain hard-edged crunch sounds with sharp treble and extended low-end definition. See Distortion pedals.

British Stacks

The British Stack models are based on the 50- and 100-watt amplifier heads that have largely defined the sound of heavy rock, especially when paired with 4 x 12″ cabinets. At medium gain settings, these amps are suitable for thick chords and riffs. Raising the gain yields lyrical solo tones and powerful rhythm guitar parts. Complex peaks and dips across the tonal spectrum keep the tones clear and appealing, even when heavy distortion is used.

Model	Description
Vintage British Stack	Captures the sound of a late 1960s 50-watt amp famed for its powerful, smooth distortion. Notes retain clarity, even at maximum gain. After four decades this remains a definitive rock tone.
Modern British Stack	1980s and 1990s descendants of the Vintage British amplifier head, which were optimized for hard rock and metal styles of the time. Tonally, it has a deeper and brighter sound at the low and high end, with a more “scooped” midrange than the Vintage British amp.
Brown Stack	Unique tones can be coaxed from a British head by running it at lower voltages than its designers intended. The resulting “brown” sound—often more distorted and loose than the standard tone—can add interesting thickness to a guitar sound.

Tip: The classic British head and 4 x 12″ cabinet combo is ideal for riffs at high gain levels. These heads can also sound good through small cabinets, or at clean, low-gain settings.

British Combos

The British Combos capture the brash, treble-rich sound associated with 1960s British rock and pop. The sonic signature of these amps is characterized by their high-end response, yet they are rarely harsh-sounding due to a mellow distortion and smooth compression.

Model	Description
British Blues Combo	This 2 x 12″ combo has a loud, aggressive tone that is cleaner than the British heads, yet delivers rich distorted tones at high gain settings.
British Combo	A 2 x 12″ combo based on early 1960s amps. Perfect for chiming chords and crisp solos.
Small British Combo	A 1 x 12″ combo with half the power of the British Combo, this amp offers a darker, less open tone.
Boutique British Combo	A 2 x 12″ combo that is a modern take on the original 1960s sound. The tone is thicker, with stronger lows and milder highs than the other British Combos.

Tip: You can often use higher Treble and Presence knob settings with the British Combos than with other amp types. If the British Blues Combo is too clean for your needs, combine it with the Hi Drive stompbox for an aggressive blues tone, or the Candy Fuzz stompbox for a heavy rock tone. See Distortion pedals.

British Alternatives

The late 1960s amplifier heads and combos that inspired the Sunshine models are loud and aggressive, with full mid frequencies. These amps are useful for single note solos, power chords, and big, open chords—making them popular with the “Brit-pop” bands of the 1990s. The Stadium amps are famed for their ability to play at extremely high levels without dissolving into an indistinct distortion. They retain crisp treble and superb note definition, even at maximum gain settings.

Model	Description
Sunshine Stack	A robust-sounding head paired with a 4 x 12″ cabinet. It is a good choice for powerful pop-rock chords. If the tone is too dark, use a high Treble knob setting to open up the sound.
Small Sunshine Combo	A 1 x 12″ combo based on a modern amp known for a “big amp” sound. It is brighter than the Sunshine Stack head and has tonal qualities similar to the 1960s British Combo. This amp also sounds good with a 4 x 12″ cabinet.
Stadium Stack	A classic head and 4 x 12″ cabinet configuration popular with 1970s arena rock bands. Its tones are cleaner than other Amp Designer 4 x 12″ stacks, but it retains body and impact. A good choice if you need power *and* clarity.
Stadium Combo	A 2 x 12″ combo based on a modern amp. The tone is smoother than the Stadium Stack.

Tip: The Stadium amps can be slow to distort, so most famous users have paired them with aggressive fuzz pedals. Try combining them with the Candy Fuzz or Fuzz Machine stompboxes. See Distortion pedals.

Metal Stacks

The Metal Stack models are inspired by the powerful, high gain amplifier heads favored by modern hard rock and metal musicians. All are paired with 4 x 12″ cabinets. Their signature tones range from heavy distortion to extremely heavy distortion. These models are ideal if you want powerful lows, harsh highs, and long sustain in your guitar tones.

Model	Description
Modern American Stack	A powerful high-gain amp that is ideal for heavy rock and metal. Use the Mids knob to set the right amount of scoop or boost.
High Octane Stack	Although a powerful, high-gain amp, this model offers a smooth transition between gain settings and natural compression. It is a good choice for fast soloing and for two- or three-note chords.
Turbo Stack	An aggressive-sounding amp with spiky highs and noisy harmonics, especially at high gain settings. Use the Turbo Stack when you need a guitar tone that cuts through a mix.

Tip: Combining the Turbo Stack with distortion and fuzz pedals can diminish the edgy tone. A dry sound is often the best choice for high-impact riffs.

Additional Combos

The combos and utility models in this category are versatile amps that you can use for a wide variety of musical styles.

Model	Description
Studio Combo	A 1 x 12″ combo based on boutique combos of the 1980s and 1990s. These models use multiple gain stages to generate smooth, sustain-heavy distortion *and* bold, bright, clean sounds. Can deliver a heavier sound when paired with a 4 x 12″ cabinet.
Boutique Retro Combo	A 2 x 12″ combo inspired by expensive modern amps that combine the sounds of several 1960s combos. It excels at clean and crunch tones, making it a good choice when you want an old-fashioned flavor but with the crisp highs and defined lows of a modern amplifier. This model has very sensitive tone controls that can deliver countless guitar tones.
Pawnshop Combo	A 1 x 8″ combo based on the inexpensive amps sold in American department stores in the 1960s. Despite their limited features and budget workmanship, these amps are the secret behind the sound of many rock, blues, and punk players. The clean sounds are warm, and distorted sounds are thick, despite the small speaker.
Transparent Preamp	A preamp stage with no coloration. Note that Transparent Preamp is activated in the Amp pop-up menu, not in the Model pop-up menu.

Tip: Combine the Pawnshop Combo amp with the Hi Drive or Candy Fuzz stompboxes to emulate hard rock tones of the late 1960s. See Distortion pedals.

Amp Designer cabinets in Logic Pro for iPad

Learn about the properties and tone of each cabinet model available in Amp Designer.

Cabinet	Description
Tweed 1 x 12	A 12″ open-back cabinet from the 1950s with a warm and smooth tone.
Tweed 4 x 10	A 4 x 10″ open-back cabinet from the late 1950s that was originally conceived for bassists but that guitarists use for its sparkling presence.
Tweed 1 x 10	A single 10″ open-back combo amp cabinet from the 1950s with a smooth sound.
Black Panel 4 x 10	Classic open-back cabinet with four 10″ speakers. Its tone is deeper and darker than the Tweed 4 x 10.
Silver Panel 2 x 12	An open-back model from the 1960s that provides low-end punch.
Black Panel 1 x 10	An open-back 1960s cabinet with glassy highs and low/mid body.
Brown Panel 1 x 12	A balanced 1960s open-back cabinet that is smooth, transparent, and rich-sounding.
Brown Panel 1 x 15	This early 1960s open-back cabinet houses the largest speaker emulated by Amp Designer. Its highs are clear and glassy, and its lows are tight and focused.
Vintage British 4 x 12	This late 1960s closed-back cabinet is synonymous with classic rock. The tone is big and thick yet also bright and lively, due to the complex phase cancelations between the four 30-watt speakers.
Modern British 4 x 12	A closed-back 4 x 12″ cabinet that is brighter and has a better low end than the Vintage British 4 x 12, with less midrange emphasis.
Brown 4 x 12	A closed-back 4 x 12″ cabinet with a good low end and complex midrange.
British Blues 2 x 12	A bright-sounding open-back cabinet with solid lows and crisp highs, even at high gain settings.
Modern American 4 x 12	A closed-back 4 x 12″ cabinet with a full sound. The lows and mids are denser than the British 4 x 12″ cabinets.
Studio 1 x 12	A compact-sounding open-back cabinet with full mids and glassy highs.
British 2 x 12	A mid 1960s open-back cabinet with an open, smooth tone.
British 1 x 12	A small open-back cabinet with crisp highs and low/mid transparency.
Boutique British 2 x 12	A 2 x 12″ cabinet based on the British 2 x 12. It has a richer midrange and is more powerful in the treble range.
Sunshine 4 x 12	A 4 x 12″ closed-back cabinet with a thick, rich midrange.
Sunshine 1 x 12	A single 12″ open-back combo amp cabinet with a lively sound that has bright, sweet highs, and transparent mids.
Stadium 4 x 12	A tight, bright, closed-back British cabinet with bold upper/mid peaks.
Stadium 2 x 12	A nicely balanced modern British open-back cabinet. Tonally, it is a compromise between the warmth of the Black Panel 4 x 10 and the brilliance of the British 2 x 12.
Boutique Retro 2 x 12	A 2 x 12″ cabinet based on the British 2 x 12. It has a rich, open midrange and is more powerful in the treble range.

Cabinet	Description
High Octane 4 x 12	A modern, closed-back European cabinet with strong lows and highs and scooped mids appropriate for metal and heavy rock.
Turbo 4 x 12	A modern, closed-back European cabinet with strong lows, very strong highs, and deeply scooped mids appropriate for metal and heavy rock.
Pawnshop 1 x 8	A single 8″ speaker cabinet that has a strong low-end punch.
Direct	This option bypasses the speaker emulation section.

Tip: A creative sound design option is to choose Direct from the Speaker pop-up menu, insert Space Designer in the next free effect slot, then load one of the “warped” presets.

Build a custom Amp Designer combo in Logic Pro for iPad

You can use one of the default models or you can create your own hybrid of different amplifiers, cabinets, and so on. You create your own by using the Amp, Speaker, and Microphone Type pop-up menus, as well as the EQ Model pop-up menu.

Note: If you create your own hybrid amp combo, you can save it as a setting file, which also includes any parameter changes you've made.

Choose an Amp Designer amplifier

- In Logic Pro, choose an amplifier from the Amp pop-up menu. See Amp Designer models for details on the characteristics of each amplifier type.



Choose an Amp Designer cabinet

Cabinets have a huge impact on the character of a guitar sound (see Amp Designer cabinets).

Whereas certain amplifier and cabinet pairings have been popular for decades, departing from them can be an effective way to create fresh-sounding tones. For example, most players automatically associate British heads with 4 x 12″ cabinets. Amp Designer lets you drive a small speaker with a powerful head, or pair a tiny amp with a 4 x 12″ cabinet. You can experiment with random amplifier and cabinet combinations, but you can also make an educated guess about nontraditional combinations by considering the variables that determine the “sound” of the cabinet.



- In Logic Pro, choose a cabinet from the Speaker pop-up menu. Use the following considerations to guide your decision:
  - *Combos or Stacks:* Combo amps include both an amplifier and speakers in a single enclosure. These usually have an open back, so the sound resonates in multiple directions. The resulting sound is open—with bright, airy highs and a spacious sound. Amplifier stacks consist of an amplifier head, with the speakers in a separate cabinet. These cabinets generally have a closed back and project the sound forward in a tight, focused beam. They tend to sound more powerful than open-back cabinets, and typically have a tighter low-end response at the expense of some high-end transparency.
  - *Old or New Speakers:* Amp Designer models based on vintage cabinets capture the character of aged speakers. These may be a bit looser and duller sounding than new speakers, but many players prefer them for their smoothness and musicality. Sounds based on new cabinets tend to have more snap and bite.
  - *Large Speakers or Small Speakers:* A larger speaker doesn't guarantee a larger sound. In fact, the most popular bass guitar cabinet in history uses 8″ speakers. You can often get a deeper, richer tone from a 10″ speaker than from a large 4 x 12″ cabinet. Try several sizes and choose the one that works best for your music.
  - *Single Speakers or Multiple Speakers:* Guitarists typically choose cabinets with multiple speakers for their big sound. The number of speakers is less important than it may appear. Phase cancelations occur between the speakers, adding texture and interest to the tone. Much of the "classic rock" sound, for example, is due to tonal peaks and dips caused by interactions between the speakers in a 4 x 12″ cabinet.

Choose a microphone type and placement



1. In Logic Pro, choose a microphone model from the Mic Type pop-up menu.
   - *Condenser models:* Emulate the sound of high-end studio condenser microphones. The sound of condenser microphones is fine, transparent, and well-balanced. Choose Condenser 87 or Condenser 414.
   - *Dynamic models:* Emulate the sound of popular dynamic cardioid microphones. Dynamic microphones sound brighter and more cutting than Condenser models. The mid-range is boosted, with softer lower-mid frequencies, making dynamic microphones a good choice for rock guitar tones, especially if you want guitars to cut through other tracks in a mix. Choose Dynamic 20, Dynamic 57, Dynamic 421, or Dynamic 609.
   - *Ribbon 121:* Emulates the sound of a ribbon microphone. A ribbon microphone is a type of dynamic microphone that captures a sound often described as bright or brittle, yet still warm. It is useful for rock, crunch, and clean tones.
2. Drag the gray dot in the X/Y pad beside the Mic Type pop-up menu to set the microphone position and distance relative to the cabinet.

Choose and adjust an EQ type

1. In Logic Pro, tap the Model pop-up menu to choose an EQ model. See Amp Designer EQ.
2. Rotate the Bass, Mids, and Treble knobs to adjust the EQ model you chose.



Amp Designer amplifier controls in Logic Pro for iPad

The amp parameters include controls for the input gain, presence, and master output.



Amplifier parameters

- *Gain knob and field:* Set the amount of preamplification applied to the input signal. This control affects specific amp models in different ways. For example, when you use the British Amp, the maximum gain setting produces a powerful crunch sound. When you use the Vintage British Head or Modern British Head, the same gain setting produces heavy distortion, suitable for lead solos.
- *Presence knob and field:* Adjust the ultra-high frequency range—above the range of the Treble control. The Presence parameter affects only the output (Master) stage.
- *Master knob and field:* Set the output volume of the amplifier signal sent to the cabinet. For tube amplifiers, increasing the Master level typically produces a compressed and saturated sound, resulting in a more distorted and louder signal.

  WARNING: Because high Master knob settings can produce an extremely loud output that can damage your speakers or hearing, start with a low Master knob setting and then slowly increase it.
- *Output Level fader and field:* Set the final output level of Amp Designer.

Amp Designer EQ in Logic Pro for iPad

Hardware amplifier tone controls vary among models and manufacturers. For example, the treble knobs on two different models may target different frequencies or provide different levels of cut or boost. Some equalizer (EQ) sections amplify the guitar signal more than others, thus affecting the way the amp distorts.

Amp Designer provides multiple EQ types to mirror these variations in hardware amplifiers. All EQ types have identical controls—Bass, Mids, and Treble—but these controls can behave very differently depending on which EQ type you choose.

Selecting an EQ type other than the one traditionally associated with an amplifier usually results in significant tonal changes. As with hardware amplifiers, Amp Designer EQs are calibrated to perform well with particular amplifier models. Choosing other EQ types can sometimes produce a thin or unpleasantly distorted tone.

Despite these less pleasant-sounding possibilities, it is worth experimenting with various amplifier and EQ combinations, because many can sound good together.



EQ parameters

- *Model pop-up menu:* Tap to choose an EQ type. Each EQ model has unique tonal qualities.
- *Bass, Mids, and Treble knobs and fields:* Adjust the EQ frequency ranges as you would with tone knobs on a hardware guitar amplifier. The behavior and response of these knobs changes when different EQ models are chosen.

Equalizer types

Learn about the properties and tonal qualities of each Amp Designer EQ type.

EQ type	Description
British Bright	Inspired by the EQ of British combo amps of the 1960s, it is loud and aggressive, with stronger highs than the Vintage EQ. This EQ is useful if you want more treble definition without an overly clean sound.
Vintage	Emulates the EQ response of American Tweed-style amps and the vintage British stack amps that used a similar circuit. It is loud and subject to distortion. This EQ is useful if you want a rougher sound.
US Classic	Derived from the EQ circuit of the American Black Panel amps, it has a tone of higher fidelity than the Vintage EQ, with tighter lows and crisper highs. This EQ is useful if you want to brighten your tone and reduce distortion.
Modern	Based on a digital EQ unit popular in the 1980s and 1990s, this EQ is useful for sculpting the aggressive highs, deep lows, and scooped mids associated with rock and metal music styles of the era.
Boutique	Replicating the tone section of a “retro modern” boutique amp, it excels at precise EQ adjustments, though its tone may be too clean when used with vintage amplifiers. This EQ is a good choice if you want a cleaner, brighter sound.

Amp Designer reverb effect in Logic Pro for iPad

Reverb is always available in Amp Designer, even when you're using a model based on an amplifier that provides no reverb function. You can add reverb to either the tremolo or vibrato effect, or you can use it independently.

Note: The Effects section is placed *before* the Presence and Master controls in the signal flow and receives the pre-amplified, pre-Master signal.



Reverb parameters

- *On/Off button:* Turn the reverb effect on or off.
- *Type pop-up menu:* Tap to open the pop-up menu, then choose a reverb type.
- *Level knob and field:* Set the amount of reverb applied to the preamplified signal.

Reverb types

Learn about the properties and sonic character of each Amp Designer reverb type.

Reverb type	Description
Vintage Spring	This bright, splashy sound has largely defined combo amp reverb since the early 1960s.
Simple Spring	A darker, subtler spring sound.
Mellow Spring	An even darker, low-fidelity spring sound.
Bright Spring	Has some of the brilliance of Vintage Spring, but with less surf-style splash.
Dark Spring	A moody-sounding spring. More restrained than Mellow Spring.
Resonant Spring	Another 1960s-style spring with a strong, slightly distorted midrange emphasis.
Boutique Spring	A modernized version of the classic Vintage Spring with a richer tone in the bass and mids.
Sweet Reverb	A smooth modern reverb with rich lows and restrained highs.
Rich Reverb	A rich and balanced modern reverb.
Warm Reverb	A lush modern reverb with rich lows/mids and understated highs.

Amp Designer tremolo and vibrato in Logic Pro for iPad

Tremolo and vibrato are controlled by several switches and two knobs in the Modulation FX section. Tremolo modulates the amplitude or volume of the sound, and Vibrato modulates the pitch of the sound.

Note: The Effects section is placed *before* the Presence and Master controls in the signal flow and receives the pre-amplified, pre-Master signal.



Modulation FX parameters

- *On/Off switch:* Turn the tremolo or vibrato effect on or off.
- *Type pop-up menu:* Tap to choose either Tremolo or Vibrato.
- *Depth knob and field:* Set the intensity of the modulation for either tremolo or vibrato.
- *Speed knob and field:* Set the speed of the modulation in hertz. Lower settings produce a smooth, floating sound. Higher settings produce a rotor-like effect.
- *Sync Mode buttons:* Choose Sync to synchronize the modulation speed with the host tempo. Choose Free to set values in Hertz with the FX Speed knob. In Sync mode, you can use the FX Speed knob to set the modulation speed to different bar, beat, and musical note values (1/8, 1/16, and so on, including triplet and dotted-note values).

Amp Designer cab and mic controls in Logic Pro for iPad

Amp Designer provides seven virtual microphone types and dozens of speaker models. As with other components in the tone chain, different selections can yield very different results. After choosing a cabinet, you can set the type of microphone to emulate and can place the microphone, relative to the cabinet.



Cabinet and Microphone parameters

- *Speaker pop-up menu:* Choose a speaker cabinet. See Amp Designer cabinets and Choose an Amp Designer cabinet.
- *Mic Type pop-up menu:* Choose a microphone model.
  - *Condenser models:* Emulates the sound of high-end studio condenser microphones. The sound of condenser microphones is fine, transparent, and well-balanced. Choose from: Condenser 87 and Condenser 414.
  - *Dynamic models:* Emulates the sound of popular dynamic cardioid microphones. Dynamic microphones sound brighter and more cutting than Condenser models. The mid-range is boosted, with softer lower-mid frequencies, making dynamic microphones a good choice for rock guitar tones; useful if you want guitars to cut through other tracks in a mix. Choose from: Dynamic 20, Dynamic 57, Dynamic 421, and Dynamic 609.
  - *Ribbon 121:* Emulates the sound of a ribbon microphone. A ribbon microphone is a type of dynamic microphone that captures a sound often described as bright or brittle, yet still warm. It is useful for rock, crunch, and clean tones.

  Tip: Combining multiple microphone types can produce an interesting sound. Duplicate the guitar track, and insert Amp Designer on both tracks. Select different microphones in each Amp Designer instance while retaining identical settings for all other parameters, then set track signal levels.
- *X/Y pad:* Microphone position is indicated by the gray dot in the XY pad. Drag the dot to change microphone position and distance. Placement is relative to the cabinet and is limited to near-field positioning.

  By default, the gray dot is placed in the center of the speaker cone (on-axis). This placement produces a fuller, more powerful sound, suitable for blues or jazz guitar tones. If you place the microphone on the rim of the speaker (off-axis), you obtain a brighter, thinner tone, making it suitable for cutting rock or R & B guitar parts. Moving the gray microphone dot closer to the speaker emphasizes bass response.

Bass Amp Designer

Bass Amp Designer in Logic Pro for iPad

Bass Amp Designer emulates the sound of three famous bass guitar amplifiers and the speaker cabinets used with them. Each preconfigured model combines an amp and cabinet that recreates a well-known bass guitar amplifier sound. The amp and cabinet can be combined with integrated compression and EQ units to alter the tone. You can process signals directly, reproducing the sound of your bass played through these amplification systems. Virtual microphones are used to pick up the signal of the emulated amplifier and cabinet. You can choose from, and position, three different microphone types.

When recording, many bass players use a direct connection to a mixing board or other recording equipment, often using a passive (non powered) or active (powered) Direct Box (Direct Injection or D.I. box). The use of a pre-amp with passive or active EQ and a hardware compressor instead of, or in addition to, a D.I. box is extremely popular too. Bass Amp Designer emulates a professional-level American D.I. box.

Bass Amp Designer has a two channel design—one for the pre-amp and one for the Direct Box. This lets you flexibly change the signal flow for the following playing and recording configurations: pre-amp with passive or active EQ, compressor, a straight power amp, just the sound of the cabinets and microphones, Direct Box alone, bass amp alone, or both in parallel. See Bass Amp Designer signal flow and Bass Amp Designer Pre-amp signal flow.

To add Bass Amp Designer to your project, choose Amps and Pedals > Bass Amp Designer in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



The Bass Amp Designer interface is divided into four main parameter sections.

- *Combo parameters:* The Model pop-up menu is used to choose a preconfigured model, consisting of an amplifier, a cabinet, and a microphone type. Individual pop-up menus let you independently choose the type of amplifier, cabinet, and microphone. See Build a custom Bass Amp Designer combo.
- *Amp parameters:* These parameters are used to set the input gain, presence, and output level of the amp. See Bass Amp Designer amplifier controls.
- *Effects parameters:* These parameters control the integrated EQ and compressor effects. You can choose either a graphic or parametric EQ. See Bass Amp Designer effects.
- *Microphone parameters:* These parameters set the type and position of the microphone that captures the amplifier and cabinet sound. See Bass Amp Designer microphone parameters.
- *Output slider:* The Output slider is found at the lower-right corner of the interface. It serves as the final level control for Bass Amp Designer output that is fed to ensuing effect slots in the channel strip, or directly to the channel strip output.

  Note: This parameter is different from the Master control, which serves the dual purpose of sound design as well as controlling the level of the Amp section.

Choose a Bass Amp Designer model

- *Model pop-up menu:* In Logic Pro, choose a preconfigured model, consisting of an amplifier, a cabinet, and a microphone type.

  You can use the Model pop-up menu to choose a preconfigured model, or you can build a customized model using the Amp, Speaker, and Mic Type pop-up menus. See Build a custom Bass Amp Designer combo. Your choices remain visible in the pop-up menus.

Bass Amp Designer amplifier models in Logic Pro for iPad

Bass Amp Designer emulates the three most iconic tube bass amps and cabinets from the 1960s through to the late 1980s. The table includes the cabinets that each amplifier is normally matched with.

Amp model	Cabinet	Description
Classic Amp	8 x 10 inch speakers	Emulates a 300-watt tube head introduced in 1969. It is ideal for full, fundamental tones.
Flip Top Amp	1 x 15 inch speaker	Emulates a classic six-tube bass amp with a tuned, closed-back cabinet introduced in 1960. This model is good for a range of musical styles.
Modern Amp	3-way speaker array	Emulates a 12-tube 360-watt head introduced in 1989. It is suitable for many musical styles and is the ideal choice for highly articulated performances.

Bass Amp Designer cabinet models in Logic Pro for iPad

The table outlines the properties of each cabinet model available in Bass Amp Designer.

Cabinet	Description
Modern Cabinet 15″	1 x 15 inch speaker, closed-back design. Very deep and full tone.
Modern Cabinet 10″	1 x 10 inch speaker, closed-back design. A punchy tone.
Modern Cabinet 6″	1 x 6 inch speaker, closed-back design.
Classic Cabinet 8 X 10″	8 x 10 inch speakers, closed-back design.
Flip Top Cabinet 1 X 15″	1 x 15 inch speaker, closed-back design.
Modern 3 Way	1 x 15 inch speaker, 1 x 10 inch speaker, and 1 x 6 inch speaker. You can move the microphone vertically and can position it 20, 30, or 40 cm away from the cabinet.
Direct (PowerAmp Out)	A direct signal from the power stage of the emulated amplifier. The cabinet and microphone are removed from the signal path.
Direct (PreAmp Out)	A direct signal from the pre-amplifier stage of the emulated amplifier. The cabinet, microphone, and power amp are removed from the signal path.

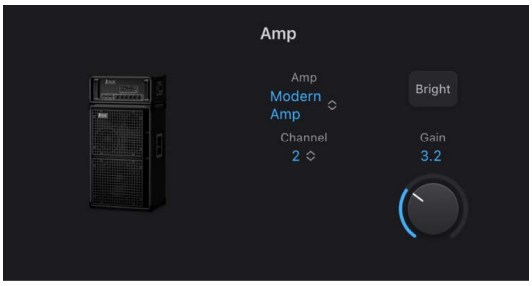
Build a custom Bass Amp Designer combo in Logic Pro for iPad

You can use one of the default models or you can create your own hybrid of different amplifiers, cabinets, and so on, using the Amp, Speaker, and Mic Type pop-up menus.

Note: If you create your own hybrid amp combo, you can save it as a setting file, which also includes any parameter changes you have made.

Choose a Bass Amp Designer amplifier

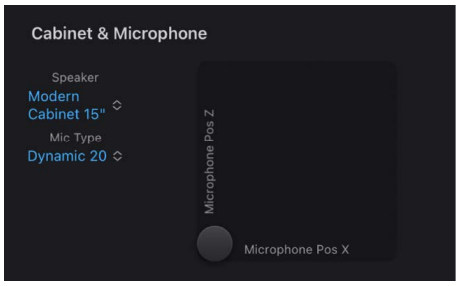
- In Logic Pro, choose an amplifier from the Amp pop-up menu. See Bass Amp Designer amplifier models for details on the characteristics of each amplifier.



Choose a Bass Amp Designer cabinet

Cabinets have a huge impact on the character of a bass guitar sound (see Bass Amp Designer cabinet models).

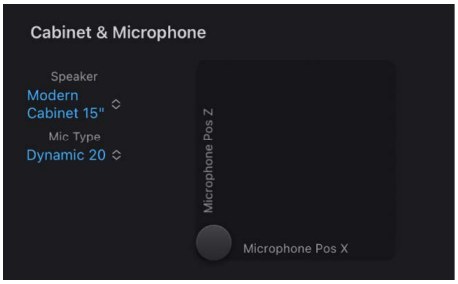
Whereas certain amplifier and cabinet pairings have been popular for decades, departing from them is an effective way to create fresh-sounding tones. You can try random combinations, but if you consider the variables that determine the “sound” of a cabinet, you can make educated guesses about non-traditional amplifier and cabinet combinations.



- In Logic Pro, choose a cabinet from the Speaker pop-up menu.
  - *Old or new speakers:* Some Bass Amp Designer models capture the character of aged speakers. These may be a bit looser and duller sounding than new speakers, but many players prefer them for their smoothness and musicality. Sounds based on new cabinets tend to have more snap and bite.
  - *Large speakers or small speakers:* Try several sizes and choose the one that works best for your music.
  - *Single speakers or multiple speakers:* The number of speakers is less important than it may appear. Phase cancelations occur between the speakers, adding texture and interest to the tone.

Choose a microphone type and placement

1. In Logic Pro, choose a microphone model from the Mic Type pop-up menu.
   - *Condenser 87:* Emulates the sound of a high-end German studio condenser microphone. The sound of condenser microphones is fine, transparent, and well-balanced.
   - *Dynamic 20:* Emulates the sound of popular American dynamic cardioid microphones. This microphone type sounds brighter and more cutting than the Condenser 87 model. The lower-mid frequencies are rolled off, making it a good choice for miking rock tones. It is especially useful if you want your bass guitar part to cut through other tracks in a mix.
   - *Dynamic 421:* Emulates the sound of a German dynamic cardioid microphone. It can capture a wide frequency range and has a slight emphasis of the treble range. It is useful for clean tones.
2. Drag the gray dot in the X/Y pad beside the Mic Type pop-up menu to set the microphone position and distance relative to the cabinet.



Bass Amp Designer signal flow in Logic Pro for iPad

Bass Amp Designer has a two-channel design—one for the pre-amp and one for the Direct Box. You can use these independently or can blend them.



Important: The two channels are always used in parallel if the Amp/DI Mix knob in the Output section is not set to the full left or full right position.

The channel signal flow changes when you choose different models from the Speaker pop-up menu.

Cabinet	Amp/DI Mix position	Channel 1 routing	Channel 2 routing
Any speaker cabinet model	Middle	Pre-amp, power amp, cabinet, mic	Direct Box
Direct (PowerAmp Out)	Middle	Pre-amp, power amp	Direct Box
Direct (PreAmp Out)	Middle	Pre-amp	Direct Box
Any speaker cabinet model	Far left	Pre-amp, power amp, cabinet, mic	
Direct (PowerAmp Out)	Far left	Pre-amp, power amp	
Direct (PreAmp Out)	Far left	Pre-amp	
Direct (PreAmp Out)	Far right		Direct Box

Bass Amp Designer Pre-amp signal flow in Logic Pro for iPad

The pre-amp section is very flexible, and can be used in several ways when you use different combinations of On/Off and Pre/Post options. The signal flow indicated in the Mode column is in series when multiple processors are used—that is, the output of one processor signal is fed into the next processor.

Mode	EQ On/Off	Compressor On/Off	Additional EQ On/Off	Pre/Post switch
All off	Off	Off	Off	
EQ only	On	Off	Off	
Compressor only	Off	On	Off	
Additional EQ only	Off	Off	On	
EQ into Compressor only	On	On	Off	
EQ into Additional EQ only	On	Off	On	
Additional EQ into Compressor only	Off	On	On	Pre
Compressor into Additional EQ only	Off	On	On	Post
All on (EQ into Additional EQ into Compressor)	On	On	On	Pre
All on (EQ into Compressor into Additional EQ)	On	On	On	Post

Use the Bass Amp Designer Direct Box in Logic Pro for iPad

The Direct Box is modeled on a highly regarded American D.I. unit.



Direct Box parameters

- *Gain knob and field:* Set the input gain of the Direct Box.
- *Tone knob and field:* Set the tonal color of the Direct Box. Each number represents a preset EQ curve.
  - *1:* An EQ curve with a -6 dB scoop from 100 Hz to 10 kHz, most pronounced around 800 Hz. Suitable for acoustic and string instruments, electric bass, and keyboards.
  - *2:* An EQ curve with a very pronounced -24 dB v-shaped notch from 100 Hz to 10 kHz, centered around 800 Hz. Suitable for electric bass guitar.
  - *3:* An EQ curve with a -3 dB scoop from 100 Hz to 10 kHz, most pronounced around 800 to 1200 Hz. Suitable for acoustics, strings, electric and bass guitar, and keyboards.
  - *4:* An EQ curve with a -3 dB scoop from 1 kHz to 10 kHz, most pronounced around 8 kHz. Frequencies between 60 Hz and 1 kHz have a slight boost of 1 or 2 dB above unity. Frequencies above 10 kHz have a +3 dB boost. Suitable for acoustics, strings, electric and bass guitars, and keyboards.
  - *5:* A sloped EQ curve that ramps up from -24 dB at 10 Hz to + 3 dB at around 900 Hz. Suitable for acoustic and electric guitar.
  - *6:* A sloped EQ curve that ramps up from -24 dB at 10 Hz to +3 dB at around 900 Hz. The signal rolls off by approximately 6 dB between 10 and 20 kHz. Suitable for electric and bass guitar.
- *HF Cut button:* Turn on a highpass filter. This is used to reduce noise.
- *Tone On/Off button:* Turn on the tone control.
- *Amp/DI Mix knob:* Drag to hear the Direct Box signal alone or in parallel with the amplifier.

Use the Direct Box only

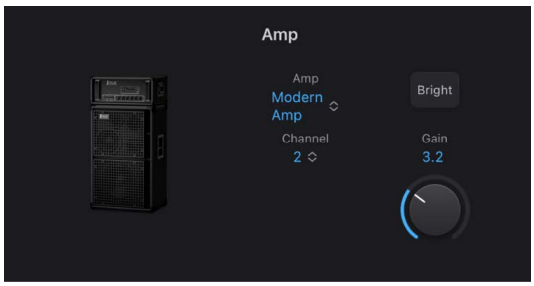
- In the Logic Pro Bass Amp Designer Output section, set the Amp/DI Mix knob to the full right position.

Use the Direct Box and the amplifier in parallel

- In the Logic Pro Bass Amp Designer Output section, set the Amp/DI Mix knob to any central position—not to the full right or the full left position.

Bass Amp Designer amplifier controls in Logic Pro for iPad

The amp parameters include controls for channel selection, input filter and gain, and master output. The Gain knob is located in the Amp section, the Master knob is in the Amp Out section, and the Output Gain slider is found in the Output section.



Amplifier parameters

- *Amp pop-up menu:* Choose an amplifier model.
- *Channel pop-up menu:* Choose channel I or channel II.
  - Channel I is active, with a gain of 0 dB.
  - Channel II is passive, with a gain of -15 dB.
- *Bright button:* Tap to switch between normal and bright modes. When bright is active, highs and upper mids are added to the tone.

  Note: The increased mid and high range may lead to a perceived low end roll-off. Use the Bass EQ knob if you feel the bottom end needs a boost.
- *Gain knob and field:* Set the amount of preamplification applied to the input signal. The Gain knob affects amp models differently.
- *Master knob and field:* Set the output volume of the amplifier signal sent to the cabinet. Increasing the Master level typically produces a compressed and saturated sound, resulting in a more distorted and louder signal.

  Note: If you choose *Direct (PowerAmp Out)* from the Speaker pop-up menu, the output signal is routed directly to the Amp/DI Mix knob. However, if you choose *Direct (PreAmp Out)* from the Speaker pop-up menu, the Master knob acts as a pre-amp master gain control before the output signal is routed to the Amp/DI Mix knob.
- *Output Gain control and field:* Set the final output level of Bass Amp Designer.

Effects

Bass Amp Designer effects in Logic Pro for iPad

Bass Amp Designer provides multiple EQ units and EQ types to sculpt your instrument tones.

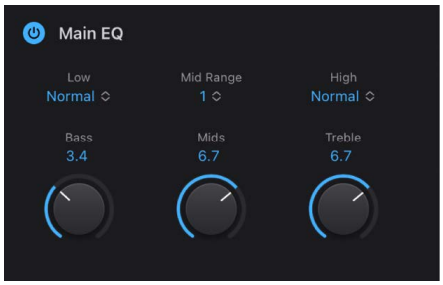
It provides a main EQ that mirrors the tonal qualities of the integrated EQ of the amplifier model you choose, if applicable. All amplifier model EQs have identical controls: Bass, Mids, and Treble. See Main EQ.

Bass Amp Designer also offers an additional Graphic or Parametric EQ. See Graphic EQ and Parametric EQ.

Bass Amp Designer also integrates a dedicated, custom-built compression circuit that is optimized for electric bass. See Compressor.

Bass Amp Designer Main EQ in Logic Pro for iPad

The Main EQ section contains a larger and more inclusive set of the EQ units found in the three original bass amps emulated by Bass Amp Designer.



Main EQ parameters

- *Main EQ On/Off button:* Turn the EQ (tone controls) on or off.
- *Low pop-up menu:* Choose from three options that affect the tone and behavior of the Bass EQ knob.
- *Mid Range pop-up menu:* Switch between three positions that affect the tone and behavior of the Mids EQ knob.
- *High pop-up menu:* Switch between two positions that affect the tone and behavior of the Treble EQ knob.
- *Bass, Mids, and Treble knobs:* Adjust the frequency ranges of the EQ, similar to the tone knobs on a hardware amplifier.

Bass Amp Designer Compressor in Logic Pro for iPad

The internal compression circuit is custom-built for use with Bass Amp Designer. It features an AutoGain function that compensates for volume reductions caused by compression.



Compressor parameters

- *Compressor On/Off button:* Turn the compressor on or off.
- *Attack pop-up menu:* Switch between two compression algorithms.
  - *Soft:* Compression with a slow attack and longer sustain phase.
  - *Hard:* Stronger compression, with good control over levels, which makes it easier to fit the bass into an arrangement.
- *Amount knob:* Set the amount of compression intensity applied to the input signal.
- *Gain slider:* Add gain to, or subtract gain from, the gain staging of the internal AutoGain feature.

  Note: AutoGain is always active.

Bass Amp Designer Graphic EQ in Logic Pro for iPad

Bass Amp Designer offers an additional Graphic EQ or Parametric EQ that is independent from the Main EQ.

Note: The additional EQ defaults to a pre-Compressor position in the signal flow.



Graphic EQ parameters

- *Graphic/Parametric EQ On/Off button:* Turn the graphic EQ on or off.
- *Type pop-up menu:* Choose the Graphic EQ or Parametric EQ.

  Graphic and Parametric EQ parameter settings are retained when switching between EQ types and when the additional EQ is turned off. This allows quick A/B comparisons.
- *Position pop-up menu:* Choose whether the additional EQ is inserted before or after—pre or post—the Compressor module in the signal path.

  Note: This parameter is relevant only if the Compressor is turned on.
- *Frequency sliders:* Set the amount of boost or cut for each frequency band.

Bass Amp Designer Parametric EQ in Logic Pro for iPad

Bass Amp Designer offers an additional Graphic EQ or Parametric EQ that is independent from the Main EQ. The Parametric EQ provides two EQ bands:

- *Low-Mid:* Controls frequencies in the low and low-mid range. Use the LMF Gain, Freq, and Q parameters to adjust this frequency band.
- *High-Mid:* Controls frequencies in the high and high-mid range. the HMF Gain, Freq, and Q parameters to adjust this frequency band.

Note: The additional EQ defaults to a pre-Compressor position in the signal flow.



Parametric EQ parameters

- *Graphic/Parametric EQ On/Off button:* Turn the parametric EQ on or off.
- *Type pop-up menu:* Choose the Graphic EQ or Parametric EQ.

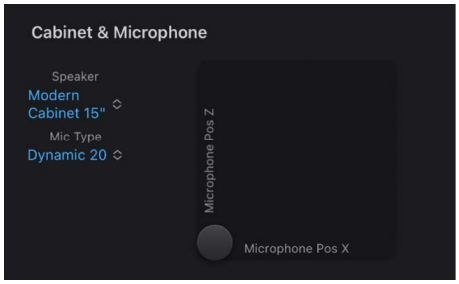
  Graphic and Parametric EQ parameter settings are retained when switching between EQ types and when the additional EQ is turned off. This allows quick AB comparisons.
- *Position pop-up menu:* Choose whether the additional EQ is inserted before or after—pre or post—the Compressor module in the signal path.

  Note: This parameter is relevant only if the Compressor is turned on.
- *LMF/HMF Gain knobs:* Adjust the amount of cut or boost applied to the frequency range set with the corresponding Freq knob.
- *LMF/HMF Freq knobs:* Set the frequency range you want to cut or boost with the corresponding Gain knob.
- *LMF/HMF Q knobs:* Set the width of the band surrounding the frequency set with the corresponding Freq knob.

  The lower the Q knob value, the wider the band, which means that more frequencies are affected. The higher the Q knob value, the narrower the band, which means that only the frequencies nearest to the frequency set with the Freq knob are affected.

Bass Amp Designer cab and mic controls in Logic Pro for iPad

Bass Amp Designer offers three virtual microphone types and several speaker cabinet options. As with other components in the tone chain, different selections can yield different results. After choosing a cabinet, you can choose the type of microphone to emulate and you can adjust the position of the microphone, relative to the cabinet.



Microphone parameters

- *Speaker pop-up menu:* Choose a speaker cabinet. See Bass Amp Designer cabinet models and Choose a Bass Amp Designer cabinet. Also see Use the Bass Amp Designer Direct Box.
- *Mic Type pop-up menu:* Choose a microphone model.
  - *Condenser 87:* Emulates the sound of a high-end German studio condenser microphone. The sound of condenser microphones is fine, transparent, and well-balanced.
  - *Dynamic 20:* Emulates the sound of popular American dynamic cardioid microphones. This microphone type sounds brighter and more cutting than the Condenser 87 model. The lower-mid frequencies are rolled off, making it a good choice for miking rock tones. It is especially useful if you want your bass guitar part to cut through other tracks in a mix.

- *Dynamic 421:* Emulates the sound of a German dynamic cardioid microphone. It can capture a wide frequency range and has a slight emphasis of the treble range. It is useful for clean tones.

Tip: Combining multiple microphone types can produce an interesting sound. Duplicate the bass guitar track, and insert Bass Amp Designer on both tracks. Select different microphones in each Bass Amp Designer instance while retaining identical settings for all other parameters, then set track signal levels.

- *X/Y pad:* Microphone position is indicated by the gray dot in the X/Y pad. Drag the dot to change microphone position and distance. Placement is relative to the cabinet and is limited to near-field positioning.

  By default, the gray dot is placed in the center of the speaker cone (on-axis). This placement produces a fuller, more powerful sound. If you place the microphone on the rim of the speaker (off-axis), you obtain a brighter, thinner tone. Moving the microphone closer to the speaker emphasizes bass response.

Stompboxes

Stompboxes in Logic Pro for iPad

Logic Pro for iPad Stompboxes simulate the sound of many famous pedal effects.

To add a stompbox to your project, choose Amps and Pedals > Stompboxes > Category > Stompbox name in a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

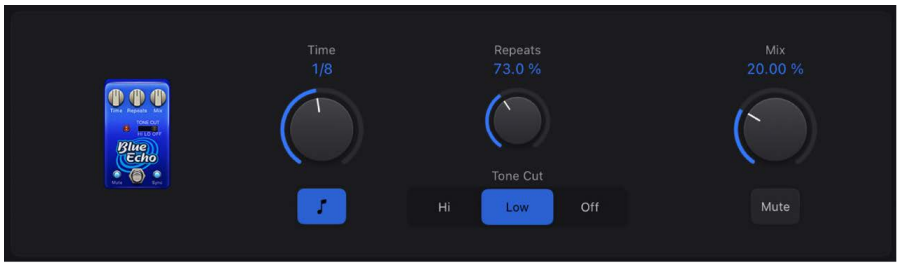
Each stompbox is grouped into a category, such as distortion. Parameters of individual pedals are described in these sections:

- Delay pedals
- Distortion pedals
- Dynamics pedals
- Filter pedals
- Modulation pedals
- Pitch pedals

Delay pedals in Logic Pro for iPad

Blue Echo

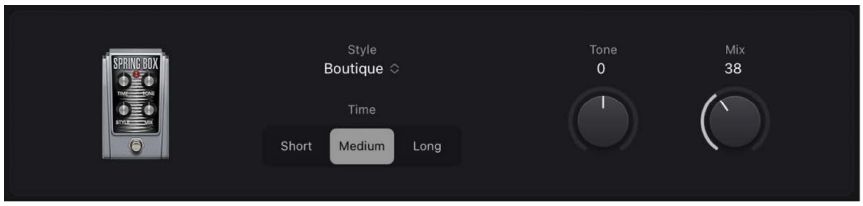
Blue Echo is a simple delay effect.



- *Time knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Repeats knob:* Determine the number of delay repeats.
- *Mix knob:* Set the level balance between source and effect signals.
- *Sync button:* Turn on to synchronize the Time value with the host tempo.
- *Tone Cut buttons:* Choose a fixed frequency internal filter circuit that allows more high (Hi) or low (Low) frequency content to be heard. Choose Off to turn off the filter.
- *Mute button:* Passes the source signal through to the next pedal, while delay repeats continue.

Spring Box

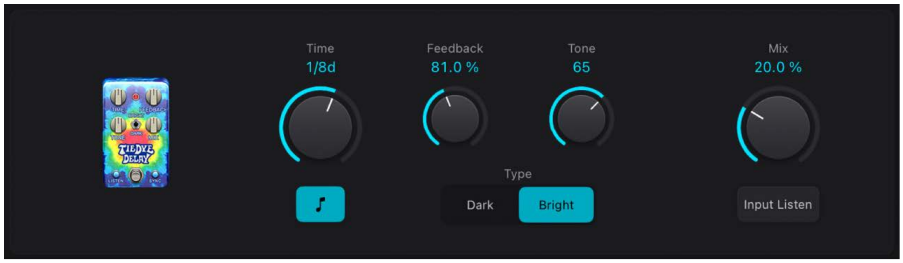
Spring Box emulates a spring reverb effect.



- *Style pop-up menu:* Switches between algorithms, each with different characteristics. You can choose Boutique, Simple, Vintage, Bright, or Resonant.
- *Time buttons:* Set the length of the reverberation to short, medium, or long values.
- *Tone knob:* Set the cutoff frequency, making the effect brighter or darker.
- *Mix knob:* Set the level balance between source and effect signals.

Tie Dye Delay

Tie Dye Delay is a warm-sounding reverse delay effect that's perfect for fans of 1960s and 1970s psychedelic rock.



- *Time knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Feedback knob:* Set the amount of effect output sent to the effect input, changing the tonal color, making the effect more pronounced, or both.
- *Tone knob:* Set the cutoff frequency, making the effect brighter or darker.
- *Sync button:* Turn on to synchronize the Time value with the host tempo.
- *Type buttons:* Both Dark and Bright apply a fixed frequency internal EQ.
- *Mix knob:* Set the level balance between source and effect signals.
- *Input Listen button:* Passes the source signal through to the next pedal while delay repeats continue.

Tru-Tape Delay

Tru-Tape Delay emulates a vintage tape delay effect.

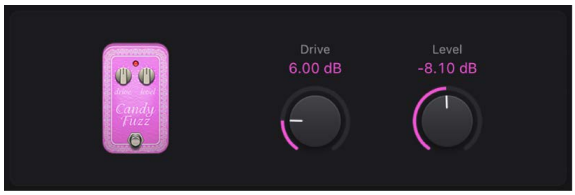


- *Time knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Time value with the host tempo.
- *Feedback knob:* Set the amount of effect output sent to the effect input. The buildup of repeating signals can be used creatively for dub-delay and other effects by adjusting Feedback in real time.
- *Mix knob:* Set the level balance between source and effect signals.
- *Mode buttons:* Change the delay playback direction.
- *Lo/Hi Cut knobs:* Adjust the range of the fixed frequency internal EQ.
- *Dirt knob:* Set the amount of input signal gain, which can introduce an overdriven, saturated quality.
- *Flutter knob:* Emulate speed fluctuations in the tape transport mechanism.

Distortion pedals in Logic Pro for iPad

Candy Fuzz

Candy Fuzz is a bright, “nasty” distortion effect.



- *Drive knob:* Set the input gain.
- *Level knob:* Set the effect output volume.

Double Dragon

Double Dragon is a deluxe distortion effect.



- *Drive knob:* Set the amount of saturation applied to the input signal.
- *Tone knob:* Set the cutoff frequency.
- *Level knob:* Set the output level.
- *Input knob:* Set the input level.
- *Squash knob:* Set the threshold for the internal compression circuit.
- *Contour knob:* Set the amount of nonlinear distortion applied to the signal.
- *Mode buttons:* Choose between two fixed high shelving filter frequencies.
- *Mix knob:* Set the ratio between the source and distorted signals.

Fuzz Machine

Fuzz Machine emulates an American “fuzz” distortion effect.



- *Fuzz knob:* Set the input gain.
- *Tone knob:* Increase treble, while simultaneously reducing low frequencies, as you move it to higher values.
- *Level knob:* Set the output level.

Grinder

Grinder is a lo-fi dirty “metal” distortion.



- *Grind knob:* Set the amount of drive applied to the input signal.
- *Filter knob:* Make the sound harsher and more crunchy at higher values.
- *Full/Scoop buttons:* Choose between two fixed Gain/Q filter settings. At the Full position, filtering is less pronounced than at the Scoop position.
- *Level knob:* Set the output level.

Grit

Grit is a hard and nasty filtered distortion effect that sounds great on keyboards and guitars.



- *Volume knob:* Set the amount of drive applied to the input signal.
- *Filter knob:* Make the sound harsher and more crunchy at higher values.
- *Distortion knob:* Set the amount of drive applied to the output signal.

Happy Face Fuzz

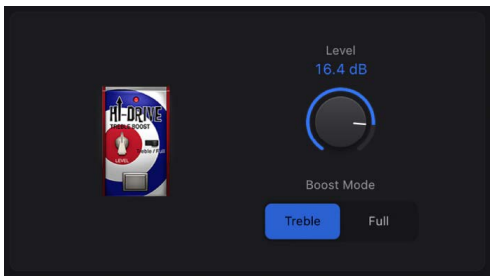
Happy Face Fuzz is a softer, full-sounding distortion effect.



- *Fuzz knob:* Set the amount of saturation applied to the input signal.
- *Volume knob:* Set the output level.

Hi-Drive

Hi-Drive is an overdrive effect that can emphasize high frequency content in the signal.



- *Level knob:* Set the output level.
- *Boost Mode buttons:* Set a fixed shelving frequency, allowing either the treble portion or the full range input signal to be processed.

Monster Fuzz

Monster Fuzz is a saturated, slightly harsh distortion.



- *Roar knob:* Set the amount of gain applied to the input signal.
- *Growl knob:* Set the amount of saturation.
- *Tone knob:* Set the overall color of the distortion. Higher values increase treble with a corresponding decrease in overall volume.
- *Texture knob:* Smooth or roughen the distortion.
- *Grain knob:* Set the amount of nonlinear distortion applied to the signal.
- *Level knob:* Set the output level.

Octafuzz

Octafuzz is a fat fuzz effect that can deliver a soft, saturated distortion.



- *Fuzz knob:* Set the amount of gain applied to the input signal.
- *Level knob:* Set the output level.
- *Tone knob:* Set the cutoff frequency of the integrated highpass filter.

Rawk! Distortion

Rawk! Distortion is a metal/hard rock distortion effect.



- *Crunch knob:* Set the amount of saturation applied to the input signal.
- *Level knob:* Set the output level.
- *Tone knob:* Set the tonal color. High values are brighter.

Tube Burner

Tube Burner emulates a vacuum tube-based distortion that provides a wide palette of sounds, ranging from warm grain to crispy overdrive.



- *Low knob:* Set the low frequency gain.
- *Mid Freq knob:* Set the center frequency.

- *Mid Gain knob:* Set the mid frequency level. This affects the range between the Low and High knob values.
- *Bias knob:* Adjust to add or avoid crossover distortion.
- *Squash knob:* Set the threshold for the internal compression circuit.
- *Fat button:* Set at the top position to enhance low frequency content in the signal.
- *High knob:* Set the high frequency gain.
- *Tone knob:* Set the tonal color. High values are harsher.
- *Drive knob:* Set the amount of saturation applied to the signal pre-output.
- *Output knob:* Set the output level.

Vintage Drive

Vintage Drive is an overdrive effect that emulates the distortion produced by a field-effect transistor (FET), commonly used in solid-state amplifiers. When saturated, FETs generate a warmer-sounding distortion than bipolar transistors, such as those emulated by Grinder.



- *Drive knob:* Set the amount of saturation applied to the input signal.
- *Tone knob:* Set the tonal color. High values are harsher.
- *Level knob:* Set the output level.
- *Fat button:* Turn on to enhance low frequency content in the signal.

Dynamics pedals in Logic Pro for iPad

Squash Compressor

Squash Compressor is a simple compressor effect.



- *Sustain knob:* Set the threshold level. Signals above this value are reduced in level.
- *Level knob:* Set the overall output gain.
- *Attack buttons:* Choose Fast for signals with fast attack transients, such as drums. Choose Slow for signals with slow attack phases, such as strings.

Filter pedals in Logic Pro for iPad

Auto-Funk

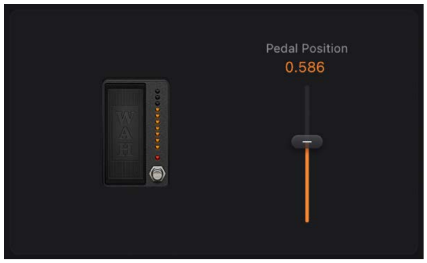
Auto-Funk is an auto-wah (filter) effect.



- *Sensitivity knob:* Set a threshold that determines how the filter responds to incoming signal levels.
- *Cutoff knob:* Set the center frequency for the filter.
- *BP/LP pop-up menu:* BP (Bandpass): Signal frequencies just above and below the cutoff are filtered. LP (Lowpass): Only signals below the cutoff are allowed through the filter.
- *Hi/Lo pop-up menu:* Choose a preset filter resonance setting.
- *Up/Down pop-up menu:* Set a positive or negative modulation direction—the “wah” filtering occurs above or below the source signal frequency.

Classic Wah

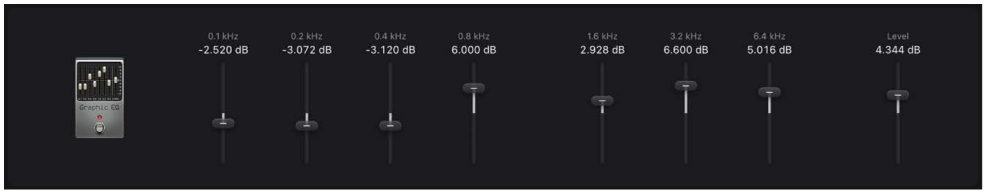
Classic Wah is a funky wah effect, straight from 1970s TV police show soundtracks.



- *Pedal Position control:* Adjust the pedal position and therefore the effect intensity and level.

Graphic EQ

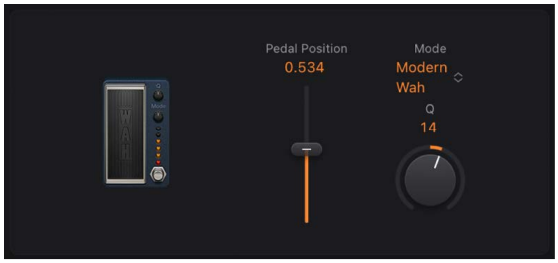
Graphic EQ is a classic 7-band EQ pedal.



- *Frequency sliders:* Boost or cut the corresponding frequency band.
- *Level control:* Set the overall output gain.

Modern Wah

Modern Wah is a more aggressive wah effect.



- *Pedal Position control:* Adjust the pedal position to add expression.
- *Mode pop-up menu:* Choose a Wah type or control Volume. Each Wah type has a different tonal quality.
- *Q knob:* Low Q values affect a wider frequency range, resulting in softer resonances. High Q values affect a narrower frequency range, resulting in more pronounced emphasis.

Modulation pedals in Logic Pro for iPad

Flange Factory

Flange Factory is a deluxe flanging effect with precise sound control features.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Depth knob:* Set the strength of the effect.
- *Shape knob:* Alter the shape of the modulation waveform.
- *Curve knob:* Smooth the waveform shape.
- *Wave buttons:* Switch between modulation waveforms.
- *Manual knob:* Set a delay time between the source and effect signals. This can result in flanger-chorus effects, or in edgier-sounding modulations.
- *Reso knob:* Determine the amount of cutoff frequency resonance.
- *High knob:* Set the high frequency cutoff.
- *Low knob:* Set the low frequency cutoff.
- *Mix knob:* Set the level balance between the flanging and source signals.

Heavenly Chorus

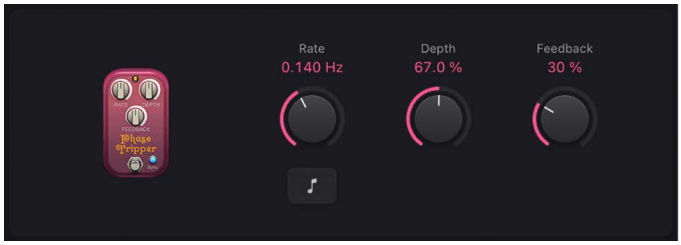
Heavenly Chorus is a rich, sweet-sounding chorus effect that thickens the sound.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Depth knob:* Set the strength of the effect.
- *Feedback knob:* Set the amount of effect output sent to the effect input, thickening the sound or leading to intermodulations.
- *Density knob:* Set the ratio between the original and effect signals.
- *Bright button:* Set at the top position to apply a fixed frequency internal EQ. Bottom position bypasses the EQ.

Phase Tripper

Phase Tripper is a simple phasing effect.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Depth knob:* Set the strength of the effect.
- *Feedback knob:* Set the amount of effect output sent to the effect input, changing the tonal color, making the sweeping effect more pronounced, or both.

Phaze 2

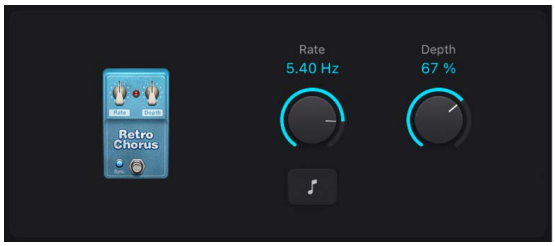
Phaze 2 is a flexible dual-phaser effect.



- *Phaser 1/2 Rate knobs:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Phaser 1/2 Sweep Floor/Ceiling knobs:* Set the lower and upper limits of the frequency range that is swept.
- *Phaser 1/2 Order knobs:* Switch between algorithms, with higher (even) numbers resulting in a heavier phasing effect. Odd order numbers result in more subtle comb-filtering effects.
- *Phaser 1/2 Feedback knobs:* Set the amount of effect output sent to the effect input, changing the tonal color, making the phasing effect more pronounced, or both.
- *Phaser 1/2 Tone knobs:* Rotate left to increase the amount of lowpass filtering. Rotate right to increase the amount of highpass filtering.
- *Output Mix knob:* Set the level balance between each phaser.
- *Sync button:* Turn on to synchronize the Rate values of both LFOs with the host tempo.

Retro Chorus

Retro Chorus is a subtle vintage chorus effect.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Depth knob:* Set the strength of the effect.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.

Robo Flanger

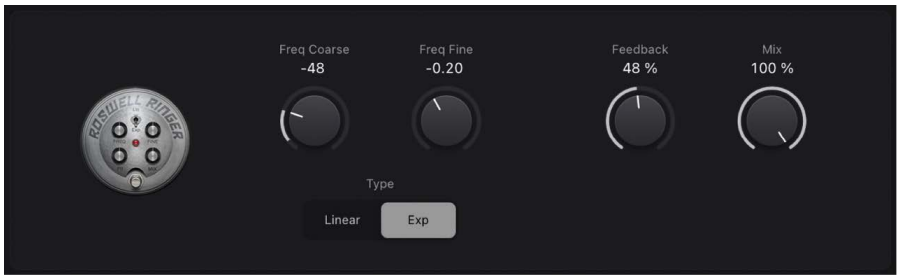
Robo Flanger is a flexible flanging effect.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Depth knob:* Set the strength of the effect.
- *Feedback knob:* Set the amount of effect output sent to the effect input, changing the tonal color, making the flanging effect more pronounced, or both.
- *Manual knob:* Set a delay time between the source and effect signals. This can result in flanger-chorus effects, or in metallic-sounding modulations, particularly when used with high Feedback values.

Roswell Ringer

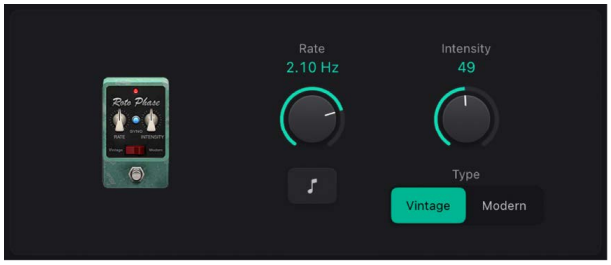
Roswell Ringer is a ring modulation effect that can make incoming audio sound metallic or unrecognizable, and can deliver tremolos, brighten up signals, and more. See Ringshifter for information on ring modulation.



- *Freq Coarse knob:* Set the frequency shift value.
- *Freq Fine knob:* Fine-tune the frequency shift.
- *Type buttons:* Set the frequency curve to linear—with 12 notes per octave—or exponential.
- *Feedback knob:* Set the amount of effect output sent to the effect input, changing the tonal color, making the effect more pronounced, or both.
- *Mix knob:* Set the level balance between the source and effect signals.

Roto Phase

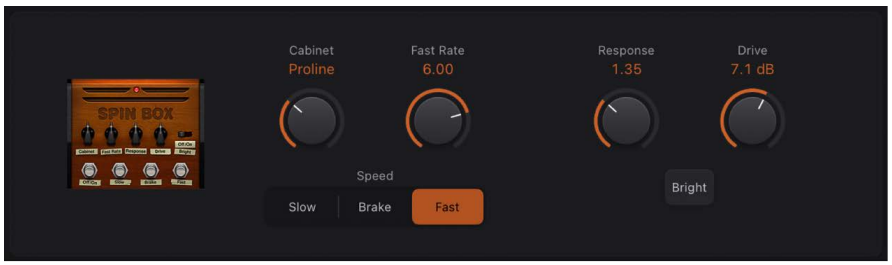
Roto Phase is a phaser effect that adds movement to, and alters the phase of, the signal.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Intensity knob:* Set the strength of the effect.
- *Type buttons:* Vintage turns on a fixed-frequency internal EQ. Modern turns off the EQ.

Spin Box

Spin Box emulates a Leslie speaker cabinet, commonly used with the Hammond B3 organ.



- *Cabinet knob:* Switch between speaker box types.
- *Fast Rate knob:* Set the maximum modulation speed; this applies only when the Fast button is active.
- *Speed buttons:* Determine speaker behavior: Slow rotates the speaker slowly. Fast rotates the speaker quickly, up to the maximum speed set with the Fast Rate knob. Brake stops speaker rotation.
- *Response knob:* Set the amount of time required for the rotor to reach its maximum and minimum speed.
- *Drive knob:* Set the amount of input gain, which introduces distortion.
- *Bright button:* Turn on to mimic a forward-facing speaker horn in the cabinet, resulting in a brighter tone.

The Vibe

The Vibe is a vibrato/chorus effect based on the Scanner vibrato effect unit found in the Hammond B3 organ.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Depth knob:* Set the strength of the effect.
- *Type knob:* Choose from three vibrato (V1–3) or chorus (C1–3) variations.

Total Tremolo

Total Tremolo is a flexible tremolo effect—modulation of the signal level.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Depth knob:* Set the strength of the effect.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Wave knob:* Set the (continuously variable) modulation waveform shape.
- *Smoothing knob:* Change the waveform shape.
- *Volume knob:* Set the post-tremolo gain.
- *Speed Up button:* Hold down to gradually accelerate the current Rate value to the maximum possible value.
- *Slow Down button:* Hold down to gradually reduce the current Rate value to the minimum possible value.
- *Speed buttons:* Set a Normal, Half, or Double speed for the current Rate value.

Trem-O-Tone

Trem-O-Tone is a simple tremolo effect—modulation of the signal level.



- *Rate knob:* Set the modulation speed in hertz, or synchronized with the host tempo when you turn on the Sync button.
- *Sync button:* Turn on to synchronize the Rate value with the host tempo.
- *Depth knob:* Set the strength of the effect.
- *Level knob:* Set the post-tremolo gain.

Pitch pedals in Logic Pro for iPad

Dr. Octave

Dr. Octave is a classic octaver effect with two independent octave controls plus an integrated overdrive.



- *Octave 1/2 knobs:* Set the level of each octave-shifted signal.
- *Direct knob:* Set the balance between the direct and Octave 1 or 2 signals.
- *Drive knob:* Set the amount of saturation applied to the output signal.

Wham

Wham is a pedal-controlled pitch shifter.



- *Pedal Position control:* Adjust the pedal position and therefore the intensity of the effect.
- *Tune knob:* Set the frequency.
- *Mix knob:* Set the level balance between the source and pitch-shifted signals.

Delay effects

Delay effects in Logic Pro for iPad

Delay effects store the input signal—and hold it for a short time—before sending it to the effect input or output.

The delayed signal creates a repeating echo effect after a given time period. Each subsequent repeat is a little quieter than the previous one. Most delays also let you feed a percentage of the delayed signal back to the input. This can result in a subtle, chorus-like effect or cascading, chaotic audio output.

The delay time can often be synchronized to the project tempo by matching the grid resolution of the project, usually in note values or milliseconds.

You can use delays to double individual sounds to resemble a group of instruments playing the same melody, to create echo effects, to place the sound in a large "space," to generate rhythmic effects, or to enhance the stereo position of tracks in a mix.

Delay effects are generally used as channel insert or bussed effects. They are rarely used on an overall mix (in an output channel), unless you're trying to achieve an unusual effect.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Delay Designer

Delay Designer in Logic Pro for iPad

Delay Designer is a multitap delay. Unlike traditional delay units that offer only one or two delays (or taps) that may or may not be fed back into the circuit, Delay Designer provides up to 26 individual taps. These taps are all fed from the source signal and can be edited to create unique delay effects.

Delay Designer provides control over the level, pan position, and pitch of each tap. Each tap can also be lowpass or highpass filtered.

Further effect-wide parameters include synchronization, quantization, and feedback.

As the name implies, Delay Designer offers significant sound design potential. You can use it for everything from a basic echo effect to an audio pattern sequencer. You can create complex, evolving, moving rhythms by synchronizing the placement of taps. This leads to further musical possibilities when coupled with judicious use of transposition and filtering. Alternatively, you can set up numerous taps as repeats of other taps, much as you would use the feedback control of a simple delay effect, but with individual control over each repeat.

To add Delay Designer to your project, choose Delay > Delay Designer in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



The Delay Designer interface consists of four main sections:

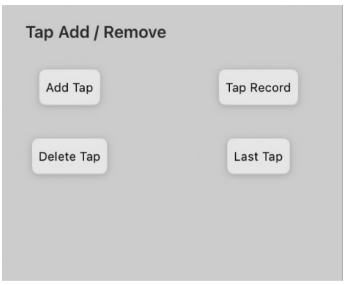
- *Tap Add/Remove:* You can record or manually create taps in Delay Designer. See Create Delay Designer taps.
- *Tap Edit:* You can view and edit the parameters of the selected tap in this area. See Tap Edit controls.
- *Feedback:* You can set all Delay Designer feedback parameters in this area. See feedback parameters.
- *Global and Output:* You can set global synchronization, quantization and mix parameters. See Use Delay Designer sync mode.

Create Delay Designer taps in Logic Pro for iPad

You can create new delay taps in two ways: by recording them in real time or by manually adding them.

The fastest way to create multiple taps is to record them in real time. If you have a specific rhythm in mind, you can quickly tap out your pattern.

Taps are assigned letters, based on their order of creation. The first tap to be created is assigned as Tap A, the second tap is assigned as Tap B, and so on. Once assigned, each tap is always identified by the same letter, even when moved in time, and therefore reordered. For example, if you initially create three taps, they are named Tap A, Tap B, and Tap C. If you then change the delay time of Tap B so that it precedes Tap A, it is still called Tap B.



Record taps in real time

1. In Logic Pro, tap the Tap Record button repeatedly.

   Delay repeats (taps) are created at the exact moments in time of each of your finger taps, adopting the rhythm of your pattern.

   Note: When you initially tap the Tap Record button, it automatically erases all existing taps.

2. To finish tap recording, tap the Last Tap button.

   The final tap is added, ending tap recording, and assigning the last tap as the feedback tap (for more information about the feedback tap, see Delay Designer feedback parameters).

   Note: If you do not tap the Last Tap button, tap recording automatically stops after 10 seconds or when the 26th tap is created, whichever comes first.

Create a tap manually

- In Logic Pro, tap the Add Tap button.

  A tap is created, named, and positioned automatically. Automatic positioning is in accordance with the Grid pop-up menu value. You can manually adjust the tap position with the Tap Time knob.

Select and edit Delay Designer taps in Logic Pro for iPad

There is always at least one selected tap, shown in the Tap by Name and Tap by Time pop-up menu fields in the Tap Edit Select section.



You can move a tap backward or forward in time, or completely remove it.

Note: When you move a tap, you're actually editing its delay time.

Select a tap

In Logic Pro, do one of the following:

- Choose the tap letter in the Tap by Name pop-up menu in the Tap Edit Select section.
- Choose the tap number in the Tap by Time pop-up menu in the Tap Edit Select section.

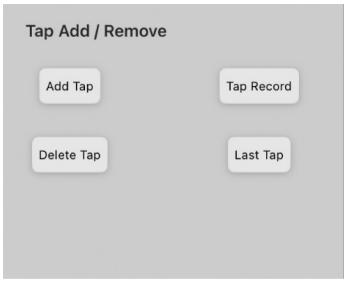
Move a selected tap in time

- In Logic Pro, adjust the Tap Time knob value in the Delay Time / Level section.

  Tip: You can tap the Tap Time field to open a numeric keypad where you can type in a value. Tap the Done button to complete your entry.

Delete a tap

- In Logic Pro, select a tap in the Tap by Name or Tap by Time pop-up menu in the Tap Edit Select section, then tap the Delete Tap button.



Delay Designer Tap Edit controls in Logic Pro for iPad

The Tap Edit controls let you edit all parameters of the selected tap.



Tap select parameters

- *Tap by Name/Time pop-up menus and fields:* Choose the selected tap by name or number. The display of the corresponding fields are updated, along with other parameter values for the selected tap.

Tap Edit parameters

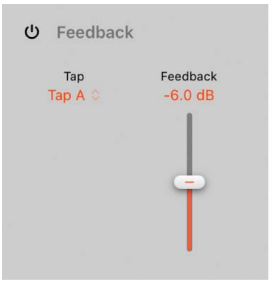
- *Tap Mute buttons:* Tap the Active button to turn on the selected tap, or tap the Muted button to turn off the selected tap.
- *Tap Time knob and field:* Set the time position of the selected tap.
- *Tap Level slider and field:* Set the output level for the selected tap.
- *Pan Amount knob and field:* Set pan position for mono signals or stereo balance for stereo signals.
  - Pan displays a percentage between -100% (full left) and +100% (full right), which represents the pan position or balance of the tap. A value of 0% represents the center panorama position.
- *Pan Flip Left/Right button:* Swap the left and right side of the stereo image, reversing the tap position from left to right, or vice versa. For example, if a tap is set to 55% left, tapping the Pan Flip Left/Right button swaps it to 55% right.
- *Pan Spread slider and field:* Set the width of the stereo spread for the selected tap (in stereo-to-stereo instances).
- *Filter On/Off button:* Turn the highpass and lowpass filters on or off for the selected tap.
- *Filter Slope pop-up menu:* Determine the steepness of the highpass and lowpass filter slope. Choose 6dB for a gentler filter slope, or 12dB for a steeper, more pronounced filtering effect.

  Note: You cannot set the slope of the highpass and lowpass filters independently.
- *HP/LP Freq sliders and fields:* Independently set the cutoff frequencies (in Hz) for the highpass and lowpass filters.
- *Filter Resonance knob and field:* Set the amount of filter resonance for both filters.
- *Pitch On/Off button:* Turn pitch transposition on or off for the selected tap.
- *Pitch Transpose knob and field:* Drag to transpose pitch by semitones for the selected tap.

Delay Designer feedback parameters in Logic Pro for iPad

In simple delays, the only way for the delay to repeat is to use feedback. Because Delay Designer offers 26 taps, you can use these taps to create repeats, rather than requiring discrete feedback controls for each tap.

The global Feedback parameter does, however, allow you to send the output of one user-defined tap back through the effect input, to create a self-sustaining rhythm or pattern. This tap is known as the *feedback tap*.



Feedback parameters

- *Feedback On/Off button:* Turn the feedback tap on or off.
- *Tap pop-up menu:* Choose a tap as the feedback tap.
- *Feedback slider and field:* Set the feedback tap output level before it is routed back into the input.
  - A value of 0% equals no feedback.
  - A value of 100% sends the feedback tap back into the input at full volume.

  Note: If Feedback is turned on and you begin creating taps with the Tap Record button, Feedback is automatically turned off. When you stop recording taps, Feedback is automatically turned on again.

Delay Designer global and output controls in Logic Pro for iPad

Delay Designer can either synchronize to the project tempo or can run independently. When in synchronized mode (sync mode), taps snap to a grid of musically relevant positions, based on note durations. You can also set a Swing value in sync mode, which varies the precise timing of the grid, resulting in a laid-back, less robotic feel for each tap. When not in sync mode, taps don't snap to a grid, nor can you apply the Swing value.

When sync mode is on, all taps are moved toward the closest delay time value on the project timing grid. Subsequently created or moved taps are snapped to positions on the grid.

When you save a Delay Designer setting, the sync mode status, Grid value, grid position of each tap, and Swing value are all saved. This ensures that a setting loaded into a project with a different tempo retains the relative positions, and rhythm, of all taps—at the new tempo.

Note: Delay Designer has a maximum delay time of 10 seconds. This means that if you load a setting into a project with a slower tempo (than the tempo saved with the setting), some taps may fall outside the 10 second limit. In such cases, these taps do not play but are retained as part of the setting.



Global and Output parameters

- *Sync to Tempo button:* Turn synchronized mode on or off.
- *Grid pop-up menu:* Choose a grid resolution from several musical note durations. The grid resolution (and project tempo) sets the length of each grid increment. As you change grid resolutions, grid increments change accordingly. This also determines a step limitation for all taps.

  For example, imagine a project with a tempo of 120 bpm. The Grid pop-up menu value is set to 1/16 notes. At this tempo and grid resolution, each grid increment is 125 milliseconds (ms) apart. If Tap A is currently set to 380 ms, turning on sync mode shifts Tap A to 375 ms. If you try to move Tap A forward in time, it snaps to 500 ms, 625 ms, 750 ms, and so on. At a resolution of 1/8 notes, the steps are 250 milliseconds apart, so Tap A automatically snaps to the nearest division (500 ms) and could be moved to 750 ms, 1000 ms, 1250 ms, and so on.
- *Swing slider and field:* Determine how close to the absolute grid position every second grid increment will be.
  - A setting of 50% means that every grid increment has the same value.
  - Settings below 50% result in every second increment being shorter in time.
  - Settings above 50% result in every second grid increment being longer in time.

  Tip: Use subtle grid position variations of every second increment (values between 45% and 55%) to create a less rigid rhythmic feel. High Swing values are unsubtle because they place every second increment directly beside the subsequent increment. Make use of higher values to create interesting and intricate double rhythms with some taps, while retaining the grid to lock other taps into more rigid synchronization with the project tempo.
- *Dry and Wet controls:* Independently set the levels of the dry input signal and the post-processing wet signal.

Echo in Logic Pro for iPad

This simple echo effect always synchronizes the delay time to the project tempo, enabling you to quickly create echo effects that run in time with your composition.

To add Echo to your project, choose Delay > Echo in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Echo parameters

- *Time control and field:* Choose the grid resolution of the delay time in musical note durations, based on the project tempo. Notes (including dotted note values) are displayed above the Time knob.
- *Double and Halve Time buttons:* Double or halve the current delay time.
- *Feedback knob and field:* Determine how often the delay effect is repeated.
- *Color knob and field:* Set the harmonic content (color) of the delay signal.
- *Dry and Wet controls and fields:* Set the amount of original and effect signal.

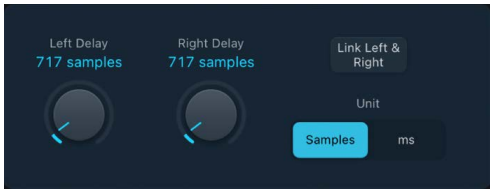
Sample Delay in Logic Pro for iPad

Sample Delay is more a utility than an effect—you can use it to delay a channel by sample or millisecond values.

When used in conjunction with the phase inversion capabilities of the Gain effect, Sample Delay is useful for correcting timing problems that may occur with multichannel microphones. It can also be used creatively to emulate stereo microphone channel separation.

Every sample at a frequency of 44.1 kHz is equivalent to the time taken for a sound wave to travel 7.76 millimeters. If you delay one channel of a stereo microphone by 13 samples, this emulates an acoustic (microphone) separation of 10 centimeters.

To add Sample Delay to your project, choose Delay > Sample Delay in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Sample Delay parameters

- *Left/Right Delay knobs and fields:* Set the number of samples or milliseconds the incoming signal is delayed by.
- *Link Left & Right button:* Turn on to make corresponding parameter adjustments for both channels. Adjusting one channel value adjusts the other. Relative values are maintained.

  Note: Link mode can be automatically turned off when you choose a new routing or setting. Turn it on again, if required.
- *Unit buttons:* Choose Samples or ms to change the appearance and behavior of Delay knob and field values.

Stereo Delay in Logic Pro for iPad

Stereo Delay lets you set the Delay, Feedback, and Mix parameters separately for the left and right channels. The Crossfeed knob (for each stereo side) sets the feedback intensity level of each signal being routed to the opposite stereo side. You can use Stereo Delay on mono tracks or busses when you want to create independent delays for the two stereo sides.

Note: If you use Stereo Delay on mono channel strips, the track or bus switches to two channel operation from the point of insertion—all Audio Effect slots after the chosen slot are stereo.

To add Stereo Delay to your project, choose Delay > Stereo Delay in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



The parameters for the left and right delays are identical. The following descriptions apply to both channels. Global and Output Mix parameters are described below the channel parameters.

Channel parameters

- *Input pop-up menu and field:* Choose the input signal for the two stereo sides. Options include Off, Left, Right, L + R, and L – R.
- *Note pop-up menu and field:* Set the grid resolution for the delay time when the Beat Sync button is active.
- *Deviation field:* Set the amount of deviation from the grid.
- *Double and Halve Time buttons:* Double or halve the current delay time for the channel.
- *Sync or Delay Time knob and field:* Set the delay time in milliseconds or in note values when the Beat Sync button is turned on. Note (including dotted note) values are displayed in the Note pop-up menu field when Stereo Delay is synchronized with the project tempo.

  Note: Choosing note or dotted values with the Sync Time knob resets the Deviation parameter value. Choose a value from the Note pop-up menu to retain the current Deviation value.
- *Low/High Cut sliders and fields:* Cut frequencies below the Low Cut value and above the High Cut value from the effect signal.
- *Feedback knob and field:* Set the amount of feedback for the left and right delay signals.
- *Feedback Phase buttons:* Choose a normal or inverted phase of the corresponding channel feedback signal.
- *Crossfeed L->R (R->L) knob and field:* Transfer the feedback signal of the left channel to the right channel, and vice versa.
- *Crossfeed L->R (R->L) Phase buttons:* Choose a normal or inverted phase of the crossfed feedback signals.

Global and Output Mix parameters

- *Routing Preset pop-up menu:* Choose the internal signal routing. Options include: Rotate L/R, Pan L/R, Ping Pong L/R, 10/90, 90/10, Straight, and Customized.
- *Beat Sync button:* Synchronize delay repeats with the project tempo. Set note values with the Note pop-up menu or Sync Time knob.
- *Stereo Link button:* Turn on to make corresponding parameter adjustments for both channels. Adjusting one channel value adjusts the other. Relative values are maintained.

  Note: Stereo Link mode can be automatically turned off when you choose a new routing or setting. Turn it on again, if required.
- *Output Mix sliders and fields:* Independently control the level of the left and right channel signals.

Tape Delay in Logic Pro for iPad

Tape Delay simulates the sound of vintage tape echo machines. It can run at a free rate or can be synchronized with the project tempo. The effect is equipped with a highpass and lowpass filter in the feedback loop, making it easy to create authentic dub echo effects. Tape Delay also includes an LFO for delay time modulation. This can be used to produce chorus effects, even on long delays.

To add Tape Delay to your project, choose Delay > Tape Delay in the Plug-ins area or a channel strip Audio Effect plug-in menu. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Delay parameters

- *Sync button:* Synchronize delay repeats with the project tempo (including tempo changes). The current tempo is shown in the field below the button. Set note values with the Note pop-up menu or Delay Time knob.
- *Note pop-up menu and field:* Set the grid resolution for the delay time.
- *Deviation field:* Set the amount of deviation from the project timing grid.
- *Double and Halve Time buttons:* Double or halve the current delay time.
- *Sync or Delay Time knob and field:* Set the delay time in milliseconds or in note values when the Sync button is turned on. Note (including dotted note) values are displayed in the Note pop-up menu field when synchronized with the project tempo.

  Note: Choosing note or dotted note values resets the Deviation parameter value. Choose a value from the Note pop-up menu to retain the current Deviation value.
- *Smoothing slider and field:* Even out the LFO and flutter effect. See LFO and Flutter parameters.

Character parameters

- *Clip Threshold knob and field:* Set the level of the distorted tape saturation signal. Higher values produce no additional audible distortion. Lower values result in an aggressive distortion. This behavior is influenced by high Feedback values which result in eventual distortion, irrespective of the Clip Threshold value. You can achieve more aggressive distortion and signal breakup when you combine high Feedback and low Clip Threshold values.
- *Stereo Spread knob and field:* Set the width of the effect signal in stereo instances. This parameter is not available in mono instances.
- *Tape Head Mode buttons:* Choose Clean or Diffuse mode to emulate a different tape head position. This affects the behavior of other parameters, such as Flutter and Feedback.
- *Low/High Cut sliders and fields:* You can cut frequencies below the Low Cut value and above the High Cut value to shape the sound of delay repeats. The highpass and lowpass filters are located in the feedback circuit, which means that the filtering effect increases in intensity with each delay repeat. If you want an increasingly muddy and confused tone, drag the High Cut slider upward. For ever thinner echoes, drag the Low Cut slider upward. If you can't hear the effect, check the Dry and Wet controls *and* the filter settings.

Feedback, Modulation, and Output parameters

The Wow and Flutter controls in the Modulation section simulate the speed irregularities of tape transports used in analog tape delay units.

- *Feedback knob and field:* Set the amount of delayed and filtered signal that is routed back to the input. Set to the lowest possible value to generate a single echo. Set to 100% to endlessly repeat the signal. The levels of the original signal and echo repeats tend to accumulate and may cause distortion. Use the Clip Threshold, Spread, Head Mode, and filter parameters to change the color of these overdriven signals.
- *Freeze button:* Capture current delay repeats and sustain them until the button is turned off.
- *Wow LFO Rate knob and field:* Set the speed of the LFO for the tape wow effect.
- *Wow LFO Intensity knob and field:* Set the amount of LFO modulation. A value of 0% turns off tape wow modulation.
- *Flutter Rate knob:* Set the speed variation of the tape flutter effect.
- *Flutter Intensity knob:* Set the intensity of the tape flutter effect.
- *Dry/Wet controls and fields:* Independently control the amount of original and effect signal.

Distortion effects

Distortion effects in Logic Pro for iPad

Distortion effects simulate the distortion created by vacuum tubes, transistors, or digital circuits.

Vacuum tubes were used in audio amplifiers before the development of digital audio technology. They are still used in musical instrument amplifiers today. When overdriven, tubes produce a musically pleasing distortion that has become a familiar part of the sound of rock and pop music. Analog tube distortion adds a distinctive warmth and bite to the signal.

There are also distortion effects that intentionally cause clipping and digital distortion of the signal. These can be used to modify any type of track to produce an intense, unnatural tone, or to create sound effects.

Distortion effects include parameters for tone, which let you shape the way the distortion alters the signal (often as a frequency-based filter), and for gain, which let you control how much the distortion alters the output level of the signal.

WARNING: When set to high output levels, distortion effects can damage your hearing. When you adjust effect settings, it is recommended that you lower the output level of the track, and raise the level gradually.

Included are Bitcrusher, ChromaGlow, Clip Distortion, Distortion, Distortion II, Overdrive, and Phase Distortion. You'll also find some great guitar pedal distortion effects. See Amps and pedals.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

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- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Bitcrusher in Logic Pro for iPad

Bitcrusher is a low-resolution digital distortion effect. You can use it to emulate the sound of early digital audio devices, to create artificial aliasing by dividing the sample rate, or to distort signals until they are unrecognizable.

To add Bitcrusher to your project, choose Distortion > Bitcrusher in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Bitcrusher parameters

- *Drive knob and field:* Set the amount of gain applied to the input signal.

  Note: Raising the Drive level also tends to increase the amount of clipping at the effect output.

- *Clip Level knob and field:* Set the point (below the clipping threshold of the track channel) at which the signal starts clipping.

- *Clip Mode buttons:* Set the distortion mode to Clip, Wrap, or Fold. Signal peaks that exceed the clip level are processed.

  Note: The Clip Level parameter has a significant impact on the behavior of all three modes. Try each mode and adjust the Clip Level value to get a feel for how this works.

  - *Clip:* Turn on to cause an abrupt distortion when the clipping threshold is exceeded.
  - *Wrap:* Set a moderately severe distortion by offsetting the start, mid, and end levels of the signal above the threshold. This parameter smooths signal levels when they cross the threshold. The center portion of the clipped signal is softer than in Clip mode.
  - *Fold:* Set a softer distortion by halving the level of the center portion of the signal above the threshold. The start and end levels of the clipped signal are unchanged.

- *Resolution knob and field:* Set the bit rate (between 1 and 24 bits) to alter the calculation precision of the process. Lower values increase the number of sampling errors, generating more distortion. At extremely low bit rates, the amount of distortion can be greater than the level of the usable signal.

- *Downsampling knob and field:* Reduce the sample rate. A value of 1x has no effect on the signal, a value of 2x halves the sample rate, and a value of 10x reduces the sample rate to one-tenth of the original. For example, if you set Downsampling to 10x, a 44.1 kHz signal is sampled at just 4.41 kHz.

  Note: Downsampling has no impact on the playback speed or pitch of the signal.

- *Mix slider and field:* Set the balance between the dry and crushed signal.

ChromaGlow in Logic Pro for iPad

ChromaGlow is a saturation plug-in designed to replicate the warmth and coloration of analog audio equipment. By introducing harmonic distortion to incoming audio signals, it emulates the nonlinear response and subtle compression found in analog gear. This process enriches the harmonic content of the audio, resulting in a more nuanced and textured sound with enhanced character and depth. Additionally, the subtle compression effect helps to smooth out dynamics and tame transients, contributing to a polished and professional-sounding end result.

ChromaGlow is available on iPads with Apple silicon.

To add ChromaGlow to your project, choose Distortion > ChromaGlow in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



ChromaGlow parameters

- *Model pop-up menu:* Choose from a range of saturation models that emulate vintage audio equipment.
  - *Retro Tube:* Replicates the warmth and even-order harmonics characteristic of vacuum tube equipment, offering a smooth and pleasant distortion that infuses audio with warmth and a vintage ambiance.
  - *Modern Tube:* Imparts the harmonic richness, gentle compression, and pleasing distortion that is typical of tube-based gear. This type of saturation can add warmth, character, and a vintage vibe to audio signals, making it a popular choice for enhancing the sound of individual tracks or entire mixes.
  - *Magnetic:* Mimics the saturation and compression qualities of analog tape machines. It introduces a warm, organic, and slightly compressed sound, with added harmonics. It's great for achieving a vintage, analog feel.
  - *Squeeze:* Replicates the saturation achieved through intentional pushing of a compressor, which introduces harmonic distortion and modifies the tonal characteristics of an audio signal. This imparts warmth, character, and color to the sound.
  - *Analog Preamp:* Provides an assertive, vibrant, and punchy sound characterized by a distinctively sharp and edgy quality, in contrast to the smoother distortion of tubes or the gentle saturation of tape.

- *Style pop-up menu:* Choose an alternative style for the selected model to impart a different colorization to the sound.
  - *Retro Tube:* When selected, the following styles are available:
    - *Clean:* Subtly and smoothly adds a touch of warmth to the sound along with a slight muddiness.
    - *Colorful:* Introduces a significant amount of character to the sound while also imparting a noticeable sense of muddiness.
  - *Modern Tube:* When selected, the following styles are available:
    - *Clean:* Delivers a pristine and transparent sound with a touch of warmth. It preserves the clarity of the audio while subtly enhancing it with the characteristics typically associated with tube amplification.
    - *Colorful:* Blends classic warmth with modern clarity, offering rich, harmonically nuanced audio reminiscent of vintage amps, but with improved fidelity.
  - *Magnetic:* When selected, the following styles are available:
    - *Colorful:* Turns on the transformer component to deliver a saturated, warm, and character-rich sound.
    - *Clean:* Turns off the transformer component for a cleaner signal with less harmonic content.
  - *Squeeze:* When selected, the following styles are available:
    - *Soft Press:* Delivers smooth, natural compression with gentle characteristics, enhancing warmth and richness. This option is ideal for achieving subtle, musical compression.
    - *Hard Press:* Generates assertive, punchy compression with evident distortion. Use this style for a more dramatic impact, particularly on percussive sounds, or to attain a pronounced and bold vocal presence.
  - *Analog Preamp:* When selected, the following styles are available:
    - *Clean:* Turns on a transistor-based saturation circuit, resulting in a cleaner signal with reduced distortion.
    - *Colorful:* Provides a vintage, woolly sound with soft clipping, offering a subtly compressed and warm tone.
- *Drive knob and field:* Set the amount of saturation applied to the signal.
- *Bypass Below button:* Turn the Bypass Below control on or off.
- *Bypass Below field:* Set the frequency threshold below which the effect is bypassed. Frequencies below this threshold will remain unaffected, while the effect is applied to frequencies above it.
- *Level In field:* Set the amount of gain applied to the plug-in input signal.
- *Level Out field:* Set the amount of gain applied to the plug-in output signal.
- *Mix slider field:* Set the percentage of the effect signal mixed with the original signal.
- *Display:* Shows the intensity of the saturation settings on the signal.

Low Cut parameters

- *Low Cut button:* Turn the low cut filter on or off.
- *Slope pop-up menu:* Choose a slope to determine the extent of frequency reduction. Increasing the slope to a higher number results in more extreme filtering.
- *Frequency:* Set the cutoff frequency of the lowpass filter.
- *Resonance:* Emphasize frequencies surrounding the cutoff frequency.
- *Pre/Post buttons:* Apply low cut equalization adjustments to the audio signal before or after the saturation effect is applied.

High Cut parameters

- *High Cut button:* Turn the high cut filter on or off.
- *Slope pop-up menu:* Choose a slope to determine the extent of frequency reduction. Increasing the slope to a higher number results in more extreme filtering.
- *Frequency:* Set the cutoff frequency of the highpass filter.
- *Resonance:* Emphasize frequencies surrounding the cutoff frequency.
- *Pre/Post buttons:* Apply high cut equalization adjustments to the audio signal before or after the saturation effect is applied.

Clip Distortion in Logic Pro for iPad

Clip Distortion is a nonlinear distortion effect that produces unpredictable harmonic spectra. It can simulate warm, overdriven tube sounds and can also generate heavy distortions.

Clip Distortion has an unusual combination of serially connected filters. The incoming signal is amplified by the Clip Drive knob value, passes through a highpass filter, then is subjected to nonlinear distortion. Following the distortion, the signal passes through a lowpass filter. The effect signal is then recombined with the original signal, and this mixed signal is sent through a further lowpass filter. All three filters have a slope of 6 dB/octave.

This unique combination of filters allows for gaps in the frequency spectra that can sound good with this sort of nonlinear distortion.

To add Clip Distortion to your project, choose Distortion > Clip Distortion in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Clip Distortion parameters

- *Input Gain slider and field:* Set the amount of gain applied to the plug-in input signal. This behaves like a preamplifier for the Drive parameter.
- *Clip Drive knob and field:* Set the amount of additional gain (distortion) applied to the input signal. After being amplified by Clip Drive, the signal passes through a highpass filter.
- *Clip Symmetry knob and field:* Set the amount of nonlinear (asymmetrical) distortion applied to the signal.
- *Clip Tone slider and field:* Set the cutoff frequency (in hertz) of the highpass filter.
- *Clip Filter slider and field:* Set the cutoff frequency (in hertz) of the first lowpass filter.
- *Mix slider and field:* Set the ratio between the effect (wet) signal and original (dry) signals, following the clip filter.
- *LP Filter knob and field:* Set the cutoff frequency (in hertz) of the lowpass filter. This processes the mixed signal.
- *Hi Shelf Freq knob and field:* Set the frequency (in hertz) of the high shelving filter. If you set the High Shelving Frequency to around 12 kHz, you can use it like the treble control on a mixer channel strip or a stereo hi-fi amplifier. Unlike these types of treble controls, however, you can boost or cut the signal by up to ±30 dB with the Hi Shelving Gain parameter.
- *Hi Shelf Gain knob and field:* Set the amount of gain applied to the output of signals above the high shelving filter frequency.
- *Output Gain slider and field:* Set the amount of gain applied to the plug-in output signal.

Distortion effect in Logic Pro for iPad

The Distortion effect simulates the low fidelity distortion generated by a bipolar transistor. You can use it to simulate playing a musical instrument through a highly overdriven amplifier or to create unique distorted sounds.

To add Distortion to your project, choose Distortion > Distortion in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Distortion parameters

- *Drive knob and field:* Set the amount of saturation applied to the signal.
- *Tone knob and field:* Set the frequency for the high cut filter. Filtering the harmonically rich distorted signal produces a softer tone.
- *Output knob and field:* Set the output level.
- *Level Compensation button:* Turn on to reference the overall processing of the signal to 0 dB. This compensates for increases in loudness caused by adding distortion.

Distortion II in Logic Pro for iPad

Distortion II emulates the distortion circuit of a Hammond B3 organ. You can use it on musical instruments to recreate this classic effect or can use it creatively when designing new sounds.

To add Distortion II to your project, choose Distortion > Distortion II in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Distortion II parameters

- *Pre Gain knob and field:* Set the amount of gain applied to the input signal.
- *Drive knob and field:* Set the amount of saturation applied to the signal.
- *Tone knob and field:* Boosts the integrated high shelf filter gain both pre- and post-distortion, which results in a different tone.
- *Distortion Type pop-up menu:* Choose the type of distortion.
  - *Growl:* Emulates a two-stage tube amplifier similar to the type found in a Leslie 122 speaker cabinet, which is often used with the Hammond B3 organ.
  - *Bity:* Emulates the sound of a bluesy (overdriven) guitar amp.
  - *Nasty:* Produces hard distortion, suitable for creating very aggressive sounds.
  - *Class AB soft:* Emulates a softer crossover distortion encountered in transistorized amplifiers when driving a higher load.
  - *Class AB hard:* Emulates a harder crossover distortion encountered in transistorized amplifiers when driving a higher load.

    Crossover, in this case, refers to a switching between two matched transistors. In Class AB designs, both transistors remain on at all times, reducing the effect of hard switching between them.
- *Level slider and field:* Set the amount of gain applied to the plug-in output stage.
- *Mix knob and field:* Set the ratio between the effect (wet) signal and original (dry) signals, following the clip filter.

Overdrive in Logic Pro for iPad

Overdrive emulates the distortion produced by a field effect transistor (FET), commonly used in solid-state musical instrument amplifiers and hardware effects devices. When saturated, FETs generate a warmer-sounding distortion than bipolar transistors, such as those emulated by the Distortion effect.

To add Overdrive to your project, choose Distortion > Overdrive in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Overdrive parameters

- *Drive knob and field:* Set the saturation amount for the simulated FET transistor.
- *Tone knob and field:* Set the frequency of the high cut filter. Filtering the harmonically rich distorted signal produces a softer tone.
- *Output knob and field:* Set the output level.
- *Level Compensation button:* Turn on to reference the overall processing of the signal to 0 dB. This compensates for increases in loudness caused by using overdrive.

Phase Distortion in Logic Pro for iPad

The Phase Distortion effect is based on a modulated delay line, similar to a chorus or flanger effect (see Modulation effects). Unlike these effects, however, the delay time is not modulated by a low frequency oscillator (LFO) but rather by a lowpass-filtered version of the input signal itself, using an internal side chain. This means that the incoming signal modulates its own phase position.

The input signal only passes the delay line and is not affected by any other process. The Mix parameter blends the effect signal with the original signal.

To add Phase Distortion to your project, choose Distortion > Phase Distortion in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Phase Distortion parameters

- *Cutoff knob and field:* Set the (center) cutoff frequency of the lowpass filter.
- *Resonance knob and field:* Emphasize frequencies surrounding the cutoff frequency.
- *Monitor button:* Turn on to hear the input signal in isolation. Turn off to hear the mixed signal.
- *Intensity knob and field:* Set the amount of modulation applied to the signal.
- *Delay knob and field:* Set the maximum delay time.
- *Phase Reverse button:* Turn on to reduce the delay time on the right channel when input signals that exceed the cutoff frequency are received. Available only for stereo instances of the Phase Distortion effect.
- *Mix slider and field:* Set the percentage of the effect signal mixed with the original signal.

Dynamics processors

Dynamics processors in Logic Pro for iPad

Dynamics processors control the perceived loudness of your audio, add focus and punch to tracks and projects, and optimize the sound for playback in different situations.

The dynamic range of an audio signal is the range between the softest and loudest parts of the signal—technically, between the lowest and highest amplitudes. Dynamics processors let you adjust the dynamic range of individual audio files, tracks, or an overall project. This can be to increase the perceived loudness or to highlight the most important sounds, while ensuring that softer sounds are not lost in the mix. Several dynamics processors provide a Side Chain input.

There are four types of dynamics processors. These are each used for different audio processing tasks. Also included is the unique Enveloper which doesn't fit any single category.

- *Compressors:* Downward compressors behave like an automatic volume control, lowering the volume whenever it rises above a certain level, called the *threshold*.

  By reducing the highest parts of the signal, called *peaks*, a compressor raises the overall level of the signal, increasing the perceived volume. This gives the signal more focus by making the louder (foreground) parts stand out, while keeping the softer background parts from becoming inaudible. Compression also tends to make sounds tighter or punchier because transients are emphasized, depending on attack and release settings, and because the maximum volume is reached more swiftly.

  In addition, compression can make a project sound better when played back in different audio environments. For example, the speakers of a television or in a car typically have a narrower dynamic range than the sound system in a cinema. Compressing the overall mix can help make the sound fuller and clearer in lower-fidelity playback situations.

  Compressors are typically used on vocal tracks to make the singing prominent in an overall mix. They are also commonly used on music and sound effect tracks, but they are rarely used on ambience tracks. See Compressor and DeEsser 2.

Some compressors—multiband compressors—can divide the incoming signal into different frequency bands and apply different compression settings to each band. This helps to achieve the maximum level without introducing compression artifacts. Multiband compression is typically used on an overall mix. See Multipressor.

- *Expanders:* Expanders are similar to compressors, except that they raise, rather than lower, the signal when it exceeds the threshold. Expanders are used to add life to audio signals. See Expander.
- *Limiters:* Limiters (also called *peak limiters*) work in a similar way to compressors in that they reduce the audio signal when it exceeds a set threshold. The difference is that whereas a compressor gradually lowers signal levels that exceed the threshold, a limiter quickly reduces any signal that is louder than the threshold to the threshold level. The main use of a limiter is to prevent clipping while preserving the maximum overall signal level. See Adaptive Limiter and Limiter.
- *Noise gates:* Noise gates alter the signal in a way that is opposite to that used by compressors or limiters. Whereas a compressor lowers the level when the signal is louder than the threshold, a noise gate lowers the signal level whenever it falls below the threshold. Louder sounds pass through unchanged, but softer sounds, such as ambient noise or the decay of a sustained instrument, are cut off. Noise gates are often used to eliminate low-level noise or hum from an audio signal. See Noise Gate.

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Adaptive Limiter in Logic Pro for iPad

Adaptive Limiter is a versatile tool for controlling the perceived loudness of sounds. It works by rounding and smoothing peaks in the signal, producing an effect similar to an analog amplifier being driven hard. Like an amplifier, it can slightly color the sound of the signal. You can use Adaptive Limiter to achieve maximum gain, without introducing unwanted distortion and clipping, which can occur when the signal exceeds 0 dBFS.

Adaptive Limiter is typically used on the final mix, where it can be placed after a compressor, such as Multipressor, and before a final gain control, resulting in a mix of maximum loudness. Adaptive Limiter can produce a louder-sounding mix than can be achieved by normalizing the signal.

To add Adaptive Limiter to your project, choose Dynamics > Adaptive Limiter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Note: Adaptive Limiter adds latency when the Lookahead parameter is active. The effect is most commonly used for mixing and mastering previously recorded tracks, not while recording. You should bypass Adaptive Limiter while recording.



Adaptive Limiter parameters

- *Input meters:* Show input levels in real time. The Margin field shows the peak input level.
- *Reduction meter:* Show the amount of gain reduction. The Margin field shows the peak reduction level.
- *Output meters:* Show output levels of the limited signal. The Margin field shows the peak output level.
- *Gain knob and field:* Set the amount of gain after input scaling.
- *Out Ceiling knob and field:* Set the maximum output level, or ceiling. The signal does not rise above this.
- *TP Detection button:* Turn on to detect inter-sample peaks (true peaks) in the signal.
- *Remove DC button:* Turn on to activate a highpass filter that removes direct current (DC) from the signal. DC can be introduced by lower-quality audio hardware.
- *Lookahead knob and field:* Set the playback buffer size (how far in the future the file is analyzed for peaks). Also see the Optimal Lookahead parameter. Values lower than the optimal buffer size are indicated in red.
- *Apply Lookahead button and field:* Use the Apply Lookahead button to set the optimal playback buffer size. This changes the value shown in the Lookahead field.

  Note: The Optimal Lookahead value is automatically determined and cannot be changed directly.

Compressor

Compressor in Logic Pro for iPad

Compressor emulates the sound and response of several professional-level compressors. It tightens up your audio by reducing sounds that exceed a certain threshold level, smoothing out the dynamics and increasing the overall volume—the perceived loudness. Compression helps bring the key parts of a track or mix into focus, while preventing softer parts from becoming inaudible. It is probably the most versatile and widely used sound-shaping tool in mixing, next to EQ.

You can use Compressor with individual tracks, including vocal, instrumental, and effects tracks, as well as on the overall mix. Usually you insert Compressor directly into a channel strip, but it can be used on aux channels or elsewhere in the signal path.

To add Compressor to your project, choose Dynamics > Compressor in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



The interface is divided into two main areas:

- *Main parameters:* The bulk of the interface contains the meters and Threshold, Ratio, Knee, Attack, and other controls. See Compressor main parameters.
- *Output and Side Chain parameters:* The lower portion of the interface is shared by two discrete groups of parameters. See Compressor output parameters and Compressor side chain parameters.

Compressor main parameters in Logic Pro for iPad

The upper portion of Compressor contains core parameters you use to choose the type of compressor circuit and where you can adjust the main settings.



Note: Not all parameters listed are available in each Compressor model.

Compressor parameters

- *Circuit Type buttons:* Choose the type of circuit emulated by Compressor. The interface updates when you choose a model. The choices are Platinum Digital, Studio VCA, Studio FET, Classic VCA, and Vintage VCA, FET, and Opto models.
  - *Platinum Digital:* A clean-sounding compression type with a fast transient response. It can be used on a variety of sources.
  - *FET models:* Field Effect Transistor compressors are known for fast transient responses. They can deliver a clean or tone (notably midrange), and can be pushed toward a "crunchy" tone on transients. Ideal for drums, vocals, guitars, and other signals with a fast attack phase. FET compressors can only attenuate the signal.
  - *VCA models:* Voltage Controlled Amplifier compressors can respond slowly or quickly to incoming transients. They tend towards a clean tone and are well-suited for bass guitars and low-frequency signals. VCA compressors can attenuate or amplify the signal.
  - *Opto:* Optical compressors are known for their fast transient response and non-linear release handling. They are very clean and are ideal for vocals and guitars. They are also often used as limiting amplifiers across buses or outputs.
- *Input Gain knob and field:* Set the level at the compressor input.
- *Input meter:* Displays the level at the compressor input in decibels.
- *Reduction meter:* Shows the compression amount in decibels.
- *Output meter:* Displays the level at the compressor output in decibels.
- *Threshold knob and field:* Set the threshold level—signals above this threshold value are reduced in level.
- *Ratio knob and field:* Set the compression ratio—the ratio of signal reduction when the threshold is exceeded.
- *Auto Gain buttons:* The Off button turns off autogain compensation. The 0 dB and -12 dB buttons compensate for volume reductions caused by compression.
- *Make Up slider and field:* Set the amount of gain applied to the compressed signal.
- *Knee knob and field:* Set the strength of compression at levels close to the threshold. Lower values result in more severe or immediate compression (hard knee). Higher values result in gentler compression (soft knee).
- *Attack knob and field:* Set the time it takes for Compressor to react when the signal exceeds the threshold.
- *Release knob and field:* Set the time it takes for Compressor to stop reducing the signal after the signal level falls below the threshold. This parameter works in conjunction with the Auto Release function when active.
- *Auto Release button:* Make the release time dynamically adjust to the audio material. The behavior of the auto release function (and compression results) change when different Release knob values are used.

Compressor output parameters in Logic Pro for iPad

Compressor output parameters are shown in the lower portion of the plug-in.



Compressor output parameters

- *Limiter On/Off button:* Turn the integrated limiter on or off. Limiting prevents the output of Compressor from exceeding the threshold value.
- *Threshold knob and field:* Set the threshold level for the limiter.
- *Mix knob and field:* Set the balance between dry (source) and wet (effect) signals. This allows you to either reduce signal peaks (dry), or to increase the level of softer signals (wet).
- *Output Gain knob and field:* Set the overall level of the compressor output.
- *Distortion buttons:* Choose whether to apply clipping above 0 dB, and the type of clipping. Soft, Hard, and Clip reduce the signal around the 0 dB line in different ways, resulting in a smoothed or squared off distortion of the signal peaks. Experiment with these options
  - *Off:* Stop all clipping.
  - *Soft:* Rounds off the signal as it approaches the 0 dB level, reducing the overall signal, rather than abruptly limiting amplitude.
  - *Hard:* Emulates a transistor effect that abruptly limits amplitude above 0 dB.
  - *Clip:* Limits amplitude at the 0 dB mark, but can be more punchy than the Hard setting, depending on the input material.

Compressor side chain parameters in Logic Pro for iPad

The side chain parameters allow you to use the signal from another channel or bus to control Compressor.

You should note that side chain parameters are active even if no external side chain source is selected. As with hardware VCA compressors, the (compressor) audio input is “normal-ed” as a side chain source when no external side chain signal is patched.



Note: Not all parameters listed are available in each Compressor model.

Compressor side chain parameters

- *Side Chain Detection buttons:* Choose the way stereo side chain signals are handled at the side chain input.
  - *Max button:* Turn on to compress both channels if either stereo channel exceeds or falls below the threshold.
  - *Sum button:* When turned on, the combined level of both channels must exceed the threshold before compression occurs.
- *Peak/RMS buttons:* Use in conjunction with the Max and Sum buttons. Choose Peak or RMS to determine whether signal peaks or a signal average is used for detection. These can help with avoiding artifacts such as clicks in the processed signal, depending on the type of audio material and parameter settings (notably Attack).
- *State buttons:* Turn the sidechain filter on or off. Tap Listen to monitor the side chain signal.
- *Filter mode buttons:* Choose the type of filter used to process the incoming (or internal) side chain signal. Filtering the side chain input signal can enhance the precision of trigger signals, resulting in more surgical compression. The choices are LP (lowpass), BP (bandpass), HP (highpass), Par EQ (parametric), and Hi Shelf (high shelving).
- *Frequency knob and field:* Set the center frequency for the side chain filter.
- *Q knob and field:* Set the width of the frequency band affected by the side chain filter.
- *Gain knob and field:* Set the side chain filter level when Par EQ or Hi Shelf mode is active.

Use Compressor in Logic Pro for iPad

This section explains how to effectively use the main Compressor parameters.

Compressor Threshold and Ratio

The most important Compressor parameters are Threshold and Ratio. The Threshold parameter sets the floor level in decibels. Signals that exceed this level are reduced by the amount set per the Ratio.

The Ratio parameter is a percentage of the overall level; the more the signal exceeds the threshold, the more it is reduced. A ratio of 4:1 means that increasing the input by 4 dB results in an increase of the output by 1 dB, if above the threshold.

For example, with the Threshold set at –20 dB and the Ratio set to 4:1, a –16 dB peak in the signal (4 dB louder than the threshold) is reduced by 3 dB, resulting in an output level of –19 dB.

Compressor envelope times

The Attack and Release parameters shape the dynamic response of Compressor. The Attack parameter determines the time it takes after the signal exceeds the threshold level before Compressor starts reducing the signal.

Many sounds, including voices and musical instruments, rely on the initial attack phase to define the core timbre and characteristic of the sound. When compressing these types of sounds, set higher Attack values to make sure that the attack transients of the source signal aren't lost or altered.

When attempting to maximize the level of an overall mix, it is best to set the Attack parameter to a lower value, because higher values often result in no, or minimal, compression.

The Release parameter determines how quickly the signal is restored to its original level after it falls below the threshold level. Set a higher Release value to smooth out dynamic differences in the signal. Set lower Release values if you want to emphasize dynamic differences.

Important: The results of your settings for the Attack and Release parameters depend not only on the type of source material but on the compression ratio and threshold settings.

Compressor Knee

The Knee parameter determines whether the signal is slightly, or severely, compressed as it approaches the threshold level.

Setting a Knee value close to 0 (zero) results in no compression of signal levels that fall just below the threshold, while levels at the threshold are compressed by the full Ratio amount. This is known as *hard knee compression*, which can cause abrupt and often unwanted transitions as the signal reaches the threshold.

Increasing the Knee parameter value increases the amount of compression as the signal approaches the threshold, creating a smoother transition. This is called *soft knee compression*.

Other Compressor parameters

As Compressor reduces levels, the overall volume at its output is typically lower than the input signal. Beyond the Output Gain control, you can adjust the output level with the Make Up slider.

You can also use the Auto Gain buttons to compensate for the level reduction caused by compression (choose either 0 dB or –12 dB).

When the Platinum Digital model is chosen, Compressor can analyze the signal using one of two methods: Peak or root mean square (RMS). While Peak is technically more accurate, RMS provides a better indication of how people perceive the signal loudness.

Note: If you turn on Auto Gain and RMS simultaneously, the signal may become oversaturated. If you hear any distortion, turn off Auto Gain and adjust the Make Up slider until the distortion is inaudible.

Use a side chain with Compressor

Use of a side chain with a compressor is common. The dynamics (level changes) of another channel strip is used as a control source for compression. For example, the dynamics of a drum groove can be used to rhythmically change the compression, and therefore dynamics, of a guitar, synthesizer, or bass part.

The side chain signal is used only as a detector or trigger in this situation. The side chain source is used to control the compressor, but the audio of the side chain signal is not actually routed through the compressor.

1. In Logic Pro, insert Compressor into a channel strip.
2. In the plug-in menu bar, choose the channel strip that carries the signal you want to use as the side chain source from the Side Chain pop-up menu.
3. Choose the Max or Sum analysis method with the Side Chain Detection buttons.
4. Adjust Compressor parameters.

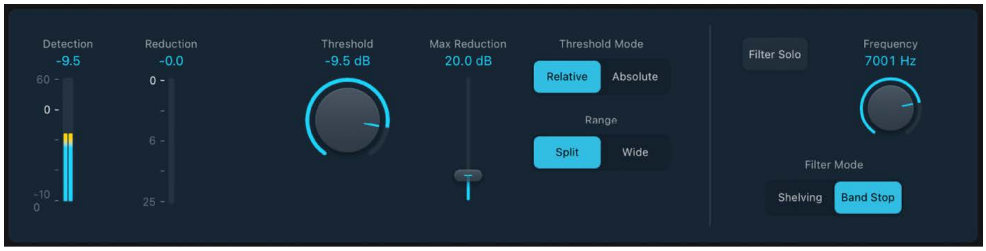
DeEsser 2 in Logic Pro for iPad

DeEsser 2 is a fast-acting dynamics compressor designed to isolate and attenuate a particular band of high frequencies in a complex audio signal. It is commonly used on vocal recordings to reduce unwanted sibilance (harsh *s* and *t* sounds) caused by the microphone positioning, the vocalist's delivery of the performance, or compression and saturation effects.

You can use DeEsser 2 on a vocal track to reduce sibilance without affecting other frequencies on the track. DeEsser 2 attenuates the selected frequency only if it exceeds a set threshold level, preventing the sound from becoming darker when no sibilance is present. It has extremely fast attack and release response times for the shortest of transients, helping the recording retain a natural sound.

To add DeEsser 2 to your project, choose Dynamics > DeEsser 2 in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

DeEsser 2 provides two operating modes—Relative and Absolute—for working with high- or low-level audio signals. Also included are two filter shapes and range parameters that you can use to define and control the affected frequency range.



DeEsser 2 parameters

- *Detection meter:* Displays the level at the DeEsser 2 input.
- *Reduction meter:* Shows the reduction (sibilance rejection) amount in decibels.
- *Threshold knob and field:* Set the Threshold, or amplification level, above which gain reduction of the selected frequency is applied.
- *Max Reduction slider and field:* Set the maximum amount of dynamic gain reduction applied to the selected frequency.
- *Threshold Mode buttons:* Choose Relative or Absolute mode. Relative is highly responsive and works with both high and low level signals. Absolute works with high level signals, fulfilling the role of a classic de-esser.
  - *Relative:* In this mode the level of the filtered signal (determined by the Range, Frequency and Filter settings) is compared with the full bandwidth level of the incoming signal. The Threshold parameter value determines the amplification level of the filtered signal (because the level of the filtered signal will always be lower than the full bandwidth signal). When the amplified, filtered signal level is lower than the full bandwidth signal, no processing occurs. When the amplified, filtered signal level is higher than the full bandwidth level, processing takes place.
  - *Absolute:* When the level surpasses the Threshold parameter value, the incoming signal is processed. Low level signals can only be processed in Absolute mode if the Threshold parameter is set to a very low value.
- *Range buttons:* Set the filter frequency range. Split affects only signals within the set frequency band. Wide affects the entire frequency range.
- *Filter Solo button:* Turn on to hear the filtered signal—the split frequency band—in isolation, when Split is turned on.
- *Frequency knob and field:* Set the center or maximum frequency of the detection filter, depending on the chosen filter mode.
- *Filter Mode buttons:* Choose a lowpass shelving or peak filter shape. To reduce a broad range of frequencies, choose Shelving. To reduce specific frequencies in a narrow range, choose Band Stop. The filter is applied before detection.

Use DeEsser 2

Imagine that you need to reduce unwanted sibilance on a vocal track. The following steps outline how you might do this.

1. In Logic Pro, start playback of the incoming signal. Ideally, this should be soloed (and cycled, if a shorter phrase).
2. In DeEsser 2, use the Threshold Mode buttons to choose a mode. The default Relative mode works for most signals.
3. Identify the frequency you want to attenuate. Sibilance in human voices typically occurs between 5 and 10 kHZ.

   Tip: To help identify the frequency you want to attenuate, insert Channel EQ in an Audio Effect slot before DeEsser 2 and watch the Channel EQ analyzer as the project plays.

4. Set the frequency you want to reduce with the Frequency knob. You can tap the Filter Solo button to make the frequency easier to hear and identify.

   To set a narrow frequency range, tap the Split button. To set a broader range, tap the Wide button.

5. Set the Threshold knob to the level at which DeEsser 2 should start to apply reduction.
6. Set the Max Reduction knob to determine the amount of sibilance reduction.

   Note: Be prudent with how much reduction you apply. Sibilance is a natural part of speech and removing too much may make your vocals sound strange.

Enveloper in Logic Pro for iPad

Enveloper is an unusual processor that lets you shape the attack and release phases of a signal—the signal *transients*, in other words. This makes it a unique tool that can be used to achieve results that differ from other dynamics processors. In contrast to a compressor or expander, Enveloper operates independently of the absolute level of the input signal, but this works only if the Threshold slider is set to the lowest possible value.

To add Enveloper to your project, choose Dynamics > Enveloper in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



The most important Enveloper parameters are the two Gain knobs, that govern the Attack and Release levels of each respective phase.

Boosting the attack phase can add snap to a drum sound, or it can amplify the initial pluck or pick sound of a stringed instrument. Attenuating the attack causes percussive signals to fade in more softly. You can also mute the attack, making it virtually inaudible. A creative use for this effect is alteration of the attack transients to mask poor timing of recorded instrument parts.

Boosting the release phase also accentuates any reverb applied to the affected channel strip. Conversely, attenuating the release phase makes reverb-drenched tracks sound drier. This is particularly useful when you're working with drum loops, but it has many other applications as well.

Enveloper parameters

- *Threshold control and field:* Set the threshold level. Signals that exceed the threshold have their attack and release phase levels altered. In general, set Threshold to the minimum value and leave it there. Only when you significantly raise the release phase level, which also boosts any noise in the original recording, should you raise the Threshold slider slightly. This limits Enveloper to affecting only the useful part of the signal.
- *Lookahead knob and field:* Set the pre-read analysis time for the incoming signal. The Lookahead knob defines how far into the future of the incoming signal Enveloper looks, to anticipate upcoming events. You generally do not need to use this feature, except when processing signals with extremely sensitive transients. If you do raise the Lookahead value, you may need to adjust the attack time to compensate.
- *Attack Time slider and field:* Set the time it takes for the signal to increase from the threshold level to the maximum Gain level. Attack Time values of around 20 ms and Release Time values of 1500 ms are a good starting point.
- *Attack Gain knob and field:* Boost or attenuate the attack phase of the signal. When set to the center position—0%—the signal is unaffected.
- *Release Time slider and field:* Set the time it takes for the signal to fall from the maximum gain level to the threshold level.
- *Release Gain knob and field:* Boost or attenuate the release phase of the signal. When set to the center position—0%—the signal is unaffected.
- *Out Level knob and field:* Set the level of the output signal. Drastic boosting or cutting of either the release or attack phase may change the overall level of the signal. You can compensate for this by adjusting the Out Level value.

Expander in Logic Pro for iPad

Expander is similar in concept to a compressor, but increases, rather than reduces, the dynamic range above the threshold level. You can use Expander to add liveliness and freshness to your audio signals.

To add Expander to your project, choose Dynamics > Expander in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Expander parameters

- *Input meters:* Shows the input signal level.
- *Expansion meter:* Shows the amount of gain (expansion) applied to the signal.
- *Output meters:* Shows the overall output signal level.
- *Threshold knob and field:* Set the threshold level. Signals above this level are expanded.
- *Ratio knob and field:* Set the expansion ratio—the ratio of signal expansion when the threshold is exceeded.

  Note: Because Expander is a genuine upward expander—in contrast to a downward expander, which increases the dynamic range below the Threshold—the Ratio knob features a value range of 1:1 to 0.5:1.
- *Peak/RMS buttons:* Determine whether the Peak or RMS method is used to analyze the signal.
- *Knee knob and field:* Determine the strength of expansion at levels close to the threshold. Lower values result in more severe or immediate expansion—hard knee. Higher values result in a gentler expansion—soft knee.
- *Attack knob and field:* Set the time it takes for Expander to respond to signals that exceed the threshold level.
- *Release knob and field:* Set the time it takes for Expander to stop processing the signal after it falls below the threshold level.
- *Auto Gain button:* Turn on to compensate for the level increase caused by expansion. When Auto Gain is active, the signal sounds softer, even when the peak level remains the same.

  Note: If you dramatically change the dynamics of a signal (with extreme Threshold and Ratio values), you may need to reduce the Gain slider level to avoid distortion. In most cases, turning on Auto Gain adjusts the signal appropriately.
- *Output Clip buttons:* Choose whether to apply clipping above 0 dB, and the type of clipping. Off turns off clip distortion. Soft and Hard change the signal around 0 dB in different ways, resulting in a smoothed or squared off distortion of signal peaks.
- *Gain slider and field:* Set the amount of overall gain applied to the signal.

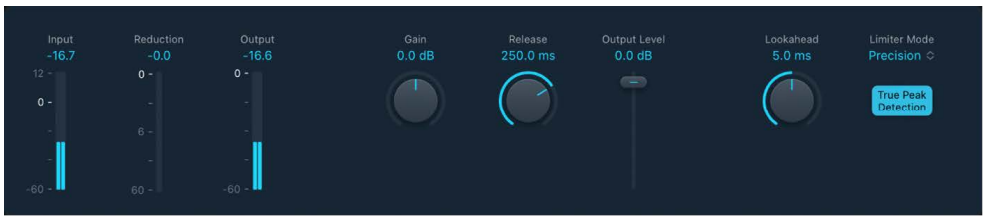
Limiter in Logic Pro for iPad

Limiter works much like a compressor but with one important difference: where a compressor proportionally reduces the signal when it exceeds the threshold, a limiter reduces any peak above the threshold to the threshold level, effectively limiting the signal to this level.

Limiter is used primarily when mastering. Typically, you apply Limiter as the very last process in the mastering signal chain, where it raises the overall volume of the signal so that it reaches, but does not exceed, 0 dB.

To add Limiter to your project, choose Dynamics > Limiter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Limiter is designed in such a way that if set to 0 dB Gain and 0 dB Output Level, it has no effect on a normalized signal. If the signal clips, Limiter reduces the level before clipping can occur. Limiter cannot, however, fix audio that is clipped during recording.



Limiter parameters

- *Input meters:* Show input levels in real time. The Margin field shows the highest input level. Tap the Margin field to reset it.
- *Reduction meter:* Shows the amount of limiting in real time.
- *Output meters:* Show output levels of the limited signal. The Margin field shows the highest output level. Tap the Margin field to reset it.
- *Gain knob and field:* Set the amount of gain applied to the input signal.
- *Release knob and field:* Set the time it takes for Limiter to stop processing, after the signal falls below the threshold level.
- *Output Level slider and field:* Set the output level of the signal.
- *Lookahead knob and field:* Adjust how far ahead (in milliseconds) Limiter analyzes the audio signal. This allows it to react earlier to peak volumes by adjusting the amount of reduction.

  Note: Lookahead causes latency, but this has no perceptible effect when you use Limiter as a mastering effect on prerecorded material. Set it to higher values if you want the limiting effect to occur before the maximum level is reached, thus creating a smoother transition.
- *Limiter Mode pop-up menu:* Choose between Legacy and Precision algorithms. Use Precision for hard limiting, but be aware that this can introduce distortion artifacts.

  When Legacy mode is active the signal is limited only when it reaches the threshold. The transition to full limiting is nonlinear, producing a softer, less abrupt effect, and reducing distortion artifacts that can be produced by hard limiting (in Precision mode).
- *TP button (Precision mode):* Turn on to detect inter-sample peaks (true peaks) in the signal.

Multipressor

Multipressor in Logic Pro for iPad

Multipressor (an abbreviation for *multiband compressor*) is a versatile audio mastering tool. It splits the incoming signal into different frequency bands—up to four—and activates independent compression of each band. After compression is applied, the bands are combined into a single output signal.

The advantage of compressing different frequency bands separately is that it allows more compression to be applied to bands that need it, without affecting other bands. This avoids the “pumping” effect often associated with high amounts of compression.

Because the use of higher compression ratios on specific frequency bands is possible, Multipressor can achieve a higher average volume without causing audible artifacts.

Raising the overall volume level can result in a corresponding increase in the existing noise floor. Each frequency band features downward expansion, which lets you reduce or suppress this noise.

Downward expansion works as a counterpart to compression. Whereas a compressor compresses the dynamic range of higher volume levels, the downward expander expands the dynamic range of the lower volume levels. With downward expansion, the signal is reduced in level when it falls below the threshold level. This works in a similar way to a noise gate, but rather than abruptly cutting off the sound, it smoothly fades the volume with an adjustable ratio.

See the Multipressor controls and use tips.

To add Multipressor to your project, choose Dynamics > Multipressor in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Multipressor controls in Logic Pro for iPad

Multipressor controls for each frequency band are identical.



Common band parameters

- *Band On/Off button:* Turn each band on or off. When active, the button is highlighted.
- *Gain Reduction field:* Shows the amount of level reduction or expansion.
- *Bypass button:* Bypass the selected frequency band.
- *Solo button:* Turn on to hear compression or expansion only for the selected frequency band.
- *Xover slider and field:* Drag to set the crossover frequency between adjacent bands.

Compressor parameters

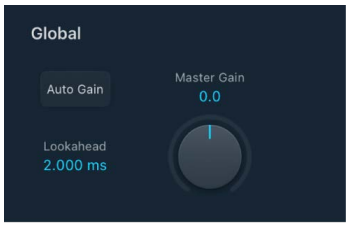
- *Comp. Threshold knob and field:* Set the compression threshold for the selected band. Setting the parameter to 0 dB results in no compression of the band. This parameter can also be set with the upper arrow to the left of each level meter.
- *Comp. Ratio knob and field:* Set the compression ratio for the selected band. Setting the parameter to 1:1 results in no compression of the band.
- *Attack knob and field:* Set the time before compression starts for the selected band, after the signal exceeds the threshold.
- *Release knob and field:* Set the time before compression stops on the selected band, after the signal falls below the threshold.
- *Response field:* Drag vertically to set a smaller value for shorter (peak) detection or a larger value for longer (RMS) detection, in milliseconds.
- *Make Up slider and field:* Drag to set the amount of the gain make-up for each band.

Expander parameters

- *Exp. Threshold knob and field:* Set the expansion threshold for the selected band. Setting the parameter to its minimum value (–60 dB) means that only signals that fall below this level are expanded.
- *Exp. Ratio knob and field:* Set the expansion ratio for the selected band.
- *Reduction slider and field:* Set the amount of downward expansion for the selected band.

Global parameters

Multipressor output parameters are global and affect all frequency bands.



- *AutoGain button:* Turn on to reference the overall processing of the signal to 0 dB, making the output louder.
- *Lookahead field:* Drag to set how far ahead the effect analyzes the incoming signal, allowing faster reactions to peak volumes.
- *Master Gain knob and field:* Set the overall amount of gain at the Multipressor output.

Use Multipressor in Logic Pro for iPad

The Gain Reduction field actually shows the amount of overall gain change—not merely the gain reduction—as with a standard compressor. This is a composite value consisting of the compression reduction, plus the expander reduction, plus the auto gain compensation, plus the gain make-up.

The Compression Threshold and Compression Ratio parameters are key to controlling compression. Usually the most useful combinations of these two settings are a low Compression Threshold with a low Compression Ratio, or a high Compression Threshold with a high Compression Ratio.

The Expansion Threshold, Expansion Ratio, and Expansion Reduction parameters are the key parameters for controlling downward expansion. They determine the strength of the expansion applied to the chosen range.

Adjusting the Response parameter between Peak (0 ms, minimum value) and RMS (root mean square –200 ms, maximum value) is dependent on the type of signal you want to compress. An extremely short detection setting (under 50 ms) is suitable for compression of short and high peaks of low power, which do not typically occur in music. Using a higher value of around 200 ms measures the power of the audio material over time and thus works much more musically. This is because human hearing is more responsive to the overall power of the signal than to single peaks. As a basic setting for most applications, a value of 100 ms is recommended.

The Master Gain knob sets the overall output level. Set Lookahead to higher values when the Response parameter is set to higher values (around 200 ms). Turn on Auto Gain to reference the overall processing to 0 dB, making the output louder.

Noise Gate

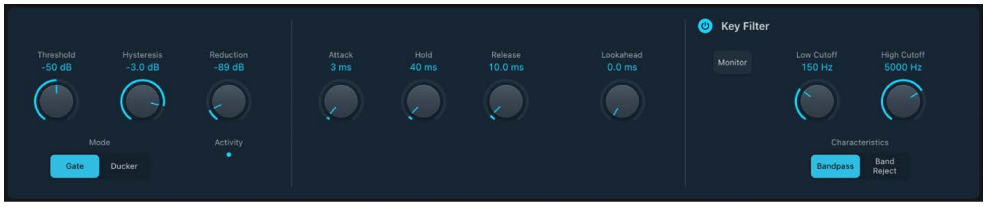
Noise Gate in Logic Pro for iPad

Noise Gate is commonly used to suppress unwanted noise that is audible when the audio signal is at a low level. You can use it to remove background noise, crosstalk from other signal sources, and low-level hum.

Noise Gate works by allowing signals above the threshold level to pass unimpeded, while reducing signals below the threshold level. This effectively removes lower-level parts of the signal, while allowing the desired parts of the audio to pass.

In Ducker mode, the source signal is reduced in level. Ducking is a common technique used in radio and television broadcasting. When the DJ or announcer speaks while music is playing, the music level is automatically reduced. When the announcement has finished, the music is automatically raised to its original volume level.

To add Noise Gate to your project, choose Dynamics > Noise Gate in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Noise Gate parameters

- *Threshold knob and field:* Set the threshold level. Signals that fall below the threshold are reduced in level.
- *Hysteresis knob and field:* Set the difference (in decibels) between the threshold values that open and close the gate. This prevents the gate from rapidly opening and closing when the input signal level is close to the threshold level.
- *Mode buttons:* Set the operating mode: Gate or Ducker. See Use Noise Gate.
- *Reduction knob and field:* Set the amount of signal reduction.
- *Activity indicators:* Show current gate state.
- *Attack knob and field:* Set the time it takes to fully open the gate after the signal exceeds the threshold.
- *Hold knob and field:* Set the time the gate remains open after the signal falls below the threshold.
- *Release knob and field:* Set the time it takes to reach maximum attenuation after the signal falls below the threshold.
- *Lookahead knob and field:* Control how far ahead Noise Gate analyzes the incoming signal, allowing the effect to respond more quickly to peak levels.
- *Key Filter button:* Turn on to activate the sidechain filter, allowing you to adjust the Low Cutoff and High Cutoff parameters.
- *Monitor button:* Turn on to hear the side chain signal, including the effect of the Low Cut and High Cut filters (if active).
- *Low Cutoff knob and field:* Set the lower cutoff frequency for the side chain signal.

  Note: When no external side chain is selected, the input signal is used as the side chain control signal.
- *High Cutoff knob and field:* Set the upper cutoff frequency for the side chain signal.
- *Characteristics buttons:* Choose a Bandpass or Band Reject filter type.

Use Noise Gate in Logic Pro for iPad

Set the Reduction knob to the lowest possible value to make sure that sounds below the Threshold value are completely suppressed. Set to a higher value to reduce low-level sounds but still allow them to pass. You can also use the Reduction knob to boost the signal by up to 20 dB, which is useful for ducking effects.

The Attack, Hold, and Release knobs modify the dynamic response of Noise Gate. If you want the gate to open extremely quickly for percussive signals such as drums, set the Attack knob to a lower value. For sounds with a slow attack phase, such as string pads, set Attack to a higher value. Similarly, when working with signals that fade out gradually or that have longer reverb tails, set a higher Release knob value that allows the signal to fade out naturally.

The Hold knob determines the minimum amount of time that the gate stays open. You can use the Hold knob to prevent abrupt level changes—known as *chattering*—caused by rapid opening or closing of the gate.

The Hysteresis knob provides another option for preventing chattering, without needing to define a minimum Hold time. Use it to set the range between the threshold values that open and close the gate. This is useful when the signal level hovers around the Threshold level, causing Noise Gate to switch on and off repeatedly, thus producing the undesirable chattering effect. The Hysteresis knob essentially sets the gate to open at the Threshold level and remain open until the level drops below another—lower—level. As long as the difference between these two values is large enough to accommodate the fluctuating level of the incoming signal, Noise Gate can function without creating chatter. This value is always negative. Generally, –6 dB is a good place to start.

In some situations, the level of the signal you want to keep and the level of the noise signal may be close, making it difficult to separate them. For example, when you're recording a drum kit and using Noise Gate to isolate the sound of the snare drum, the hi-hat may also open the gate in many cases. To remedy this, use the side chain controls to isolate the desired trigger signal with the High Cut and Low Cut filters.

Important: The side chain signal is used only as a detector/trigger in this situation. The filters are used to isolate particular trigger signals in the side chain source, but they have no influence on the actual gated signal—the audio being routed through Noise Gate.

Use the side chain filters

1. In Logic Pro, tap the Monitor button to hear how the High Cut and Low Cut filters affect the incoming sidechain trigger signal.
2. Drag the High Cutoff knob to set the upper frequency.

   Trigger signals above this are filtered.
3. Drag the Low Cutoff knob to set the lower frequency.

   Trigger signals below this are filtered.

   The filters allow only very high (loud) signal peaks to pass. In a drum kit for example, you could remove the hi-hat signal, which is higher in frequency, with the High Cut filter and allow the snare signal to pass. Turn off monitoring to set a suitable Threshold level more easily.

Use Noise Gate in Ducking mode

1. In Logic Pro, insert Noise Gate into an aux channel strip and tap the Ducker button.
2. Assign all channel strip outputs that you want to “duck” (dynamically lower the volume of the mix) to a bus—the aux channel strip chosen in step 1.
3. In the Noise Gate plug-in menu bar, choose the bus that carries the ducking (vocal) signal from the Side Chain pop-up menu.

   Note: The ducked side chain is mixed with the output signal after passing through the plug-in. This ensures that the ducking side chain signal—the voiceover—is heard at the output.
4. Adjust Noise Gate parameters as required.

Equalizers

Equalizers in Logic Pro for iPad

An equalizer (commonly abbreviated as *EQ*) shapes the sound of incoming audio by changing the level of specific frequency bands.

Equalization is one of the most-used audio processes, both for music projects and in post-production work for video. You can use EQ to subtly or significantly shape the sound of an audio file, an instrument, a vocal performance, or a project by adjusting specific frequencies or frequency ranges.

All EQs are specialized filters that allow certain frequencies to pass through unchanged while raising (boosting) or lowering (cutting) the level of other frequencies. Some EQs can be used in a “broad-brush” fashion, to boost or cut a large range of frequencies. Other EQs, particularly parametric and multiband EQs, can be used for more precise control.

The simplest types of EQs are single-band EQs, which include low cut and high cut, lowpass and highpass, shelving, and parametric EQs. See Single Band EQ.

Multiband EQs such as Channel EQ or Linear Phase EQ combine several filters in one unit, enabling you to control a large part of the frequency spectrum. Multiband EQs let you independently set the frequency, bandwidth, and Q factor of each frequency spectrum band. This provides extensive and precise tone-shaping of any audio source, be it an individual audio signal or an entire mix.

Some EQs, particularly vintage units, are known for the distinctive sonic coloration they impart on the sound. See Vintage EQ collection.

Other EQs allow you to analyze incoming audio to capture a sonic “fingerprint” which you can then apply to other audio material. See Match EQ.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Channel EQ

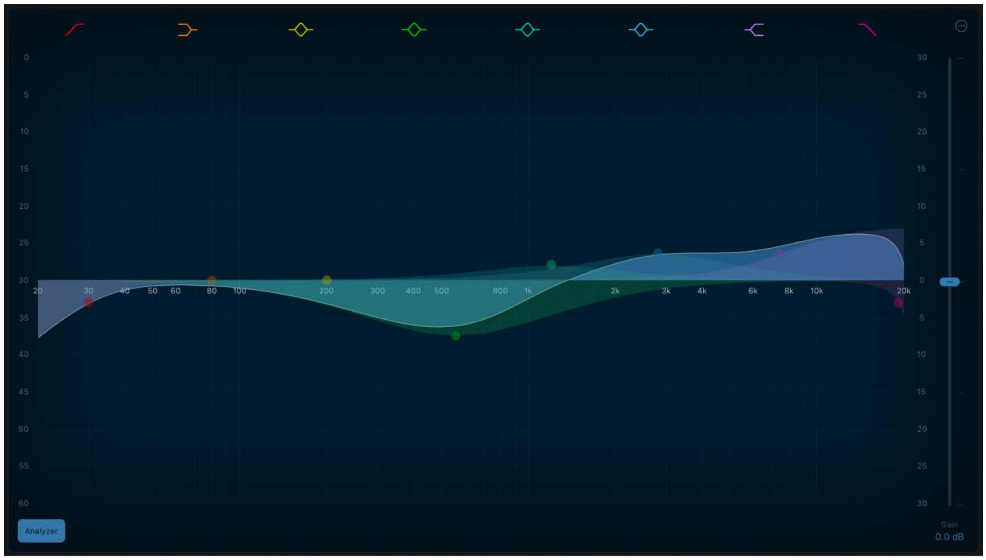
Channel EQ in Logic Pro for iPad

Channel EQ is a versatile multiband EQ. It provides eight color-coded frequency bands, including lowpass and highpass filters, low and high shelving filters, and four flexible parametric bands. It also features a Fast Fourier Transform (FFT) Analyzer that shows real time changes to the frequency curve, allowing you to see which parts of the frequency spectrum may need adjustment. See Channel EQ parameters.

You can use Channel EQ to shape the sound of individual tracks or audio files or for tone-shaping on an overall project mix. The Analyzer and graphic controls make it easy to view and change the audio signal in real time.

Tip: The parameters of Channel EQ and Linear Phase EQ are identical, enabling you to freely copy settings between them. If you replace a Channel EQ with a Linear Phase EQ (or vice versa) in the same effect slot, the current settings are automatically transferred to the new EQ.

To add Channel EQ to your project, choose Equalizers > Channel EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Use the Channel EQ graphic display

The graphic display shows the current curve of each EQ band. The scale is shown in decibels. The color of each band matches the corresponding button above the display. Each band (and corresponding Frequency, Gain, and Q field) is highlighted when selected.

Tap a curve line segment, the (center frequency) control point, or anywhere in the space between the zero line and EQ curve to adjust a band.

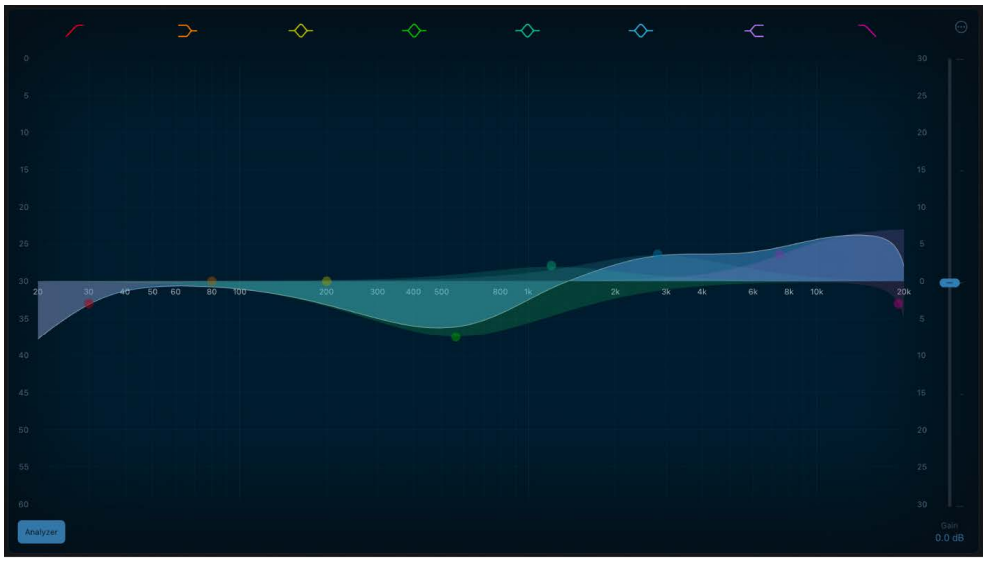
Tap the control point to select a band for editing. Once a band is selected, no other band control point that falls within the active (highlighted) area of the selected band can be selected.

Tap the graphic display background (outside a highlighted band) to deselect the selected band.

- Drag anywhere in a selected band to adjust both gain and the center frequency.
- Drag the vertical lines that encompass the selected band to adjust the Q (bandwidth) only.
- Drag the horizontal line in the selected band to adjust the gain only. If Q-Coupling is turned on, both the gain and bandwidth are adjusted.
- Drag the intersection of vertical and horizontal lines in the selected band to adjust the gain and Q simultaneously.
- Drag vertically in the Frequency field of the selected band to adjust the frequency only.
- Drag vertically in the Gain field of the selected band (2 to 6) to adjust the gain only.
- Drag vertically in the Order field of bands 1 or 8 to adjust the filter slope only.
- Drag vertically in the Q field to set the bandwidth of the selected band.

Channel EQ parameters in Logic Pro for iPad

The central area of Channel EQ includes the graphic display and parameters for shaping each EQ band. The master Gain slider is shown at the right. The Analyzer control is shown at the lower left.



Channel EQ parameters

- *Band 1 On/Off button:* Switch on a high pass filter. Only frequencies above the set frequency value are allowed to pass.
  - *Band 1 background or control point:* Drag the red control point to change the frequency and order (filter slope) values.
  - *Band 1 vertical/horizontal line:* Drag vertically to change the slope.

    Note: The Q parameter of band 1 and band 8 has no effect when the slope is set to 6 decibels per octave. When the Q parameter is set to an extremely high value, such as 100, these filters affect only a very narrow frequency band.

- *Band 2 On/Off button:* Switch on a low shelving filter that cuts or boosts frequencies below the set frequency.
  - *Band 2 background or control point:* Drag the orange shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 2 horizontal line:* Drag vertically to change the gain value.
  - *Band 2 vertical line:* Drag horizontally to change the Q value.
  - *Band 2 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 3 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 3 background or control point:* Drag the yellow shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 3 horizontal line:* Drag vertically to change the gain value.
  - *Band 3 vertical line:* Drag horizontally to change the Q value.
  - *Band 3 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 4 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 4 background or control point:* Drag the green shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 4 horizontal line:* Drag vertically to change the gain value.
  - *Band 4 vertical line:* Drag horizontally to change the Q value.
  - *Band 4 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 5 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 5 background or control point:* Drag the aqua shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 5 horizontal line:* Drag vertically to change the gain value.
  - *Band 5 vertical line:* Drag horizontally to change the Q value.
  - *Band 5 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 6 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 6 background or control point:* Drag the blue shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 6 horizontal line:* Drag vertically to change the gain value.

    - *Band 6 vertical line:* Drag horizontally to change the Q value.
    - *Band 6 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 7 On/Off button:* Switch on a high shelving filter that cuts or boosts frequencies above the set frequency.
    - *Band 7 background or control point:* Drag the purple shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
    - *Band 7 horizontal line:* Drag vertically to change the gain value.
    - *Band 7 vertical line:* Drag horizontally to change the Q value.
    - *Band 7 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 8 On/Off button:* Switch on a low pass filter. Only frequencies below the set frequency value are allowed to pass.
    - *Band 8 background or control point:* Drag the pink control point to change the frequency and order (filter slope) values.
    - *Band 8 vertical/horizontal line:* Drag vertically to change the slope.
- *Scale display:* Drag vertically to offset the scaling of the overall EQ curve. Tap and hold to open a shortcut menu where you can set the EQ dB Scale Mode.
- *Analyzer Range display:* Drag vertically to offset the scaling of the Analyzer range.
- *Analyzer button:* Turn the Analyzer on or off. Play the audio signal and watch the graphic display to identify peaks and troughs in the frequency spectrum. See Channel EQ More menu and Channel EQ Analyzer.
- *Frequency field:* Drag vertically to set the frequency of the selected band.
- *Gain/Slope field:* Drag vertically to set the amount of gain for the selected band. For bands 1 and 8, this changes the slope of the filter.
- *Q field:* Drag vertically to set the Q factor or resonance of the effected range around the center frequency in the selected band.

  Note: The Q parameter of band 1 and band 8 has no effect when the slope is set to 6 decibels per octave. When the Q parameter is set to an extremely high value, such as 100, these filters affect only a very narrow frequency band.
- *Master Gain slider and field:* Set the overall output level of the signal. Use it after boosting or cutting individual frequency bands. Tap and hold the graphic display to open a shortcut menu where you can choose from the following options:
    - *Linear 12 dB, 30 dB, and 60 dB mode:* Set the scale of the Channel EQ graphic display to a linear value.
    - *Warped:* Set the Channel EQ graphic display to a logarithmic, non-linear scale.
    - *Show Master Gain switch:* Turn on to view an overlay on the Channel EQ graphic display which shows the overall EQ curve when adjusted by the Master Gain parameter.

Channel EQ More menu in Logic Pro for iPad

The Channel EQ graphic display and the Analyzer provide additional parameters that you can use to enhance the behavior of Channel EQ.

Tap ⋯ at the top right of the Channel EQ graphic display to open a menu that contains the following parameters.



More menu parameters

- *Analyzer Position pop-up menu:* Set to display the frequency curve before (Pre) or after (Post) EQ is applied, when Analyzer mode is active.
- *Gain Q-Coupling switch:* Turn on Gain-Q Coupling to automatically adjust the Q when you change the gain on any EQ band. This preserves the perceived bandwidth of the bell curve.
- *Oversampling switch:* Turn on to activate oversampling.

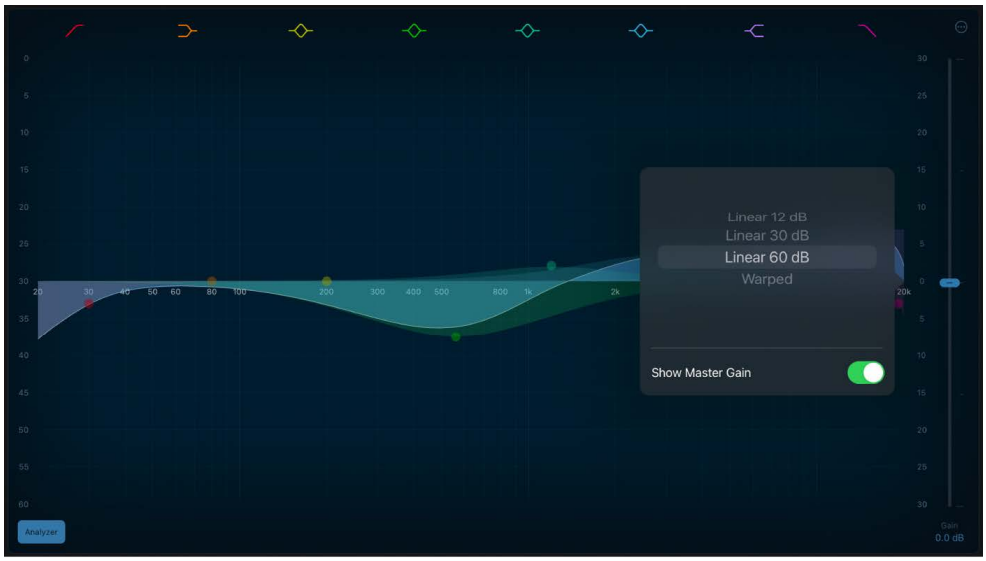
  This setting is useful when you're EQing near the upper end of the spectrum (5kHz and higher) and your project sample rate is below 96kHz. Without oversampling, filters (notably peaking filters) can sound harsh because they become narrower at high frequencies, and have an asymmetric slope.
- *Channel Mode pop-up menu:* Choose to process both sides of a stereo signal, or the Left Only, Right Only, Mid Only, or Side Only signal. See Channel EQ use tips for information on using Channel EQ with Mid-Side recordings.

Channel EQ use tips in Logic Pro for iPad

The way you use Channel EQ depends on the audio material and your intended outcome. A useful workflow for many situations is as follows: Set the Channel EQ to a flat response (no frequencies boosted or cut), turn on the Analyzer, and play the audio signal. Watch the graphic display to see which parts of the frequency spectrum have frequent peaks and which parts of the spectrum stay at a low level. Pay attention to sections where the signal distorts or clips. Use the graphic display or parameter controls to adjust the frequency bands.

You can reduce or eliminate unwanted frequencies, and you can raise quieter frequencies to make them more pronounced. You can adjust the center frequencies of bands 2 through 7 to affect a specific frequency—either one you want to emphasize, such as the root note of the music, or one you want to eliminate, such as hum or other noise. While doing so, change the Q parameter or parameters so that only a narrow range of frequencies is affected, or widen it to alter a broader frequency area.

You can offset the decibel scale of the graphic display by vertically dragging either the left or right edge of the dB scale when the Analyzer is not active. When the Analyzer is active, dragging the left edge adjusts the Analyzer dB scale, and dragging the right edge adjusts the linear dB scale.



Process Mid-Side recordings with Channel EQ

Mid-Side routing effectively splits a stereo signal into separate stereo and mono signals. This allows discrete processing of each signal. See Stereo miking techniques for a description of Mid-Side (MS) recordings.

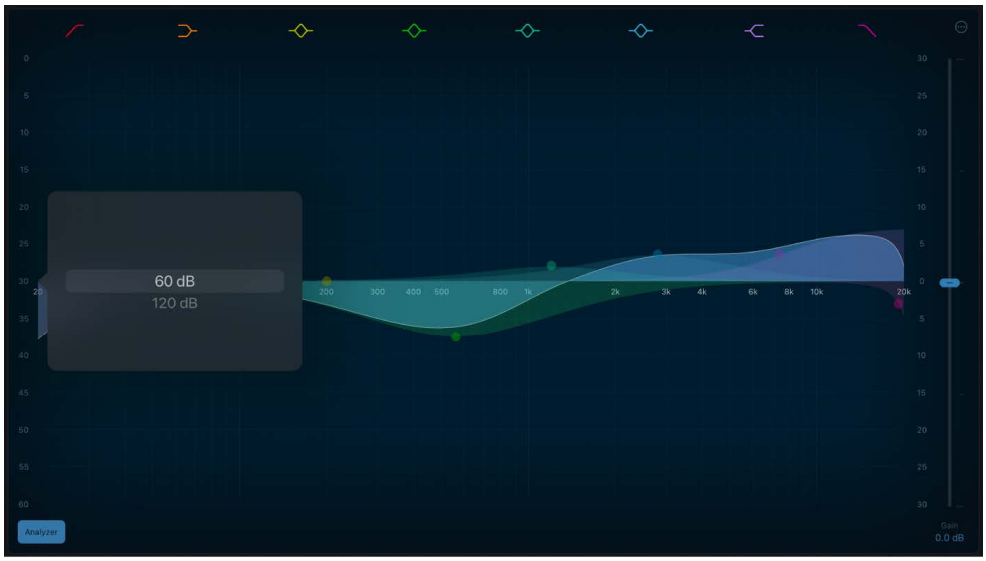
1. In Logic Pro, insert a Channel EQ instance for each mode in the channel strip: one for Mid, one for Side. You can also choose to insert a third instance for a stereo signal, if an overall EQ is useful.
2. Tap ⋯ at the top right of the Channel EQ graphic display and choose a Channel Mode:
   - *Mid Only:* You hear only the sound of identical signals in each side, such as lead vocals, and mono signals, such as bass or guitar parts.
   - *Side Only:* You hear only the sound of the different signals in each side, such as reverbs or backing vocals.
3. Turn on the Analyzer if required. See Channel EQ Analyzer.
4. Adjust the frequency parameters of the Channel EQ instance running in Side mode. One typical use would be to reduce the low frequencies and perhaps boost the upper frequencies. This cleans up the bottom end and enhances stereo effects present in the signal.
5. Adjust the frequency parameters of the Channel EQ instance running in Mid mode. Often used to boost or sculpt the low frequencies of signals such as bass.

Channel EQ Analyzer in Logic Pro for iPad

The Analyzer uses a mathematical process called a Fast Fourier Transform (FFT) to provide a real-time curve of all frequency components in the incoming signal. This is superimposed over any EQ curves you have set. The Analyzer curve uses the same scale as the EQ curves, making it easy to recognize important frequencies in the incoming audio. This also simplifies the task of setting EQ curves to raise or lower the levels of frequencies and frequency ranges.

The bands derived from FFT analysis are scaled logarithmically—there are more bands in higher octaves than in lower octaves.

As soon as the Analyzer is activated, you can change the display scaling from the default dynamic range of 60 dB. Drag vertically on the scale to the right of the graphic display to set the maximum value to anywhere between +20 dB and –80 dB. The Analyzer display is always dB-linear. There are additional Analyzer parameters in the Channel EQ More menu.



Here are the steps:

- Tap the Analyzer button, then play the project to view changes to the frequency curve. This can help you to decide which frequencies to boost or cut.
- While the project plays, a real time frequency curve for the track appears in the EQ display (when the Analyzer is set to Post EQ), showing which frequencies are louder or softer. You can adjust bands in the EQ display while watching changes to the frequency curve.

  Note: Be sure to turn off the Analyzer when you're not using it. When the EQ is visible, the Analyzer uses additional processing power.

Linear Phase EQ

Linear Phase EQ in Logic Pro for iPad

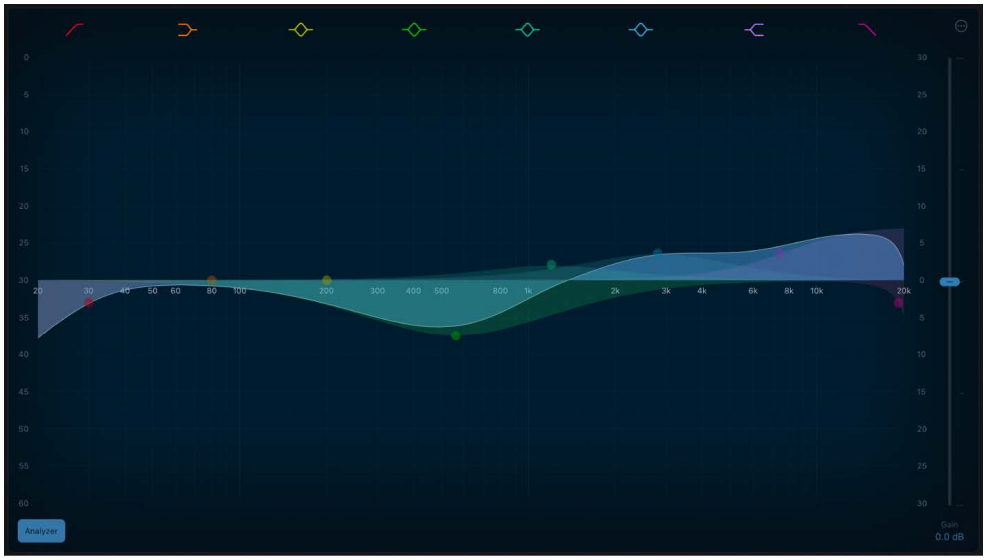
The high-quality Linear Phase EQ effect is similar to Channel EQ, sharing the same parameters and eight-band layout. See Channel EQ. You can copy settings between them. If you replace Channel EQ with Linear Phase EQ (or vice versa) in the same effect slot, the current settings are automatically transferred to the new EQ.

Linear Phase EQ uses a different underlying technology to Channel EQ that preserves the phase of the audio signal. Phase coherency is always maintained, even when you apply extreme EQ curves to the sharpest signal transients. This differs from Channel EQ, which can introduce phase shifts of the signal that can have an audible (and often desirable) effect on the sound.

A further difference between Channel EQ and Linear Phase EQ is that the latter uses a fixed amount of CPU resources, regardless of the number of active bands. Linear Phase EQ also introduces greater amounts of latency.

Note: Use the Linear Phase EQ where phase coherence between tracks is needed, such as multi microphone recordings. The Linear Phase does not introduce any phase shift to the signal which can also be beneficial in mastering, but it does impact on the onset of the transient. This is most evident when using steep cut filters, or high boosts/cuts of narrow filter bands.

To add Linear Phase EQ to your project, choose Equalizers > Linear Phase EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Use the Linear Phase EQ graphic display

The graphic display shows the current curve of each EQ band. The scale is shown in decibels. The color of each band matches the corresponding button above the display. Each band (and corresponding Frequency, Gain, and Q field) is highlighted when selected.

Tap a curve line segment, the (center frequency) control point, or anywhere in the space between the zero line and EQ curve to adjust a band.

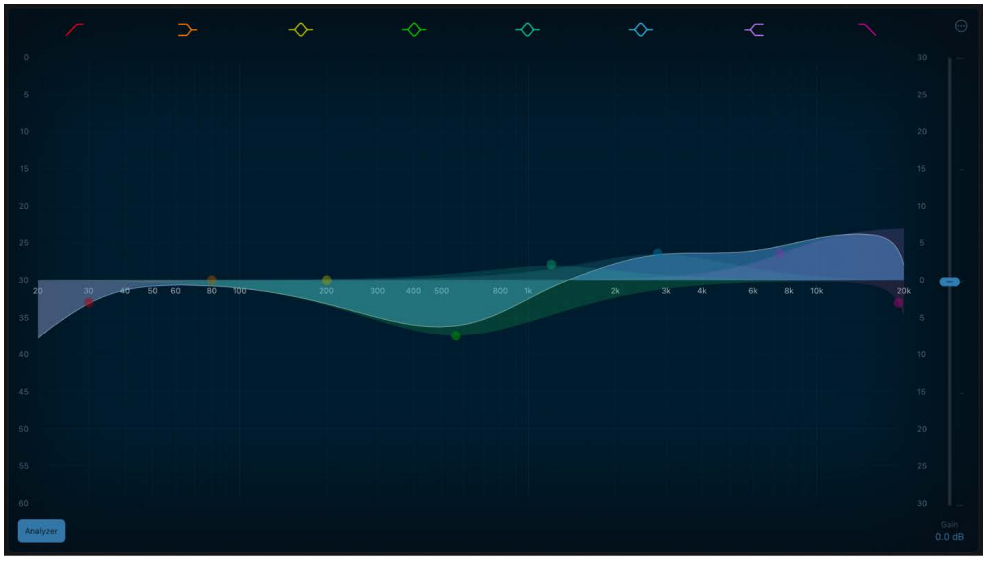
Tap the control point to select a band for editing. Once a band is selected, no other band control point that falls within the active (highlighted) area of the selected band can be selected.

Tap the graphic display background (outside a highlighted band) to deselect the selected band.

- Drag anywhere in a selected band to adjust both gain and the center frequency.
- Drag the vertical lines that encompass the selected band to adjust the Q (bandwidth) only.
- Drag the horizontal line in the selected band to adjust the gain only. If Q-Coupling is turned on, both the gain and bandwidth are adjusted.
- Drag the intersection of vertical and horizontal lines in the selected band to adjust the gain and Q simultaneously.
- Drag vertically in the Frequency field of the selected band to adjust the frequency only.
- Drag vertically in the Gain field of the selected band (2 to 6) to adjust the gain only.
- Drag vertically in the Order field of bands 1 or 8 to adjust the filter slope only.
- Drag vertically in the Q field to set the bandwidth of the selected band.

Linear Phase EQ parameters in Logic Pro for iPad

The central area of Linear Phase EQ includes the graphic display and parameters for shaping each EQ band. The master Gain slider is shown at the right. The Analyzer button is shown at the lower left.



Linear Phase EQ parameters

- *Band 1 On/Off button:* Switch on a high pass filter. Only frequencies above the set frequency value are allowed to pass.
  - *Band 1 background or control point:* Drag the red control point to change the frequency and order (filter slope) values.
  - *Band 1 vertical/horizontal line:* Drag vertically to change the slope.

    Note: The Q parameter of band 1 and band 8 has no effect when the slope is set to 6 decibels per octave. When the Q parameter is set to an extremely high value, such as 100, these filters affect only a very narrow frequency band.
- *Band 2 On/Off button:* Switch on a low shelving filter that cuts or boosts frequencies below the set frequency.
  - *Band 2 background or control point:* Drag the orange shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 2 horizontal line:* Drag vertically to change the gain value.
  - *Band 2 vertical line:* Drag horizontally to change the Q value.
  - *Band 2 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 3 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 3 background or control point:* Drag the yellow shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 3 horizontal line:* Drag vertically to change the gain value.
  - *Band 3 vertical line:* Drag horizontally to change the Q value.
  - *Band 3 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 4 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 4 background or control point:* Drag the green shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 4 horizontal line:* Drag vertically to change the gain value.
  - *Band 4 vertical line:* Drag horizontally to change the Q value.
  - *Band 4 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 5 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 5 background or control point:* Drag the aqua shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 5 horizontal line:* Drag vertically to change the gain value.

- *Band 5 vertical line:* Drag horizontally to change the Q value.
- *Band 5 vertical/horizontal lines:* Drag to change both the gain and Q values.

- *Band 6 On/Off button:* Switch on a parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Band 6 background or control point:* Drag the blue shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 6 horizontal line:* Drag vertically to change the gain value.
  - *Band 6 vertical line:* Drag horizontally to change the Q value.
  - *Band 6 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 7 On/Off button:* Switch on a high shelving filter that cuts or boosts frequencies above the set frequency.
  - *Band 7 background or control point:* Drag the purple shaded area, curve, or control point to change the frequency and gain values. Tap the control point to select the band.
  - *Band 7 horizontal line:* Drag vertically to change the gain value.
  - *Band 7 vertical line:* Drag horizontally to change the Q value.
  - *Band 7 vertical/horizontal lines:* Drag to change both the gain and Q values.
- *Band 8 On/Off button:* Switch on a low pass filter. Only frequencies below the set frequency value are allowed to pass.
  - *Band 8 background or control point:* Drag the pink control point to change the frequency and order (filter slope) value.
  - *Band 8 vertical/horizontal line:* Drag vertically to change the slope.
- *Scale display:* Drag vertically to offset the scaling of the overall EQ curve. Tap and hold to open a shortcut menu where you can set the EQ dB Scale Mode.
- *Analyzer Range display:* Drag vertically to offset the scaling of the Analyzer range. Tap and hold to open a shortcut menu where you can set the Analyzer Range value.
- *Analyzer button:* Turn the Analyzer on or off. Play the audio signal and watch the graphic display to identify peaks and troughs in the frequency spectrum. See Linear Phase EQ More menu and Use the Linear Phase EQ Analyzer.
- *Frequency field:* Drag vertically to set the frequency of the selected band.
- *Gain/Slope field:* Drag vertically to set the amount of gain for the selected band. For bands 1 and 8, this changes the slope of the filter.
- *Q field:* Drag vertically to set the Q factor or resonance of the effected range around the center frequency in the selected band.

  Note: The Q parameter of band 1 and band 8 has no effect when the slope is set to 6 decibels per octave. When the Q parameter is set to an extremely high value, such as 100, these filters affect only a very narrow frequency band.

- *Master Gain slider and field:* Set the overall output level of the signal. Use it after boosting or cutting individual frequency bands. Tap and hold the graphic display to open a shortcut menu where you can choose from the following options:
  - *Linear 12 dB, 30 dB, and 60 dB mode:* Set the scale of the Channel EQ graphic display to a linear value.
  - *Warped:* Set the Linear Phase EQ graphic display to a logarithmic, non-linear scale.
  - *Visualize Master Gain:* Turn on to view an overlay on the Linear Phase EQ graphic display which shows the overall EQ curve when adjusted by the Master Gain parameter.

Linear Phase EQ More menu in Logic Pro for iPad

The Linear Phase EQ graphic display and the Analyzer provide additional parameters that you can use to enhance the behavior of Linear Phase EQ.

Tap ⋯ at the top right of the Linear Phase EQ graphic display to open a menu that contains the following parameters.



More menu parameters

- *Analyzer Position pop-up menu:* Set to display the frequency curve before (Pre) or after (Post) EQ is applied, when Analyzer mode is active.
- *Gain Q-Coupling switch:* Turn on Gain-Q Coupling to automatically adjust the Q when you change the gain on any EQ band. This preserves the perceived bandwidth of the bell curve.
- *Oversampling switch:* Turn on to activate oversampling.

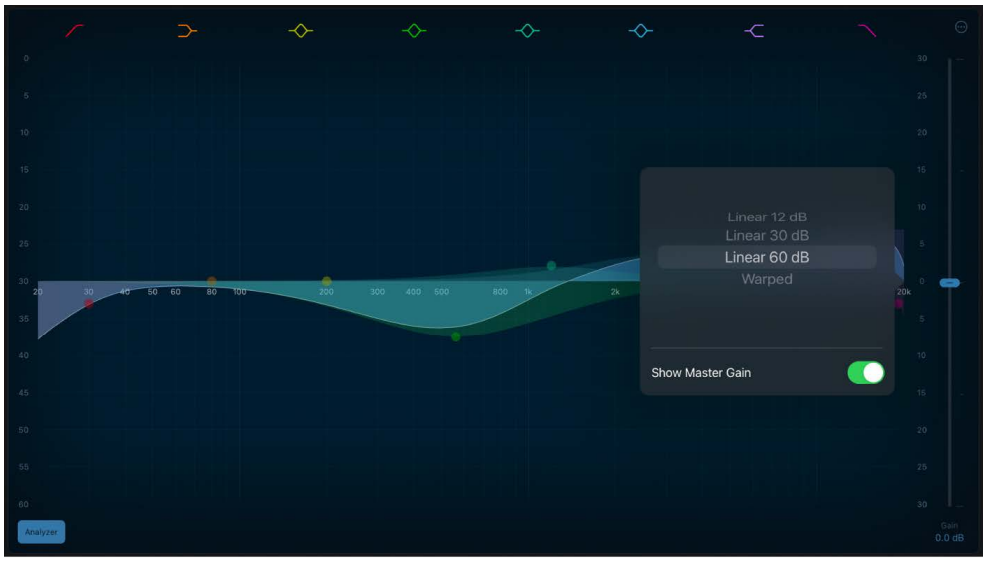
  This setting is useful when you're EQing near the upper end of the spectrum (5kHz and higher) and your project sample rate is below 96kHz. Without oversampling, filters (notably peaking filters) can sound harsh because they become narrower at high frequencies, and have an asymmetric slope.
- *Channel Mode pop-up menu:* Choose to process both sides of a stereo signal, or the Left Only, Right Only, Mid Only, or Side Only signal. See Linear Phase EQ use tips for information about using Linear Phase EQ with Mid-Side recordings.

Linear Phase EQ use tips in Logic Pro for iPad

Linear Phase EQ is typically used as a mastering tool that is inserted into master or output channel strips. The way you use Linear Phase EQ depends on the audio material and your intended outcome. A useful workflow for many situations is as follows Set Linear Phase EQ to a flat response (no frequencies boosted or cut), turn on the Analyzer, then play the audio signal. Watch the graphic display to see which parts of the frequency spectrum have frequent peaks and which parts of the spectrum stay at a low level. Pay attention to sections where the signal distorts or clips. Use the graphic display or parameter controls to adjust the frequency bands.

You can reduce or eliminate unwanted frequencies and you can raise quieter frequencies to make them more pronounced. You can adjust the center frequencies of bands 2 through 7 to affect a specific frequency—either one you want to emphasize, such as the root note of the music, or one you want to eliminate, such as hum or other noise. Use the Q parameter or parameters so that only a narrow range of frequencies is affected.

You can offset the decibel scale of the graphic display by vertically dragging either the left or right edge of the dB scale when the Analyzer is not active. When the Analyzer is active, dragging the left edge adjusts the Analyzer dB scale, and dragging the right edge adjusts the linear dB scale.



Process Mid-Side recordings with Linear Phase EQ

Mid-Side routing effectively splits a stereo signal into separate stereo and mono signals. This allows discrete processing of each signal. See Stereo miking techniques for a description of Mid-Side (MS) recordings.

1. In Logic Pro, insert a Linear Phase EQ instance for each mode in the channel strip: one for Mid, one for Side. You can also choose to insert a third instance for a stereo signal, if an overall EQ is useful.
2. Tap ⋯ at the top right of the Linear Phase EQ graphic display and choose a Channel Mode:
   - *Mid Only:* You hear only the sound of identical signals in each side, such as lead vocals, and mono signals, such as bass or guitar parts.
   - *Side Only:* You hear only the sound of the different signals in each side, such as reverbs or backing vocals.

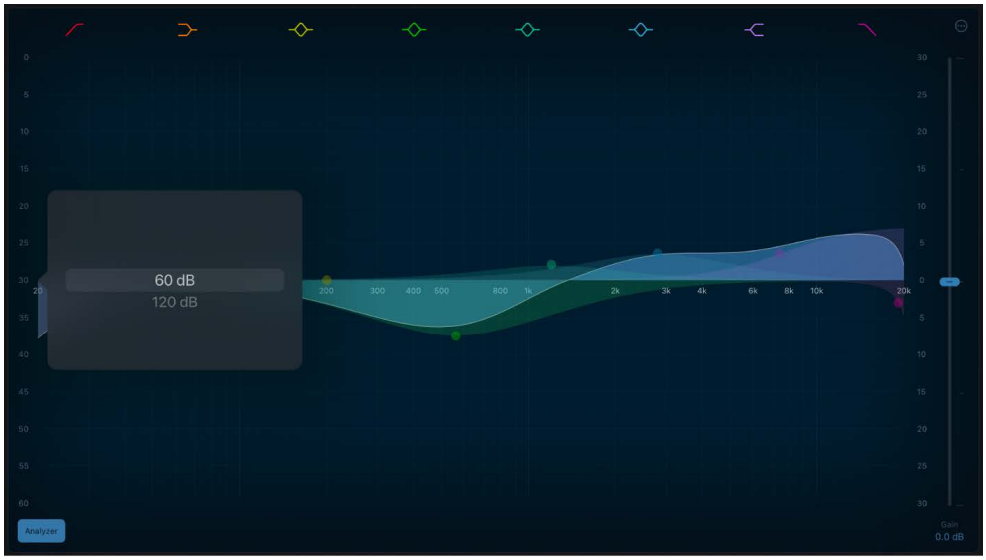
3. Turn on the Analyzer if required. See Use the Linear Phase EQ Analyzer.
4. Adjust the frequency parameters of the Linear Phase EQ instance running in Side mode. One typical use would be to reduce the low frequencies and perhaps boost the upper frequencies. This cleans up the bottom end and enhances stereo effects present in the signal.
5. Adjust the frequency parameters of the Linear Phase EQ instance running in Mid mode. Often used to boost or sculpt the low frequencies of signals such as bass.

Use the Linear Phase EQ Analyzer in Logic Pro for iPad

The Analyzer uses a mathematical process called a Fast Fourier Transform (FFT) to provide a real-time curve of all frequency components in the incoming signal. This is superimposed over any EQ curves you have set. The Analyzer curve uses the same scale as the EQ curves, making it easy to recognize important frequencies in the incoming audio. This also simplifies the task of setting EQ curves to raise or lower the levels of frequencies or frequency ranges.

The bands derived from FFT analysis are scaled logarithmically—there are more bands in higher octaves than in lower octaves.

As soon as the Analyzer is activated, you can change the display scaling from the default dynamic range of 60 dB. Drag vertically on the scale to the right of the graphic display to set the maximum value to anywhere between +20 dB and –80 dB. The Analyzer display is always dB-linear. There are additional Analyzer parameters in the Linear Phase EQ More menu.



Here are the steps:

- Tap the Analyzer button, then play the project to view changes to the frequency curve. This can help you to decide which frequencies to boost or cut.
- While the project plays, a real time frequency curve for the track appears in the EQ display (when the Analyzer is set to Post EQ), showing which frequencies are louder or softer. You can adjust bands in the EQ display while watching changes to the frequency curve.

  Note: Be sure to turn off the Analyzer when you're not using it. When the EQ is visible, the Analyzer uses additional processing power.

Match EQ

Match EQ in Logic Pro for iPad

Match EQ allows you to analyze and store the average frequency spectrum of an audio file as a template. You can apply this template to another audio signal so that it matches the spectrum of the original file. This is also known as a *fingerprint EQ*, where one sonic fingerprint is applied to another signal.

Match EQ lets you acoustically match the tonal quality or overall sound of different songs you plan to include on an album, for example, or to impart the color of any source recording to your own projects.

Match EQ is a learning equalizer that analyzes the frequency spectrum of an audio signal such as an audio file, a channel strip input signal, or a template. The average frequency spectrum of the source file (the template) and of the current material (this can be the entire project or individual channel strips within it) is analyzed. These two spectra are then matched, creating a filter curve. This filter curve adapts the frequency response of the current material to match that of the template. Before applying the filter curve, you can modify it by boosting or cutting any number of frequencies or by inverting the curve.

Note: Although Match EQ acoustically matches the frequency curve of two audio signals, it does not match any dynamic differences between the two signals.

See the Use Match EQ and Match EQ parameters sections.

To add Match EQ to your project, choose Equalizers > Match EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Match EQ parameters in Logic Pro for iPad

Match EQ offers the parameters described in this section.



Match EQ parameters

- *Current Material Learn button:* Start or stop the process of learning the frequency spectrum of the project you want to match with the source file or input.
- *Reference Material Learn button:* Start or stop the process of learning the frequency spectrum of the source file or input.

- *Crnt/Ref Actions pop-up menus:* Choose and execute commands from either the Current or Reference Actions pop-up menu.
  - *Clear Current Material/Reference Spectrum:* Clears the Current Material Spectrum or Reference Spectrum.
  - *Copy Current/Reference Spectrum:* Copies the Current Material Spectrum or Reference Spectrum to the Clipboard.
  - *Paste Current/Reference Spectrum:* Pastes the Current Material Spectrum or Reference Spectrum from the Clipboard.
- *Match button:* Match the frequency spectrum of the current material to that of the template (source) file.
- *Phase pop-up menu:* Choose the operational principle of the filter curve.
  - *Linear:* Prevents processing from altering the signal phase, but latency is higher.
  - *Minimal:* Alters the signal phase (slightly), but latency is reduced.
  - *Minimal, Zero Latency:* Adds no latency, but has a higher CPU overhead than the other options.
- *Channel Link knob:* Change the way the EQ curve is applied to stereo channels.
  - When set to 100%, both channels share a common EQ curve.
  - When set to 0%, a separate filter curve is applied for the left and right channel.
  - Settings between 0 and 100% blend these values with your filter curve changes for each channel. This results in a hybrid curve.

    Note: The Channel Link parameter is unavailable when you use the effect on a mono channel.
- *Smoothing knob and field:* Set the amount of smoothing for the filter curve, using a constant bandwidth set in semitone steps. A value of 0.0 has no impact on the filter curve. A value of 1.0 means a smoothing bandwidth of one semitone. A value of 4.0 means a smoothing bandwidth of four semitones (a major third). A value of 12.0 means a smoothing bandwidth of one octave, and so on.

  Note: Smoothing has no effect on any manual changes you make to the filter curve.
- *Apply Amount slider and field:* Determine the impact of the filter curve on the signal.
  - Values above 100% magnify the effect.
  - Values below 100% reduce it.
  - Negative values (–1% to –100%) invert the peaks and troughs in the filter curve.
  - A value of 100% has no impact on the filter curve.
- *Fade Extremes button:* Select to set an automatic high cut and low cut threshold. Matching signals above or below these thresholds are slowly faded to zero.
- *Fade LF Bottom/Top sliders:* Set the bottom and top frequencies for the filter curve that is applied to low frequency spectrum signals.
- *Fade HF Bottom/Top sliders:* Set the bottom and top frequencies for the filter curve that is applied to high frequency spectrum signals.

Use Match EQ in Logic Pro for iPad

These tasks cover use of Match EQ.

Use the matched EQ on a channel strip

Match EQ creates a filter curve based on the differences between the spectrum of the template and the current material. This curve automatically compensates for differences in gain between the template and the current material, with the resulting EQ curve referenced to 0 dB. This curve approximates (mirrors) the average spectrum of your source audio file.

1. In Logic Pro, choose the channel strip that you want to match from the Side Chain pop-up menu of Match EQ.
2. Tap the Reference Material Learn button.
3. Play the entire source audio file from start to finish. To stop the learn process, tap the Reference Material Learn button again.
4. Return to the start of your mix, tap the Current Material Learn button, and play your mix (the current material) from start to finish.
5. When done, tap the Match button.

Refine the Match EQ curve

Each time you match two audio signals, either by loading or learning a new spectrum while the Match button is activated or by turning on the Match button after a new spectrum has been loaded, any existing changes to the filter curve are discarded and the Apply Amount slider is set to 100%.

In Logic Pro, do either of the following:

- Drag the Apply Amount slider down from the default 100% value to avoid extreme spectral changes to your mix.
- Drag the Smoothing knob to adjust the spectral detail of the generated EQ curve—if required.

Edit spectra with the Match EQ Actions pop-up menus

The Crnt Actions and Ref Actions pop-up menus provide commands that can be applied to the either the Current Material or Reference spectrum.

- In Logic Pro, choose one of the following from the Action menu:
  - *Clear Current Material/Reference Spectrum:* Clears the current spectrum.
  - *Copy Current/Reference Spectrum:* Copies the current spectrum to the Clipboard (this can be used by any Match EQ instance in the current project).
  - *Paste Current/Reference Spectrum:* Pastes the Clipboard contents to the current Match EQ instance.

Single Band EQ in Logic Pro for iPad

Single Band EQ can operate in several modes. When you choose an EQ type with the EQ Mode buttons, the controls update to provide functions appropriate to the EQ type.

To add Single Band EQ to your project, choose Equalizers > Single Band EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Single-Band EQ parameters

- *Gain knob and field:* Set the amount of cut or boost. Available only when Low Shelf, Peak, or High Shelf is the active EQ mode.
- *Slope knob and field:* Choose the amount of cut, in decibels per octave. The higher the value, the more pronounced the effect. Available only when Low Cut or High Cut is the active EQ mode.
- *Frequency knob and field:* Set the cutoff frequency.
- *Q Factor knob and field:* Set the width of the frequency band around the cutoff frequency.
- *EQ Mode buttons:* Choose an EQ type.
  - *Low Cut:* Low Cut EQ attenuates the frequency range that falls below the selected frequency.
  - *Low Shelf:* Low Shelf EQ affects only the frequency range that falls below the selected frequency.
  - *Peak:* A simple filter with a variable center frequency. It can be used to boost or cut any frequency band in the audio spectrum, either with a wide frequency range or as a notch filter with a very narrow range. A symmetrical frequency range on either side of the center frequency is boosted or cut.
  - *High Shelf:* High Shelf EQ affects only the frequency range above the selected frequency.
  - *High Cut:* High Cut EQ attenuates the frequency range above the selected frequency.

Vintage EQ Collection

Vintage EQ collection in Logic Pro for iPad

The Vintage Console EQ, Vintage Graphic EQ, and Vintage Tube EQ plug-ins are modeled on the original EQ circuits of three classic units from the 1950s, 1960s, and 1970s.

The unique output stage of each unit is also modeled, allowing you to pair the output stage of any unit with the original or other EQ models.

Further enhancements include fully sweepable frequency controls that allow more detailed signal contouring than the fixed frequency options found on some of the original devices.

Each vintage EQ unit provides a distinct tonal signature that imparts a sonic color on signals, unlike precise, clean modern equalizers such as the other included EQs.

All vintage EQ models share a set of common Output parameters, along with unique parameters that are discussed in each section.



Output parameters

- *Output Mode pop-up menu:* Either turn it off or choose a vintage EQ model output stage. You can use the matching output stage model for the active EQ or can choose the output stage of another unit. The output stage allows you to add harmonic distortion to your signals.
  - *Silky (Tube EQ):* The output stage of the Vintage Tube EQ.
  - *Punchy (Graphic EQ):* The output stage of the Vintage Graphic EQ.
  - *Smooth (Console EQ):* The output stage of the Vintage Console EQ.
  - *Off:* Deactivates the output stage model.
- *Phase buttons:* Set the processing mode of the EQ and the chosen output stage. Natural mirrors the cut/boost phase shifts of the original EQ. Linear allows EQ changes without phase shifts of the source signal.

  Each analog EQ introduces phase shifts of the signal which can have an audible (and often desirable) effect on the sound. In some situations, however, phase shifts can affect transients. This is especially the case when using steep cut filters, or high boost of narrow filters. Linear phase filters let you change only the gain of a certain frequency area of your material by retaining the phase, with slightly higher latency than in natural mode.
- *Drive knob and field:* Set the amount of gain/saturation of the chosen vintage EQ output stage. This imparts the distortion and coloration of the original hardware output stage, even if all EQ bands are in a neutral position.
- *Volume knob and field:* Drag vertically to set the overall plug-in output level. Range is ±25 dB.

Vintage Console EQ in Logic Pro for iPad

Vintage Console EQ emulates the EQ section of a well-known mixing console channel that is noted for its tonal color, warmth, smooth top end, and mid-forward presence. A three-band design with switchable low and mid range bands and a fixed 12 kHz high frequency band, it also has a passive third-order (18 dB/octave) low cut/highpass filter.

The original console module is regarded as a cult classic by many recording engineers, and has been used on countless hit records over the past 40 to 50 years.

To add Vintage Console EQ to your project, choose Equalizers > Vintage EQ Collection > Vintage Console EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Vintage Console EQ parameters

- *EQ On/Off button:* Turn the EQ circuit on or off.
- *Low Cut On/Off button:* Turn the low cut/highpass filter on or off. This is a third-order filter set at 18 dB per octave.
- *Low Cut knob:* Set the low cut/highpass filter frequency at 50, 80, 160, or 300 Hz, or set values between these increments. Frequencies below this are rolled off at a fixed 18 dB per octave.
- *Low Shelf On/Off button:* Turn the low shelving filter on or off.
- *Low Gain knob:* Set the low shelving filter level. The gain range is ±16 dB.
- *Low Freq knob:* Set the low shelving filter center frequency at 35, 60, 110, or 220 Hz, or set values between these increments.
- *Mid Peak On/Off button:* Turn the mid range filter on or off.
- *Mid Gain knob:* Set the mid range filter level. The gain range is ±18 dB.
- *Mid Freq knob:* Set the mid range filter center frequency at 0.36, 0.7, 1.6, 3.2, 4.8, or 7.2 kHz, or set values between these increments.
- *High Shelf On/Off button:* Turn the high shelving filter on or off. Fixed at 12 kHz.
- *High Gain knob:* Set the high shelving level. The gain range is ±16 dB.

Vintage Graphic EQ in Logic Pro for iPad

Vintage Graphic EQ is based on a classic mixing console module. The 10 EQ bands provide 12 dB of cut/boost. It emulates the *Proportional Q* design of the original device, which widens filter bandwidth at lower cut/boost levels and narrows filter bandwidth at higher cut/boost levels.

Frequencies aren't fixed at the default values, and you can proportionally scale all bands to provide more focus on a portion of the overall frequency spectrum. This flexibility makes it great for precise signal shaping and also a useful tool for tasks such as tuning difficult rooms.

To add Vintage Graphic EQ to your project, choose Equalizers > Vintage EQ Collection > Vintage Graphic EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Vintage Graphic EQ parameters

You can change the standard frequency with the Detune knob.

- *EQ On/Off button:* Turn the EQ circuit on or off.
- *EQ band sliders:* Drag to cut or boost the selected frequency of the incoming signal by ± 12 dB.
- *Detune knob:* Drag to set the frequency of all band sliders. Scaling of frequencies is proportional. This can be used to tune the bands to your project key.

  Tip: When set to +12 you can boost 32 kHz which results in a very smooth high-end boost.

Vintage Tube EQ in Logic Pro for iPad

Vintage Tube EQ emulates two retro EQ units that were often paired as they complemented each other. These units are still in use today, despite being out of production for decades.

The main original unit (Program EQ) that Vintage Tube EQ is based on is a valve-equipped analog design. It is a lossless passive equalizer. This means that the signal level remains constant even if the EQ is switched out. The original unit is noted for the “musical” quality of its filters, making it a versatile tool for mixing and mastering.

The low-frequency section of Vintage Tube EQ is a shelving EQ with sweepable frequency bands between 20 and 100 Hz. These frequencies can be boosted by 13.5 dB or cut by 17.5 dB. You can create unusual EQ curves by simultaneously boosting and cutting overlapping frequencies.

The Vintage Tube EQ high-frequency section provides up to 18 dB of boost at frequencies sweepable from 3 to 16 kHz. A Bandwidth control changes the Q value. A shelf-cut EQ provides up to 16 dB of attenuation between 5 and 20 kHz.

The second emulated EQ model (Mid-Range EQ) is often paired with the original unit. It’s the perfect partner for the upper unit, adding mid-range flexibility that lets you fine-tune signals in this frequency spectrum, with a beautifully matched tonal signature.

To add Vintage Tube EQ to your project, choose Equalizers > Vintage EQ Collection > Vintage Tube EQ in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Program EQ (main unit) parameters

- *Program EQ On/Off button:* Turn the EQ circuit on or off.
- *Low Boost knob:* Set the amount of low frequency boost, up to 13.5 dB.
- *Low Atten knob:* Set the amount of low frequency attenuation (cut), up to 17.5 dB.
- *Low Freq knob:* Set the low range center frequency to 20, 30, 60, or 100 Hz, or values between these increments.
- *High Boost knob:* Set the amount of high frequency boost, up to 18 dB.
- *High Bandwidth knob:* Set the Q, or bandwidth, of the high frequency range from narrow to broad.

- *High Freq knob:* Set the high range center frequency to 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, or 16 kHz, or values between these increments.
- *High Atten knob:* Set the amount of high frequency attenuation (cut), up to 16 dB.
- *High Atten Sel knob:* Set the high range shelving frequency to 5, 10, or 20 kHz, or values between these increments.

Mid-Range EQ parameters

- *Mid-Range EQ On/Off button:* Turn the EQ circuit on or off.
- *Low Peak knob:* Set the amount of low frequency boost, up to 10 dB.
- *Low Freq knob:* Set the low range center frequency to 0.2, 0.3, 0.5, 0.7, or 1.0 kHz, or values between these increments.
- *Dip knob:* Set the amount of attenuation (cut) for the selected Dip frequency, up to 10 dB.
- *Dip Q knob:* Set the width of the frequency band around the cutoff frequency.
- *Dip Freq knob:* Set the Dip (attenuation) center frequency to 0.2, 0.3, 0.5, 0.7, or 1.0, 1.5, 2, 3, 4, or 5 kHz, or values between these increments.
- *High Peak knob:* Set the amount of high frequency boost, up to 8 dB.
- *High Freq knob:* Set the high range center frequency to 1.5, 2, 3, 4, or 5 kHz, or values between these increments.

Filter effects

Filter effects in Logic Pro for iPad

Filters are used to emphasize or suppress frequencies in an audio signal, resulting in a change in the tonal color of the audio.

Logic Pro for iPad contains a variety of advanced filter-based effects that you can use to creatively modify your audio. These effects are most often used to radically alter the frequency spectrum of a sound or mix. Several filter effects provide a Side Chain input.

Included are AutoFilter and Spectral Gate which can be used for interesting sound design manipulations, the vocoder-based EVOC 20 Filterbank and EVOC 20 TrackOscillator, and the Fuzz-Wah.

Note: Equalizers (EQs) are special types of filters. They are not usually used as “effects” per se, but as tools to refine the frequency spectrum of a sound or mix. See equalizers.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

AutoFilter

AutoFilter in Logic Pro for iPad

AutoFilter is a versatile filter effect with several unique features. You can use it to create classic, analog-style synthesizer effects, or as a tool for creative sound design.

The effect works by analyzing incoming signal levels through use of a threshold parameter. Any signal level that exceeds the threshold is used as a trigger for a synthesizer-style ADSR envelope or an LFO (low frequency oscillator). These control sources are used to dynamically modulate the filter cutoff.

AutoFilter lets you choose between different filter types and slopes, control the amount of resonance, add distortion for more aggressive sounds, and mix the original, dry signal with the processed signal.

To add AutoFilter to your project, choose Filter > AutoFilter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



AutoFilter is divided into Filter, Envelope, Distortion, LFO, and Output parameter sections.

- *Filter parameters:* Control the tonal color of the filtered sound. See AutoFilter filter controls.
- *Distortion parameters:* Distort the signal both before and after the filter. See AutoFilter distortion.
- *Envelope parameters:* Define how the filter cutoff frequency is modulated over time. See AutoFilter envelope controls.
- *LFO parameters:* Define how the filter cutoff frequency is modulated by the LFO. See AutoFilter LFO controls.
- *Output parameters:* Set the level of both the dry and effect signal. See AutoFilter output controls.

AutoFilter filter controls in Logic Pro for iPad

The Filter parameters precisely tailor the tonal color.



Filter parameters

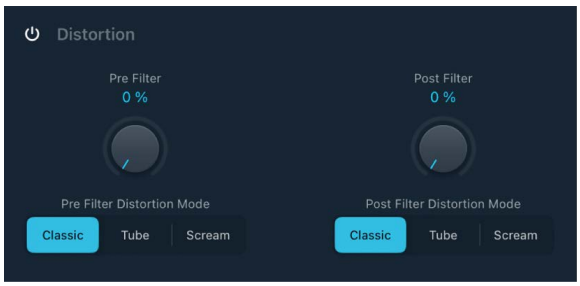
- *On/Off button:* Turn the filter section on or off.
- *Cutoff knob and field:* Set the cutoff frequency for the filter. Higher frequencies are attenuated, whereas lower frequencies are allowed to pass through in a lowpass filter. The reverse is true in a highpass filter. When the State Variable Filter is set to bandpass (BP) mode, the filter cutoff determines the center frequency of the frequency band that is allowed to pass.
- *Resonance knob and field:* Boost or cut signals in the frequency band that surrounds the cutoff frequency. Very high Resonance values cause the filter to begin oscillating at the cutoff frequency. This self-oscillation occurs before you reach the maximum Resonance value.
- *Filter Mode pop-up menu:* Switch the filter between multimode highpass (MM HP), bandpass (MM BP), lowpass (MM LP), or peak (PK) modes, or choose a lowpass filter with a slope of 6, 12, 18, or 24 dB per octave.
- *Fatness knob and field:* Boost the level of low frequency content. When you set Fatness to its maximum value, adjusting Resonance has no effect on frequencies below the cutoff frequency. This parameter is used to compensate for a weak or “brittle” sound caused by high resonance values, when in the lowpass filter mode.
- *Stereo Spread knob and field:* Set the stereo spread width.

Filter Modulation parameters

- *Env Cutoff Mod knob and field:* Determine the impact of the envelope on cutoff frequency.
- *LFO Cutoff Mod knob and field:* Determine the impact of the LFO on cutoff frequency.

AutoFilter distortion controls in Logic Pro for iPad

The distortion parameters can be used to overdrive the filter input or filter output. The distortion input and output modules are identical, but their positions in the signal chain—before and after the filter, respectively—result in remarkably different sounds.



Distortion parameters

- *On/Off button:* Turn the distortion section on or off.
- *Pre Filter knob and field:* Set the amount of distortion applied before the filter section processes the signal.
- *Post Filter knob and field:* Set the amount of distortion applied after the filter section processes the signal.
- *Pre/Post Filter Distortion Mode buttons:* Choose the distortion type for either the pre or post filter. Options are: Classic, Tube, and Scream.

AutoFilter envelope controls in Logic Pro for iPad

The envelope is used to shape the filter cutoff over time. When the input signal exceeds the set threshold level, the envelope is triggered.



Envelope parameters

- *On/Off button:* Turn the envelope section on or off.
- *Threshold knob and field:* Set an input level that—if exceeded—triggers the envelope or LFO that dynamically modulates filter cutoff frequency. See AutoFilter LFO controls and AutoFilter filter controls.

  Note: Retriggering of the envelope or LFO occurs only if the Retrigger button is active.
- *Env Dynamic knob and field:* Determine the input signal modulation amount. You can modulate the peak value of the envelope section by varying this control.
- *Side Chain Link button:* Turn on to use a side chain as the control signal for the envelope. You choose the side chain source channel strip from the Side Chain pop-up menu in the plug-in menu bar.

- *Attack slider and field:* Set the envelope attack time.
- *Decay slider and field:* Set the envelope decay time.
- *Sustain slider and field:* Set the envelope sustain level. If the input signal falls below the threshold level before the envelope sustain phase, the release phase is triggered.
- *Release slider and field:* Set the envelope release time. This is triggered as soon as the input signal falls below the threshold.

AutoFilter LFO controls in Logic Pro for iPad

The LFO is used as a modulation source for filter cutoff.



LFO parameters

- *On/Off button:* Turn the LFO section on or off.
- *Rate knob and field:* Set the speed of LFO modulation.
- *Sync button:* Synchronize the LFO with the project tempo. You can set bar values, triplet values, and more with the Rate knob and field.
- *Waveform pop-up menu:* Select the shape of the LFO waveform. Choose from: descending sawtooth, ascending sawtooth, triangle, pulse wave, or random.
- *Retrigger button:* Turn on to retrigger the LFO waveform from the start of the cycle each time.
- *Pulsewidth knob and field:* Alter the curve shape of the selected waveform.

LFO Phase parameters

- *Sync Phase knob and field:* When Sync is active, rotate to set the phase relationship between the LFO rate and the project tempo. This parameter is dimmed when Beat Sync is turned off.
- *Stereo Phase knob and field:* Set the phase relationship of the LFO modulations between the two channels (stereo only).

AutoFilter out controls in Logic Pro for iPad

The Out parameters are used to set the wet/dry balance and overall level.

Out parameters

- *Dry Signal slider and field:* Set the amount of original, dry signal added to the filtered signal.
- *Main Out slider and field:* Set the overall output level. This compensates for higher levels caused by the use of distortion or by the filtering process itself.

EVOC 20 Filterbank

EVOC 20 Filterbank in Logic Pro for iPad

EVOC 20 Filterbank consists of two formant filter banks. The input signal passes through the two filter banks in parallel. Each bank features level faders for up to 20 frequency bands, allowing independent level control of each band. Setting a level fader to its minimum value completely suppresses the formants in that band. You can control the position of the filter bands with the Formant Shift parameter. You can also crossfade between the two filter banks.

The EVOC 20 Filterbank interface is divided into three main sections: the Formant Filter parameters section in the center, the Modulation parameters section at the bottom, and the Output parameters section along the right side.

To add EVOC 20 Filterbank to your project, choose Filter > EVOC 20 Filterbank in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



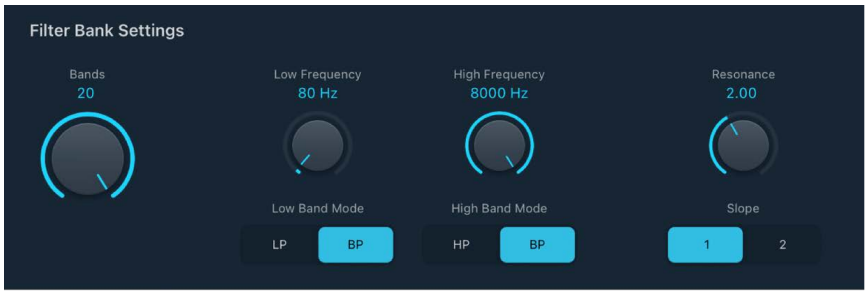
- *Formant Filter parameters:* Control the frequency bands in the two filter banks—the upper filter bank A and the lower filter bank B. See EVOC 20 Filterbank Formant Filter.
- *Modulation parameters:* Control how Formant Filter parameters are modulated. See EVOC 20 Filterbank modulation.
- *Output parameters:* Control the overall output level and panning of the EVOC 20 Filterbank. See EVOC 20 Filterbank output controls.

About formants

A formant is a peak in the frequency spectrum of a sound. In the context of human voices, formants are the key component that allows humans to distinguish between different vowel sounds, based purely on the frequency of these sounds. Formants in human speech and singing are produced by the vocal tract, with most vowel sounds containing four or more formants.

EVOC 20 Filterbank Formant Filter in Logic Pro for iPad

The parameters discussed in this section provide precise level and frequency control of the filters.



Filter Bank Settings parameters

- *Bands knob and field:* Set the number of active frequency bands—up to 20—in each filter bank.
- *Low and High Frequency knobs:* Determine the lowest and highest frequencies allowed to pass by the filter banks. Frequencies that fall outside these boundaries are cut.
- *Low Band Mode buttons:* Switch the lowest filter band between bandpass or highpass mode. In bandpass mode, the frequencies above and below the lowest band are ignored. In highpass mode, all frequencies below the lowest band are filtered.
- *High Band Mode buttons:* Switch the highest filter band between bandpass or lowpass mode. In bandpass mode, the frequencies above and below the highest band are ignored. In lowpass mode, all frequencies above the highest band are filtered.
- *Resonance knob and field:* Determine the basic sonic character of both filter banks. High Resonance settings emphasize the center frequency of each band and result in a sharper, brighter character. Low settings result in a softer character.
- *Slope buttons:* Choose the amount of filter attenuation applied to all filters in both filter banks. You can choose 1, which sounds softer at 6 dB/octave, or 2, which sounds brighter at 12 dB/octave.

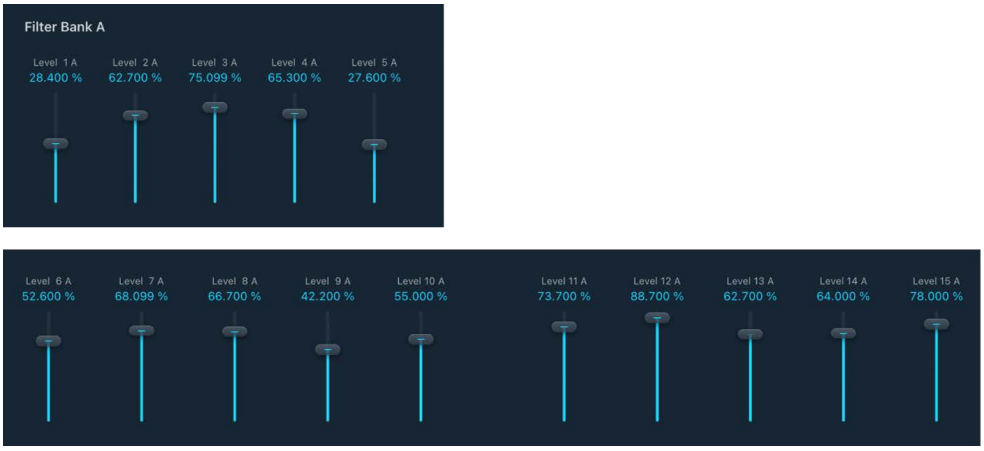
Filter Bank Crossfade parameters



- *Boost A and Boost B sliders and fields:* Set the amount of boost or cut applied to the frequency bands in filter bank A or B. You can use these controls to compensate for the reduction in volume caused by lowering the level of one or more bands. If you use Boost A and Boost B to set the mix relationship between filter bank levels, you can use Fade AB (see “Fade AB slider” below) to alter the tonal color, but not the levels.

- *Level A< >B knob and field:* Crossfade between filter bank A and filter bank B. At the full left position, only bank A is audible, and at the rightmost position, only bank B is audible. In the center position, the signals passing through both banks are evenly mixed. This parameter can be modulated by LFO2. See Filter Bank Crossfade LFO2 parameters.
- *Filter Bank A/B sliders and fields:* Set the level of each frequency band in filter bank A or filter bank B.

  Note: All twenty bands of filter bank A and B are always visible, irrespective of the Bands knob value. When the Bands knob is set to a value below 20, both banks will have a corresponding number of *active* bands, enumerated from band 1 in each bank. All other visible bands above the defined Bands knob value are inactive in both banks and will not impact the audio signal.

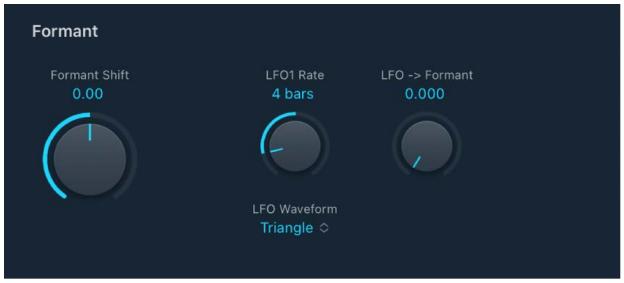


EVOC 20 Filterbank modulation in Logic Pro for iPad

The EVOC20 Filterbank features two LFOs. The LFO1 parameters shown in the Formant section control the Formant Shift parameter. The LFO2 parameters shown in the Filter Bank Crossfade section control the fade between filter banks A and B.

LFO modulations are the key to interesting effects. Set up either completely different or complementary filter curves in both filter banks. You can use rhythmic material—such as a drum loop—as an input signal, and can set up tempo-synchronized modulations with different rates for each LFO. Also try inserting a tempo-synchronized delay effect—such as Tape Delay—after the EVOC 20 Filterbank to produce unique polyrhythms.

Formant LFO1 parameters



- *Formant Shift knob and field:* Move all bands in both filter banks up or down the frequency spectrum.

Note: The use of Formant Shift can result in the generation of unusual resonant frequencies when high Resonance settings are used. This parameter can be modulated by LFO1. See Formant LFO1 parameters.

- *LFO1 Rate knob and field:* Set the speed of modulation. Values to the left are synchronized with the Logic Pro tempo and include bar values, triplet values, and so on. Values to the right are nonsynchronized, or free, and are displayed in hertz—cycles per second.

  Note: The ability to use synchronous bar values could be used to perform a formant shift every four bars on a cycled one-bar percussion part, for example. Alternatively, you could perform the same formant shift on every eighth-note triplet within the same part. Either method can generate interesting results.

- *LFO -> Formant knob and field:* Set the amount of Formant Shift modulation by LFO1.
- *LFO Waveform pop-up menu:* Set the waveform type used by LFO1. You can choose from the following waveforms:
  - Triangle
  - Saw Down and Up
  - Square 1 (bipolar, good for trills)
  - Square 2 (unipolar, good for changing between two definable pitches)
  - Sample and Hold and Lag (smoothed) Sample and Hold
  - Sine

Filter Bank Crossfade LFO2 parameters



- *LFO2 Rate knob and field:* Set the speed of modulation. Values to the left are synchronized with the Logic Pro tempo and include bar values, triplet values, and so on. Values to the right are nonsynchronized, or free, and are displayed in hertz—cycles per second.
- *LFO -> Xfade knob and field:* Control the amount of Fade AB modulation by LFO2.
- *LFO Waveform pop-up menu:* Set the waveform type used by LFO2. You can choose from the following waveforms:
  - Triangle
  - Saw Down and Up
  - Square 1 (bipolar, good for trills)
  - Square 2 (unipolar, good for changing between two definable pitches)
  - Sample and Hold and Lag (smoothed) Sample and Hold
  - Sine

EVOC 20 Filterbank output controls in Logic Pro for iPad

The output parameters provide control over the level and stereo width. The output section also incorporates an integrated overdrive (distortion) circuit.



Output parameters

- *Output Level knob and field:* Set the volume of the output signal.
- *Stereo knob and field:* Distribute the output signals of the filter bands in the stereo field.
  - At the 0 position to the left, the outputs of all bands are centered.
  - At the centered position at the top, the outputs of all bands ascend from left to right.
  - At the full position to the right, the bands are output to the left and right channels alternately.
- *Distortion button:* Turn the overdrive circuit on or off.

  Note: To hear the overdrive effect, you might need to increase the level of one or both filter banks with the Boost A or Boost B sliders.
- *Stereo Mode pop-up menu:* Choose the input/output mode.
  - In Mono/Stereo mode (mono input/stereo output), a stereo input signal is first summed to mono before being routed to the filter banks.
  - In Stereo/Stereo mode (stereo input/output), the left and right channels are processed by separate filter banks.

EVOC 20 TrackOscillator

EVOC 20 TrackOscillator in Logic Pro for iPad

EVOC 20 TrackOscillator is a vocoder with a monophonic pitch tracking oscillator. The tracking oscillator tracks, or follows, the pitch of a monophonic input signal. If the input signal is a sung vocal melody, the individual note pitches are tracked and mirrored, or played, by the synthesis engine.

EVOC 20 TrackOscillator features two formant filter banks, an analysis bank, and a synthesis filter bank. Each offers multiple input options.

You can capture an analysis signal source by using the audio arriving at the input of the channel strip that EVOC 20 TrackOscillator is inserted into or by using a side chained signal from another channel strip.

The synthesis source can be derived from the audio input of the channel strip that EVOC 20 TrackOscillator is inserted into, a side chain signal, or the tracking oscillator.

Because you can select both the analysis and synthesis input signals, EVOC 20 TrackOscillator is not limited to pitch tracking effects; you can also use it for unusual filter effects. For example, you could filter an orchestral recording on one channel strip with train noises side chained from another channel strip. Or you could use it to process drum loops with side chained signals, such as other drum loops or rhythmic guitar, clavinet, and piano parts.

To add EVOC 20 TrackOscillator to your project, choose Filter > EVOC 20 TrackOscillator in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Vocoder overview

The word *vocoder* is an abbreviation for *voice encoder*. A vocoder analyzes and transfers the sonic character of the audio signal arriving at its analysis input to the synthesizer sound generators. The result of this process is heard at the output of the vocoder.

The classic vocoder sound uses speech as the analysis signal and a synthesizer sound as the synthesis signal. This sound was popularized in the late 1970s and early 1980s. You may be familiar with tracks such as "O Superman" by Laurie Anderson, "Funkytown" by Lipps Inc., and numerous Kraftwerk pieces—such as "Autobahn," "Europe Endless," "The Robots," and "Computer World."

In addition to these "singing robot" sounds, vocoding has also been used in many films—such as with the Cylons in *Battlestar Galactica*, and most famously, with the voice of Darth Vader from the *Star Wars* saga.

Vocoding, as a process, is not strictly limited to vocal performances. You could use a drum loop as the analysis signal to shape a string ensemble sound arriving at the synthesis input.

The speech analyzer and synthesizer features of a vocoder are two bandpass filter banks. Bandpass filters allow a frequency band—a slice in the overall frequency spectrum—to pass through unchanged. Frequencies that fall outside the band are cut.

In the EVOC 20 plug-ins, these filter banks are named the *analysis* and *synthesis* banks. Each filter bank has a matching number of corresponding bands—if the analysis filter bank has five bands (1, 2, 3, 4, and 5), there is a corresponding set of five bands in the synthesis filter bank. Band 1 in the analysis bank is matched to band 1 in the synthesis bank, band 2 to band 2, and so on.

The audio signal arriving at the analysis input passes through the analysis filter bank, where it is divided into bands.

An envelope follower is coupled to each filter band. The envelope follower of each band tracks, or follows, volume changes in the audio source—or, more specifically, the portion of the audio that has been allowed to pass by the associated bandpass filter. In this way, the envelope follower of each band generates dynamic control signals.

These control signals are then sent to the synthesis filter bank—where they control the levels of the corresponding synthesis filter bands. This is done with voltage-controlled amplifiers (VCAs) in analog vocoders. Volume changes to the bands in the analysis filter bank are imposed on the matching bands in the synthesis filter bank. These filter level changes are heard as a synthetic reproduction of the original input signal—or a mix of the two filter bank signals.

EVOC 20 TrackOscillator interface in Logic Pro for iPad

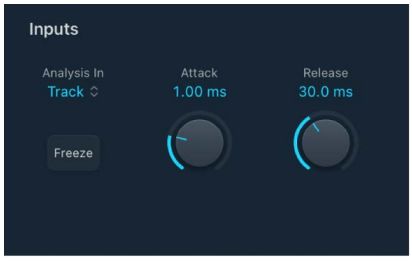
EVOC 20 TrackOscillator is divided into a number of parameter sections.



- *Input parameters:* Determine how the input signal is analyzed and used by the analysis filter bank. See EVOC 20 TrackOscillator input controls.
- *Tracking Oscillator parameters:* Set synthesis parameters and determine how the analysis input signal is used by the tracking oscillator. See EVOC 20 TrackOscillator oscillator.
- *Oscillator Quantization parameters:* The oscillator quantization parameters control the automatic pitch correction feature of the tracking oscillator. They can be used to constrain the tracking oscillator pitch to a scale or chord. See EVOC 20 TrackOscillator pitch quantization.
- *Filter Bank parameters:* Configure the analysis and synthesis filter banks. See EVOC 20 TrackOscillator filter bank.
- *LFO parameters:* Modulate either the oscillator pitch or the Formant Shift parameter. See EVOC 20 TrackOscillator LFO.
- *Un/Voiced Detection parameters:* Control how EVOC 20 TrackOscillator handles voiced and unvoiced signals. See EVOC 20 TrackOscillator Un/Voiced detection.
- *Output parameters:* Configure the output signal of the EVOC 20 TrackOscillator, including voiced and unvoiced signals. See EVOC 20 TrackOscillator output controls.

EVOC 20 TrackOscillator Inputs in Logic Pro for iPad

The parameters of the Inputs section determine how the input signal is analyzed and used by EVOC 20 TrackOscillator. See also EVOC 20 TrackOscillator Un/Voiced detection.



Inputs parameters

- *Analysis in pop-up menu:* Choose the analysis signal source.
  - *Track:* Uses the input audio signal of the channel strip the EVOC 20 TrackOscillator is inserted into as the analysis signal.
  - *Side Chain:* Uses a side chain as the analysis signal. You choose the side chain source channel strip from the Side Chain pop-up menu in the plug-in menu bar.

  Note: If Side Chain is chosen and no Side Chain channel strip is assigned, the EVOC 20 TrackOscillator reverts to Track mode.
- *Freeze button:* Hold the current analysis sound spectrum indefinitely. When Freeze is active, the analysis filter bank ignores the input source, and the Attack and Release knobs have no effect.
- *Attack knob and field:* Determine how quickly each envelope follower—coupled to each analysis filter band—reacts to rising signals.
- *Release knob and field:* Determine how quickly each envelope follower—coupled to each analysis filter band—reacts to falling signals.

Set Attack and Release times in EVOC 20 TrackOscillator

- In Logic Pro, rotate the Attack and Release knobs to set times that provide the most articulated sound.

  Longer attack times result in a slower tracking response to transients—level spikes—of the analysis input signal. A long attack time on percussive input signals, such as a spoken word or hi-hat part, translates into a less articulated vocoder effect. Set the Attack parameter to the lowest possible value to enhance articulation.

  Longer release times cause the analysis input signal transients to sustain for a longer period at the vocoder output. A long release time on percussive input signals, such as a spoken word or hi-hat part, translates into a less articulated vocoder effect. Use of extremely short release times results in rough, grainy vocoder sounds. Release values of around 8 to 10 ms are useful starting points.

Freeze the input signal in EVOC 20 TrackOscillator

- In Logic Pro, tap the Freeze button to hold, or sustain, the sound spectrum of the analysis input signal.

  By freezing the input signal you can capture a particular characteristic of the signal, which is then imposed as a complex sustained filter shape on the Synthesis section. Here are some examples of when this could be useful:

  - If you're using a spoken word pattern as a source, the Freeze button could capture the attack or tail phase of an individual word within the pattern—the vowel *a*, for example.
  - People cannot sustain sung notes indefinitely. To compensate for this human limitation, use the Freeze button. If the synthesis signal needs to be sustained but the analysis source signal—a vocal part—is not sustained, use the Freeze button to lock the current formant levels of a sung note, even during gaps in the vocal part, between words in a vocal phrase.

  Tip: The Freeze parameter can be automated, which may be useful in this situation.

EVOC 20 TrackOscillator oscillator in Logic Pro for iPad

The tracking oscillator follows the pitch of incoming monophonic audio signals and mirrors these pitches with a synthesized sound. The FM tone generator of EVOC 20 TrackOscillator consists of two oscillators. The frequency of Oscillator 1, the carrier, is modulated by multiwaveform Oscillator 2, the modulator, which deforms the sine wave of Oscillator 1. This results in a waveform with rich harmonic content.

In classic FM synthesis, sine waves are used as both modulator and carrier waveforms. The EVOC 20 TrackOscillator modulator oscillator provides a number of additional digital waveforms, which extend its sonic capabilities significantly. These waveforms contain additional harmonics that add a new level of richness to the resulting FM sounds.

Important: Many parameters discussed in this section are available only if the Synthesis in pop-up menu is set to Oscillator.



Tracking Oscillator parameters

- *Synthesis in pop-up menu:* Choose the tracking signal source.
  - *Track:* Use the input audio signal of the channel strip that EVOC 20 TrackOscillator is inserted into as the synthesis signal, which drives the internal synthesizer.
  - *Side Chain:* Use a side chain as the synthesis control signal. You choose the side chain source channel from the Side Chain pop-up menu in the plug-in menu bar.
  - *Oscillator:* Set the tracking oscillator as the synthesis source. The oscillator mirrors, or tracks, the pitch of the analysis input signal. Choosing Oscillator activates the other parameters in the synthesis section. If Osc is not chosen, the FM Ratio, FM Int, and other parameters in this section have no effect.

  Note: If you choose Side Chain and no Side Chain channel is assigned, EVOC 20 TrackOscillator reverts to Track mode.
- *Track Mode pop-up menu:* Choose the pitch tracking mode.
  - *Old:* Pitch tracking mode based on a Fast Fourier Transform calculation.
  - *Cepstrum:* Pitch tracking mode based on analysis of harmonic spacing, enabling grouped harmonics and/or sidebands to be identified.
  - *AKF:* Pitch tracking mode based on analysis of harmonic content, enabling the fundamental frequency to be identified.
- *Max Frequency knob and field:* Set the upper frequency of the pitch tracking oscillator.
- *Fixed Note knob and field:* Set a fixed note frequency or set to the 0 position to turn on tracking mode.
- *Glide knob and field:* Set the amount of time pitch correction takes, allowing sliding transitions to quantized pitches. See EVOC 20 TrackOscillator pitch controls.

- *Oscillator Wave knob and field:* Choose an oscillator waveform from 100 Digiwaves for oscillator 2, the modulator.

  Digiwaves are very short samples of the attack transients of various sounds and instruments.
- *Osc. Pitch knob and field:* Set the pitch offset of the oscillator in semitones.
- *Tune field:* Drag to adjust the tuning in hertz.
- *Osc. Ratio knob and field:* Set the ratio between Oscillators 1 and 2, which defines the basic character of the sound. Even-numbered values or their multiples produce harmonic sounds, whereas odd-numbered values or their multiples produce inharmonic, metallic sounds.
  - An FM Ratio of 1.000 produces results resembling a sawtooth waveform.
  - An FM Ratio of 2.000 produces results resembling a square wave with a pulse width of 50%.
  - An FM Ratio of 3.000 produces results resembling a square wave with a pulse width of 33%.
- *FM Intensity knob and field:* Determine the intensity of modulation. Higher values result in a more complex waveform with more overtones.
  - At a value of 0, the FM tone generator is deactivated and a sawtooth wave is generated.
  - At values above 0, the FM tone generator is activated. Higher values result in a more complex and brighter sound.

EVOC 20 TrackOscillator pitch quantization in Logic Pro for iPad

The oscillator quantization parameters control the automatic pitch correction feature of the tracking oscillator. They can be used to constrain the pitch of the tracking oscillator to a scale or chord. This allows subtle or strong pitch corrections and can be used creatively on unpitched material with high harmonic content, such as cymbals and high-hats.



Oscillator Quantization parameters

- *Scale/Chord pop-up menu:* Choose the scale or chord that the tracking oscillator is quantized to.
- *Root Note pop-up menu:* Choose the root key for the tracking oscillator.
- *Qtz. Strength knob and field:* Determine how pronounced the automatic pitch correction (quantization) is.
- *Scale/Chord Quantize buttons:* Tap note buttons to define the pitch or pitches that the tracking oscillator is quantized to.

Choose a scale, chord, or root key in EVOC 20 TrackOscillator

1. In Logic Pro, tap the Scale/Chord pop-up menu.
2. Choose the scale or chord you want to use as the basis for pitch correction.
3. Tap the Root Note pop-up menu to set the root key of the chosen scale or chord, if needed.

Note: The Root Note parameter is not available when the Scale/Chord value is set to “Chromatic” or “User Scale.”

Add notes to, or remove notes from, the chosen scale or chord in EVOC 20 TrackOscillator

In Logic Pro:

- *To add notes to the scale or chord:* Tap unused keys on the keyboard to highlight them.
- *To remove notes from the scale or chord:* Tap selected notes, which then are no longer highlighted.

  Tip: Your last edit is remembered. If you choose a new scale or chord but do not make any changes, you can revert to the previously set scale by choosing “User Scale” from the Scale/Chord pop-up menu.

EVOC 20 TrackOscillator filter bank in Logic Pro for iPad

EVOC 20 TrackOscillator features two formant filter banks—one for the Analysis In (Inputs) section and one for the Synthesis In (Tracking Oscillator) section. The entire frequency spectrum of an incoming signal is analyzed by the Analysis In section and is divided equally into a number of frequency bands. Each filter bank can control up to 20 of these frequency bands.



Filter Bank parameters

- *Bands knob and field:* Set the number of frequency bands analyzed and then used by the synthesis engine. Up to 20 bands can be used.
- *Low and High Frequency knobs and fields:* Determine the lowest and highest frequencies allowed to pass by the filter section. Frequencies that fall outside these boundaries are cut.
- *Low Band Mode buttons:* Switch the lowest filter band between highpass or bandpass mode. In bandpass mode, the frequencies above and below the lowest band are ignored. In highpass mode, all frequencies below the lowest band are filtered.

- *High Band Mode buttons:* Switch the highest filter band between lowpass or bandpass mode. In bandpass mode, the frequencies above and below the highest band are ignored. In lowpass mode, all frequencies above the highest band are filtered.
- *Resonance knob and field:* Change the basic sonic character of the vocoder. Low settings result in a soft character, whereas high settings lead to a more snarling, sharp character. Technically, increasing the Resonance value emphasizes the middle frequency of each frequency band.

Filter Bank Formant parameters

- *Formant Shift knob and field:* Move all bands in the synthesis filter bank up or down the frequency spectrum.

  When Formant Shift is set to 0, the positions of the bands in the synthesis filter bank match the positions of the bands in the analysis filter bank. Positive values move the synthesis filter bank bands up in frequency, whereas negative values move them down—in relation to the analysis filter bank band positions.

  When combined, Formant Stretch and Formant Shift alter the formant structure of the resulting vocoder sound, which can lead to interesting timbre changes. For example, using speech signals and tuning Formant Shift up results in “Mickey Mouse” effects.

  Formant Stretch and Formant Shift are also useful if the frequency spectrum of the synthesis signal does not complement the frequency spectrum of the analysis signal. You could create a synthesis signal in the high-frequency range from an analysis signal that mainly modulates the sound in a lower-frequency range, for example.

  Note: Use of the Formant Stretch and Formant Shift parameters can result in the generation of unusual resonant frequencies when high Resonance settings are used.
- *Formant Stretch knob and field:* Change the width and distribution of all bands in the synthesis filter bank. This can be a broader or narrower frequency range than that defined by the Low and High Frequency parameters.

  When Formant Stretch is set to 0, the width and distribution of the bands in the synthesis filter bank at the bottom match the width of the bands in the analysis filter bank at the top. Low values narrow the width of each band in the synthesis bank, whereas high values widen the bands. The control range is expressed as a ratio of the overall bandwidth.

Set the number of filter bank bands in EVOC 20 TrackOscillator

- In Logic Pro, use the Bands knob to set the number of frequency bands the EVOC 20 TrackOscillator filter bank uses.

  The greater the number of frequency bands, the more precisely the sound can be reshaped. As the number of bands is reduced, the source signal frequency range is divided up into fewer bands, and the resulting sound is formed with less precision by the synthesis engine. A good compromise between sonic precision—allowing incoming signals such as speech and vocals to remain intelligible—and resource usage is around 10 to 15 bands.

  Tip: To attain the best possible pitch tracking, it is essential to use a mono signal with no overlapping pitches. Ideally, the signal should be unprocessed and free of background noises. Using a signal processed with even a slight amount of reverb, for example, can produce unusual results. Processing a signal with no audible pitch, such as drum loop, also delivers unusual results, but the resulting artifacts might be perfect for your project.

EVOC 20 TrackOscillator LFO in Logic Pro for iPad

The LFO parameters can be used to modulate either the pitch of the tracking oscillator, thus creating a vibrato, or the Formant Shift parameter of the synthesis filter bank. See oscillator and filter bank.



LFO parameters

- *LFO Rate knob and field:* Set the speed of modulation. Values to the left of the center position are synchronized with the Logic Pro tempo and include bar values, triplet values, and so on. Values to the right are nonsynchronized, or free, and are displayed in hertz—cycles per second.

  Note: The ability to use synchronous bar values could be used to perform a formant shift every four bars on a cycled one-bar percussion part, for example. Alternatively, you could perform the same formant shift on every eighth-note triplet within the same part. Either method can generate interesting results.

- *LFO Waveform pop-up menu:* Set the waveform type used by the LFO. You can choose from the following waveforms:
  - Triangle
  - Saw Down and Up
  - Square 1 (bipolar, good for trills)
  - Square 2 (unipolar, good for changing between two definable pitches)
  - Sample and Hold and Lag (smoothed) Sample and Hold
  - Sine
- *LFO -> Formant knob:* Set the amount of formant shift modulation by the LFO.
- *TO Vibrato knob:* Set the amount of (Tracking Oscillator) pitch modulation—vibrato—by the LFO.

EVOC 20 TrackOscillator Un/Voiced detection in Logic Pro for iPad

The Un/Voiced Detection section provides control over voiced and unvoiced sounds.

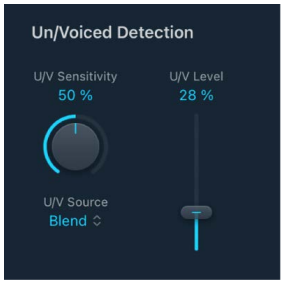
To explain, human speech consists of a series of voiced sounds—tonal sounds or formants—and unvoiced sounds. The main distinction between voiced and unvoiced sounds is that voiced sounds are produced by an oscillation of the vocal cords, whereas unvoiced sounds are produced by blocking and restricting the air flow with lips, tongue, palate, throat, and larynx.

If speech containing voiced and unvoiced sounds is used as a vocoder analysis signal but the synthesis engine doesn't differentiate between voiced and unvoiced sounds, the result sounds rather weak. To avoid this problem, the synthesis engine of a vocoder must produce different sounds for the voiced and unvoiced parts of the signal.

EVOC 20 TrackOscillator includes an unvoiced/voiced detection circuit which identifies unvoiced elements of the sound in the analysis signal. Corresponding portions in the synthesis signal are then replaced with noise, with a mixture of noise and synthesizer signal, or with the original signal. If the U/V detection circuit identifies voiced parts, it passes this information to the synthesis section, which uses the normal synthesis signal for these portions.

About formants

A formant is a peak in the frequency spectrum of a sound. In the context of human voices, formants are the key component that allows humans to distinguish between different vowel sounds—based purely on the frequency of the sounds. Formants in human speech and singing are produced by the vocal tract, with most vowel sounds containing four or more formants.



Un/Voiced Detection parameters

- *U/V Sensitivity knob and field:* Determine how responsive U/V detection is. Turn to the right for higher settings, where more of the individual unvoiced portions of the input signal are recognized. When high settings are used, the increased sensitivity to unvoiced signals can lead to the U/V sound source being used on the majority of the input signal, including voiced signals. Sonically, this results in a sound that resembles a radio signal that is breaking up and contains a lot of static, or noise. The U/V sound source is determined by the U/V Src. pop-up menu.
- *U/V Source pop-up menu:* Choose the sound sources used to replace the unvoiced content of the input signal.
  - *Off:* Do not replace unvoiced portions of the sound with a noise or synth signal.
  - *Noise:* Use noise alone for the unvoiced portions of the sound.

- *Noise + Synth:* Use noise and the synthesizer for the unvoiced portions of the sound.
- *Blend:* Use the analysis signal after it has passed through a highpass filter for the unvoiced portions of the sound. The Sensitivity parameter has no effect when this setting is used.

- *U/V Level slider and field:* Set the volume of the signal used to replace the unvoiced content of the input signal.

  Important: Be careful with the U/V Level control, particularly when using a high U/V Sensitivity value, to avoid internally overloading EVOC 20 TrackOscillator.

EVOC 20 TrackOscillator output controls in Logic Pro for iPad

The output section provides control over the type, stereo width, and level of signal that is sent from EVOC 20 TrackOscillator.



Output parameters

- *Output Level knob and field:* Set the overall volume of the output signal.
- *Stereo knob and field:* Distribute the output signals of the synthesis section filter bands in the stereo field.
  - At the 0 position to the left, the outputs of all bands are centered.
  - At the centered position, the outputs of all bands ascend from left to right.
  - At the Full position to the right, the bands are output—alternately—to the left and right channels.
- *Stereo Mode pop-up menu:* Choose the input/output mode.
  - In Mono/Stereo mode (mono input/stereo output), a stereo input signal is first summed to mono before being routed to the filter banks.
  - In Stereo/Stereo mode (stereo input/output), the left and right channels are processed by separate filter banks.
- *Out buttons:* Choose the signal that is sent to the plug-in main outputs.
  - *Voc(oder):* Hear the vocoder effect.
  - *Syn(thesis):* Hear only the synthesizer signal.
  - *Ana(lysis):* Hear only the analysis signal.

  Note: The last two settings are mainly useful for monitoring purposes.

Fuzz-Wah

Fuzz-Wah in Logic Pro for iPad

The Fuzz-Wah plug-in emulates classic wah effects, combined with compression and fuzz distortion effects. The name *wah wah* comes from the sound it produces. It has been a popular effect—usually a pedal effect—with electric guitarists since the days of Jimi Hendrix. The pedal controls the cutoff frequency of a bandpass, a lowpass, or less commonly a highpass filter.

To add Fuzz-Wah to your project, choose Filter > Fuzz-Wah in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Fuzz-Wah effects work in series—where the output of one effect is fed into the next in an effects chain. The routing order lets you choose whether a distorted signal should be wah-filtered (for funkier sounds) or the wah-filtered sound should be distorted (for screaming sounds), for example.

Routing parameter

- *FX Order pop-up menu:* Choose the order of the effects chain in the Routing section of the Fuzz-Wah plug-in.

Auto Wah in Fuzz-Wah effect in Logic Pro for iPad

These parameters determine the tone and behavior of the wah effect.

You can control the wah effect with the Auto Wah feature, which continually performs a filter sweep across the entire range. You can also control the wah sweep with MIDI foot pedals or other controllers.



Auto Wah parameters

- *On/Off button:* Turn the Auto Wah effect on or off.
- *Wah Mode pop-up menu:* Choose a Wah effect type.
  - *Classic Wah:* This setting mimics the sound of a popular wah pedal with a slight peak characteristic.
  - *Retro Wah:* This setting mimics the sound of a popular vintage wah pedal.
  - *Modern Wah:* This setting mimics the sound of a distortion wah pedal with a constant Relative Q(uality) setting. Relative Q determines the resonant characteristics. Low Relative Q values affect a wider frequency range, resulting in softer resonances. High Relative Q values affect a narrower frequency range, resulting in more pronounced emphasis.
  - *Opto Wah 1:* This setting mimics the sound of a distortion wah pedal with a constant Relative Q(uality) Factor setting.
  - *Opto Wah 2:* This setting mimics the sound of a distortion wah pedal with a constant Relative Q(uality) setting.
  - *Resonant LP:* In this mode, the Wah works as a resonance-capable lowpass filter. At the minimum pedal position, only low frequencies can pass.
  - *Resonant HP:* In this mode, the Wah works as a resonance-capable highpass filter. At the maximum pedal position, only high frequencies can pass.
  - *Peak:* In this mode, the Wah works as a peak (bell) filter. Frequencies close to the cutoff frequency are emphasized.
- *Auto Gain button:* Limit the output signal dynamic range. The wah effect can cause the output level to vary widely. Auto Gain compensates for this tendency and keeps the output signal within a more stable range.
- *Auto Wah Depth knob and field:* Set the intensity of the Auto Wah effect. When set to 0, the automatic wah feature is turned off.
- *Relative Q knob and field:* Adjust the main filter peak, resulting in a sharper or softer wah sweep.
- *Auto Wah Attack knob and field:* Set the time it takes for the wah filter to fully open.
- *Auto Wah Release knob and field:* Set the time it takes for the wah filter to close.
- *Wah Level knob and field:* Set the amount of the wah-filtered signal.
- *Pedal Position knob and field:* Set a virtual pedal position.
- *Pedal Start/Pedal Range End sliders and field:* Set the maximum and minimum values of the sweep range. You can sweep the wah filter range with the Pedal Position knob or with a MIDI pedal.

Fuzz-Wah effect Compressor in Logic Pro for iPad

The Compressor effect is normally used just before the Fuzz (distortion) effect. This allows you to increase or decrease the perceived gain, thus providing a suitable input level to the distortion circuit. You can, however, place the Compressor at any position in the effects chain or can turn it off completely.



Compressor parameters

- *On/Off button:* Turn the Compressor effect on or off.
- *Ratio knob and field:* Adjust the compression slope. The additional gain offered by the compression circuit—when directly preceding the Fuzz effect—lets you create crunchy distortions.

Fuzz parameters in Fuzz-Wah effect in Logic Pro for iPad

These parameters control the integrated distortion circuit.



Fuzz parameters

- *On/Off button:* Turn the Fuzz distortion effect on or off.
- *Fuzz Tone knob and field:* Adjust the tonal color of the distortion. Low settings tend to be warmer, and high settings are brighter and harsher.
- *Fuzz Gain knob and field:* Set the level of distortion.

Spectral Gate

Spectral Gate in Logic Pro for iPad

Spectral Gate is an unusual filter effect that can be used as a tool for creative sound design.

It works by dividing the incoming signal into two frequency ranges—above and below a central frequency band that you specify with the Center Freq and Bandwidth parameters. The signal ranges above and below the defined band can be individually processed with the Low Level and High Level parameters and the Super Energy and Sub Energy parameters.

To add Spectral Gate to your project, choose Filter > Spectral Gate in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Spectral Gate parameters

- *Threshold control and field:* Set the threshold level that is used to divide frequency ranges. When the threshold is exceeded, the frequency band defined by the Center Freq and Bandwidth parameters is divided into upper and lower frequency ranges.
- *Center Frequency knob and field:* Set the center frequency of the band you want to process.
- *Bandwidth knob and field:* Set the width of the frequency band you want to process.
- *Speed knob and field:* Set the modulation frequency for the defined frequency band.
- *CF Modulation knob and field:* Set the intensity of center frequency modulation.
- *BW Modulation knob and field:* Set the amount of bandwidth modulation.
- *Low Level slider and field:* Mix the frequencies of the original signal—below the selected frequency band—with the processed signal.
- *Sub Energy knob and field:* Set the level of the frequency range below the threshold.
- *Super Energy knob and field:* Set the level of the frequency range above the threshold.
- *High Level slider and field:* Mix the frequencies of the original signal—above the selected frequency band—with the processed signal.
- *Gain knob and field:* Set the overall output level.

Use Spectral Gate in Logic Pro for iPad

One way you can familiarize yourself with the operation of Spectral Gate is to start with a drum loop. Set Center Frequency to the minimum value (20 Hz) and Bandwidth to the maximum value (20,000 Hz) to process the entire frequency range. Turn up the Super Energy and Sub Energy knobs, one at a time, and then try different Threshold settings to get a sense of how different Threshold levels affect the sound of Super Energy and Sub Energy. When you have obtained a sound that you like or consider useful, narrow the Bandwidth parameter drastically, gradually increase Center Frequency, and then use the Low Level and High Level sliders to mix in some treble and bass from the original signal. At lower Speed settings, turn up the CF Modulation or BW Modulation knobs.

Get started with Spectral Gate

1. In Logic Pro, rotate the Center Frequency and Bandwidth knobs to set the frequency band you want to process.
2. Drag the Threshold slider to set the appropriate level.

   All incoming signals above and below the threshold level are divided into upper and lower frequency ranges.
3. Rotate the Super Energy knob to control the level of the frequencies above the threshold, and rotate the Sub Energy knob to control the level of the frequencies below the threshold.
4. Drag the Low Level slider and the High Level slider to mix the frequencies that fall outside the defined frequency band with the processed signal.
   - Use the Low Level slider to blend the frequencies below the defined frequency band with the processed signal.
   - Use the High Level slider to blend frequencies above the defined frequency band with the processed signal.
5. Use the Speed, CF Modulation, and BW Modulation knobs to modulate the defined frequency band.
   - Use the Speed knob to determine the modulation frequency.
   - Use the CF Modulation knob to define the intensity of the center frequency modulation.
   - Use the BW Modulation knob to control the amount of bandwidth modulation.
6. Use the Gain knob to adjust the final output level of the processed signal.

Imaging processors

Imaging processors in Logic Pro for iPad

The imaging processors are tools for manipulating the stereo image. You can use them to make certain sounds, or the overall mix, seem wider and more spacious. You can also alter the phase of individual sounds within a mix to enhance or suppress particular transients.

See Direction Mixer and Stereo Spread.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Direction Mixer

Direction Mixer in Logic Pro for iPad

You can use Direction Mixer to decode middle and side audio recordings or to spread the stereo base of a left/right recording and determine its pan position.

Direction Mixer works with any type of stereo recording, regardless of the miking technique used. For information about the most common stereo miking techniques—AB, XY, and MS—see Stereo miking techniques.

To add Direction Mixer to your project, choose Imaging > Direction Mixer in a channel strip Audio Effect plug-in menu or Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Direction Mixer parameters

- *Input buttons:* Set the input signal type. Use LR if the input signal is a standard left/right signal. Use MS if the signal is middle and side encoded.
- *Direction knob and field:* Set the pan position for the middle—the center of the stereo base—of the recorded stereo signal. Controls high range signals when Split is active. When Direction is set to a value of 0, the midpoint of the stereo base in a stereo recording is perfectly centered within the mix.

When you work with LR signals:

- At 90°, the center of the stereo base is panned hard left.
- At –90°, the center of the stereo base is panned hard right.
- Higher values move the center of the stereo base back toward the center of the stereo mix, but this also has the effect of swapping the stereo sides of the recording. For example, at a value of either 180° or –180°, the center of the stereo base is dead center in the mix, but the left and right sides of the recording are swapped.

When you work with MS signals:

- At 90°, the middle signal is panned hard left.
- At –90°, the middle signal is panned hard right.
- Higher values move the middle signal back toward the center of the stereo mix, but this also has the effect of swapping the side signals of the recording. For example, at a value of either 180° or –180°, the middle signal is dead center in the mix, but the left and right sides of the side signal are swapped.

- *Spread knob and field:* Determine the spread of the stereo base in LR input signals or set the side signal level in MS input signals. Controls high range signals when Split is active. Spread parameter behavior changes when fed LR or MS signals. These differences are outlined below:

  When working with LR signals:

  - At a neutral value of 1, the left side of the signal is positioned precisely to the left and the right side precisely to the right. As you decrease the Spread value, the two sides move toward the center of the stereo image.
  - A value of 0 produces a summed mono signal—both sides of the input signal are routed to the two outputs at the same level. At values greater than 1, the stereo base is extended out to an imaginary point beyond the spatial limits of the speakers.

  When working with MS signals:

  - Values of 1 or higher increase the level of the side signal, making it louder than the middle signal.
  - At a value of 2, you hear only the side signal.

- *Split button:* Split the signal into independently controlled high and low ranges.

  When you activate the Split button a Crossover slider and additional Direction Low and Spread Low knobs are shown. Low range signals are affected by these knobs and high range signals are controlled with the Direction and Spread knobs.

- *Crossover slider and field:* Set the frequency where the signal is split between high and low ranges.
- *Direction Low knob and field:* Independently set the central pan position for the recorded stereo signal in the lower frequency range (set with the Crossover slider). The Direction knob controls panning for upper frequency signals.
- *Spread Low knob and field:* Independently set the stereo spread in LR signals or set the side signal level in MS signals for the lower frequency range (set with the Crossover slider). The Spread knob controls stereo spread for upper frequency signals.

Stereo miking techniques in Logic Pro for iPad

There are three common stereo miking variations used in recording: AB, XY, and MS. A stereo recording contains two channel signals.

AB and XY recordings both record left and right channel signals, but the middle signal is the result of combining both channels.

MS recordings record a middle signal, but the left and right channels are decoded from the side signal, which is the sum of both left and right channel signals.

AB miking

In an AB recording, two microphones—commonly omnidirectional, but any polarity can be used—are equally spaced from the center and pointed directly at the sound source. Spacing between microphones is extremely important for the overall stereo width and perceived positioning of instruments within the stereo field.

The AB technique is commonly used for recording one section of an orchestra, such as the string section, or perhaps a small group of vocalists. It is also useful for recording piano or acoustic guitar.

AB is not well suited to recording a full orchestra or group as it tends to smear the stereo imaging/positioning of off-center instruments. It is also unsuitable for mixing down to mono because phase cancelations can occur between channels.

XY miking

In an XY recording, two directional microphones are symmetrically angled from the center of the stereo field. The right-hand microphone is aimed at a point between the left side and the center of the sound source. The left-hand microphone is aimed at a point between the right side and the center of the sound source. This results in a 45° to 60° off-axis recording on each channel (or 90° to 120° between channels).

XY recordings tend to be balanced in both channels, with good positional information being encoded. XY recording is commonly used for drum recording and is also suitable for larger ensembles and many individual instruments.

Typically, XY recordings have a narrower sound field than AB recordings, so they can lack a sense of perceived width when played back. XY recordings can be mixed down to mono.

MS miking

To make a Middle and Side (MS) recording, two microphones are positioned as closely together as possible—usually placed on a stand or hung from the studio ceiling. One is a cardioid (or omnidirectional) microphone that directly faces the sound source you want to record—in a straight alignment. The other is a bidirectional microphone, with its axes pointing to the left and right of the sound source at 90° angles. The cardioid microphone records the middle signal to one side of a stereo recording. The bidirectional microphone records the side signal to the other side of a stereo recording. MS recordings made in this way can be decoded by the Direction Mixer.

When MS recordings are played back, the side signal is used twice:

- As recorded
- Panned hard left and phase reversed, panned hard right

MS is ideal for all situations where you need to retain absolute mono compatibility. The advantage of MS recordings over XY recordings is that the stereo middle is positioned on the main recording direction (on-axis) of the cardioid microphone. This means that slight fluctuations in frequency response that occur off the on-axis—as is the case with every microphone—are less troublesome, because the recording always retains mono compatibility.

Stereo Spread in Logic Pro for iPad

Stereo Spread is generally used as an output channel strip mastering effect, but can be used in any channel. There are several ways to extend the stereo base (or the perception of space), including using reverbs or other effects and altering the signal phase. These options can sound good, but they can also weaken the overall sound of your mix by ruining transient responses, for example.

Stereo Spread extends the stereo base by distributing a selectable number of frequency bands from the middle frequency range to the left and right channels. This is done alternately—middle frequencies to the left channel, middle frequencies to the right channel, and so on. This greatly increases the perception of stereo width without making the sound totally unnatural, especially when it is used on mono recordings.

To add Stereo Spread to your project, choose Imaging > Stereo Spread in a channel strip Audio Effect plug-in menu or Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Stereo Spread parameters

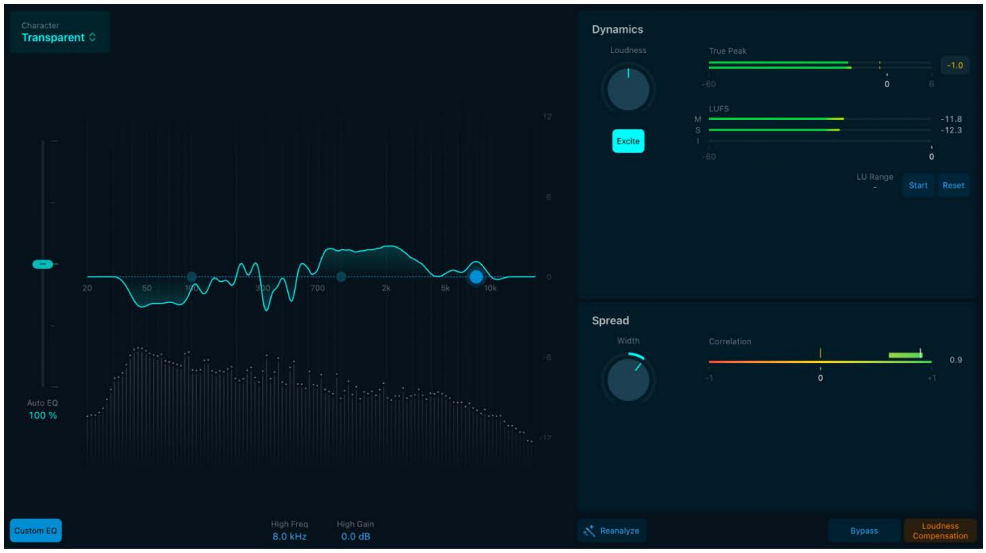
- *Order knob and field:* Determine the number of frequency bands that the signal is divided into. A value of 8 is usually sufficient for most tasks, but you can use up to 12 bands.
- *Lower Intensity knob and field:* Set the amount of stereo base extension for the lower frequency bands.
- *Lower Frequency slider and field:* Determine the lowest frequency that is redistributed in the stereo image.
- *Upper Freq slider and field:* Determine the highest frequency that is redistributed in the stereo image.
- *Upper Intensity knob and field:* Set the amount of stereo base extension for the upper frequency bands.

  Note: When setting the Lower and Upper Intensity knob values, be aware that the stereo effect is most apparent in the middle and higher frequencies. Distributing low frequencies between the left and right speakers can significantly alter the energy of the overall mix. Use low values for the Lower Intensity parameter and avoid setting the Lower Frequency slider below 300 Hz.

Mastering Assistant

Mastering Assistant overview in Logic Pro for iPad

Mastering Assistant is a plug-in designed to make your final mix sound great across any playback device. By meticulously analyzing audio, it automatically fine-tunes the sound through dynamic adjustments, precisely balanced frequency corrections, and additional sonic enhancements. Mastering Assistant also provides dynamic processing and spectral shaping inspired by boutique analog hardware devices used by professional mastering engineers. Using Mastering Assistant on your final mix will help to ensure that your project meets industry-specified loudness levels that can prepare it for distribution on streaming services like Apple Music.



Recommended workflow

The following steps map out the typical workflow for mastering a project using Mastering Assistant in Logic Pro:

- Finish mixing your project, making sure everything sounds balanced and dynamically consistent and has enough headroom so that your project doesn't clip.
- Add Mastering Assistant to the stereo output channel strip. See Add Mastering Assistant from the Plug-ins area.
- Let Mastering Assistant analyze your project:
  - When you add Mastering Assistant, an analysis is triggered, and its internal parameters are adjusted to produce the best results.
  - Mastering Assistant analyzes the whole project unless you set a cycle, in which case it will analyze only the part of the project within the cycle area.
- Listen to your project to hear how Mastering Assistant has improved the sound, while noting any manual changes you'd like to make.
- Open Mastering Assistant in Details view, and adjust essential parameters such as loudness, frequency distribution, and stereo width, or change the overall sound by selecting a character preset. See Mastering Assistant parameters.
- When you're satisfied with the sound of your project, you can export your project from the File menu. See Export a project to an audio file.

Add Mastering Assistant to a project in Logic Pro for iPad

Add Mastering Assistant from the Plug-ins area

1. Tap the Plug-ins button in the middle of the view control bar to open the Plug-ins area.
2. Tap the Output button to view the stereo output channel strip.
3. Tap the magic wand to add Mastering Assistant.

Add Mastering Assistant from the Mixer

1. Tap the Mixer button on the left side of the view control bar to view the Mixer channel strips.
2. Tap the magic wand on the stereo output channel strip to add Mastering Assistant.

Mastering Assistant parameters Logic Pro for iPad

Mastering Assistant provides the following controls:



- *Character menu:* Mastering Assistant allows you to choose the character of the processing applied to your project. The character presets change the sonic qualities of Mastering Assistant, inspired by hardware mastering chains used by professional recording engineers:
  - *Clean:* An algorithm that offers a transparent yet punchy result. This style is good for EDM, acoustic music, and anything that needs a clean yet punchy sound.
  - *Valve:* An algorithm that simulates a processing chain utilizing tubes to deliver a deep low end and refined high end, making it a great option for both acoustic music and the hip-hop genre.
  - *Punch:* An algorithm that embodies an aggressive sound with a subtle emphasis on the mid-range frequencies, ideally suited for rock music.
  - *Transparent:* An algorithm inspired by a modern and tight-sounding compressor, suitable for most genres of music.

- *Auto EQ slider:* Control the amount of the correction EQ estimated by Mastering Assistant. After analyzing your project, Mastering Assistant shows the frequency curve that it applies to improve the sound of your project, with the Auto EQ slider set at 100%. You can adjust the amount of auto EQ by dragging the slider up or down.
- *Reanalyze button:* Trigger a new analysis of your project if it has undergone changes. The button name changes to Reanalyze Section when a cycle area is set or to Analyze after you add content to an empty project.
- *Bypass button:* Switch to the unprocessed audio. This allows you to directly compare the audio with or without processing, providing a clear evaluation of the effects applied. Use in combination with the Loudness Compensation button to avoid any sudden jumps in loudness. Remember to turn off bypass before bouncing your project.
- *Loudness Compensation button:* Match the volume of the processed audio with that of the original, ensuring a balanced and unbiased basis for comparison. By doing so, you can accurately assess any changes or improvements made during the processing stage without being influenced by differences in loudness. Remember to turn off loudness compensation before bouncing your project.

Dynamics section

- *Loudness knob:* Change the loudness of the processed audio. When you adjust the loudness knob to its center position, the output typically registers at around –14 LUFS-I. This typically is the target loudness for many streaming platforms. However, in the mastering process, adhering strictly to this value isn't always the best approach. Instead, mastering engineers aim for a loudness level that best complements the specific mix. The optimal loudness can vary considerably based on the genre and the unique characteristics of the project.
- *Excite button:* Introduce saturation to frequencies within the upper-mid range of the signal. This produces more overtones and adds richness and crispness to your mix. The enriched signal produces results similar to vintage transformer-based console designs of the '60s, '70s, and '80s.
- *True Peak meter:* Displays the signal level on a dBTP (dB measured as true peak) scale, and the dBTP max level. Tap to clear the numeric scale and max level.

  True Peak represents the absolute highest level a signal is reaching, which is very important for observing where it is in relation to the ceiling, or the highest level a digital audio signal can reach before distorting or clipping. The signal level is represented by a green bar that turns yellow above –3 dB and red when it exceeds 0 dB. The numeric display follows the same color code. When the level exceeds 0 dB, the portion of the bar above the 0 dB point turns red. However, Mastering Assistant limits the processed signal to –1 dBFS True Peak, meeting the requirement for streaming platforms.
- *LUFS meter:* The M, S, and I fields and meters indicate the current momentary, short-term, and integrated loudness measurement of your processed mix. The loudness for each measurement (M, S, I) is represented by a green bar. A meter turns yellow when the measured loudness exceeds the target loudness.
- *LU Range field:* Indicates the loudness range during measurement (using the Start/Pause button).

- *Start/Pause button:* Activate the loudness meter, initiating the measurement of the audio signal's loudness. While the meter is running, it actively monitors and displays the loudness of any incoming audio signal. Pause halts the measurement process. The loudness reading ceases to update and typically holds at the last measured value. This is useful if you want to pause the measurement or if you've finished analyzing a particular section of audio.
- *Reset button:* Clear any current readings or measurements on the loudness meter. Ideal for when you want to start a fresh measurement, perhaps for a new piece of audio or after making adjustments to the audio.

Spread section

- *Width knob:* Increase or decrease the width of your mix. This knob will be set to a position other than the center if Mastering Assistant's analysis finds that the stereo width of your project is too narrow or wide. Turn this knob all the way to the left to create a mono mix that you can use to check mono compatibility.
- *Correlation meter:* Displays the phase relationship of a stereo signal. Your project should be above 0; the further it is, the better the mono compatibility.
  - A correlation of +1 (the far right position) means that the left and right channels correlate 100%—they are completely in phase.
  - A correlation of 0 (the center position) indicates the widest permissible left/right divergence, often audible as an extremely wide stereo effect.
  - Correlation values lower than 0 indicate that out-of-phase material is present, which can lead to phase cancellations if the stereo signal is combined into a monaural signal.

Spectrum analyzer and EQ section

The EQ module includes a spectrum analyzer and a composite EQ curve.



- *Spectrum analyzer:* Displays the real-time magnitude (expressed in decibels) of a signal across the frequency spectrum.
- *Composite curve:* The collective filter response curve of the analyzed signal, depicted as a solid line spanning the spectrum. Each individual band contributes to the overall contour of this curve.
- *Custom EQ button:* Turn the custom EQ on or off. When turned on, a dashed line illustrates the custom EQ curve, accompanied by three control points (blue dots) that you can drag to make very broad-stroke EQ adjustments.
- *Low frequency control point:* Adjust the low frequency by dragging the control point left and right. Adjust the low frequency gain by dragging up and down.
  - *Low Freq field:* Enter a low shelving filter frequency from 20 Hz to 200 Hz.
  - *Low Gain field:* Enter a low shelving filter level. The gain range is ±6 dB.
- *Mid frequency control point:* Adjust the mid frequency by dragging the control point left and right. Adjust the mid frequency gain by dragging up and down.
  - *Mid Freq field:* Enter a mid-range filter frequency from 200 Hz to 8.0 kHz.
  - *Mid Gain field:* Enter a mid-range filter level. The gain range is ±6 dB.
- *High frequency control point:* Adjust the high frequency by dragging the control point left and right. Adjust the high frequency gain by dragging up and down.
  - *High Freq field:* Enter a high-range filter frequency from 8.0 kHz to 20.0 kHz.
  - *High Gain field:* Enter a high shelving filter level. The gain range is ±6 dB.

Metering tools

Metering tools in Logic Pro for iPad

You can use the Metering tools to analyze audio in a variety of ways. These plug-ins provide different views of your audio data that extend the information shown in channel strip meters. The Metering plug-ins have no effect on the audio signal and are intended for use as diagnostic aids.

Each meter is specifically designed to view different characteristics of an audio signal, making each suitable for particular studio situations. For example, BPM Counter displays the tempo, Level Meter displays the level of an incoming audio signal, and Loudness Meter shows the momentary, short-term, and integrated loudness levels.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

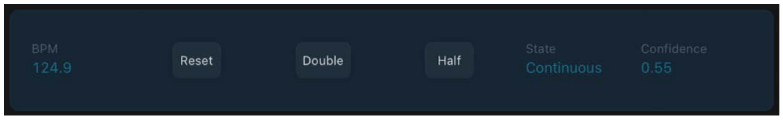
Throughout the guide, parameters available in Tile view are indicated by  .

BPM Counter in Logic Pro for iPad

BPM Counter analyzes the tempo of incoming audio in beats per minute (bpm). The detection circuit looks for any transients, also known as *impulses*, in the input signal. Transients are very fast, nonperiodic sound events in the attack portion of the signal. The more obvious this impulse is, the easier it is for BPM Counter to detect the tempo.

Percussive drum and instrumental rhythm parts, such as basslines, are suitable for tempo analysis, whereas pad sounds are unsuitable candidates for tempo analysis.

To add BPM Counter to your project, choose Metering > BPM Counter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



BPM Counter parameters

- *BPM display:* Shows the tempo of incoming audio in beats per minute (bpm).

  The measurement ranges from 80 to 160 beats per minute. The measured value is displayed with an accuracy of one decimal place.

  Note: BPM Counter detects tempo variations in the signal and tries to analyze them accurately. If the State display shows *Analyzing* during playback, this indicates that BPM Counter has detected a tempo that has deviated from the last received (or set) tempo. As soon as a new, constant tempo is recognized, *Continuous* is shown in the State display and the new tempo is shown in the BPM Counter display.

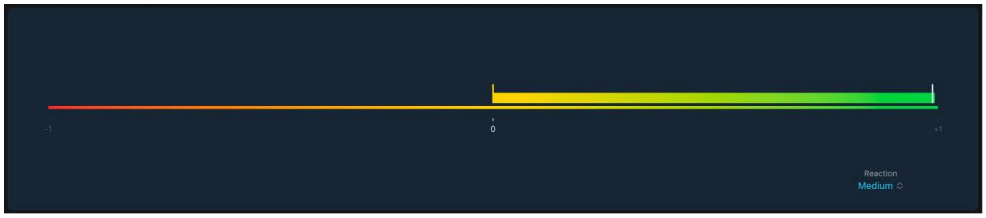
- *Reset button:* Tap to reset the BPM Counter display.
- *Double button:* Set the displayed tempo to double the analyzed rate.
- *Half button:* Set the displayed tempo to half the analyzed rate.
- *State display:* Shows the current analysis status. If *Analyzing* is displayed, a tempo measurement is taking place. When *Continuous* is displayed, analysis is complete, and the tempo is displayed in the BPM Counter display field.
- *Confidence display:* Shows a percentage value that indicates the accuracy of tempo analysis.

Correlation Meter in Logic Pro for iPad

Correlation Meter displays the phase relationship of a stereo signal. When added to an output channel strip, it helps you determine whether your stereo mix has a wide stereo image or a narrower, more mono-sounding image. By soloing a specific stereo track routed to the output channel strip, you can quickly check the phase of stereo signals, such as drum overheads or piano stereo mics.

As a tool for checking mono compatibility, the meter indicates whether your mix or a section of it contains out-of-phase content, which, when played back on a mono speaker, can alter the sound or entirely cancel the mix.

To add Correlation Meter to your project, choose Metering > Correlation Meter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Correlation Meter parameters

The scale of Correlation Meter ranges from –1 to +1.

- *Correlation Meter:* Displays the phase relationship between the left and right channels of a stereo signal.
  - A correlation of +1 (the far right position, in green) means that the left and right channels correlate 100%—they are completely in phase. This results in a mono signal.
  - A correlation of 0 (the center position) indicates the widest permissible left/right channel divergence, resulting in a wide stereo effect.
  - Correlation values lower than 0 (orange to red) indicate that out-of-phase material is present, which can lead to phase cancellations if the stereo signal is played through a mono speaker, changing the sound of your mix.

    Note: When plug-ins that offer stereo width or spread parameters are inserted before Correlation Meter in the signal path, the meter may show negative values if your plug-in uses a width or spread parameter value above 100%.
  - A correlation of –1 (the far left position, in red) indicates that the left and right channels are identical but with opposite polarity, which mutes the entire stereo signal when it's played back in mono.

    The vertical white line indicates the momentary correlation value. It resets to 0 when the signal stops for two seconds. The yellow to green bar represents the movement of the white line over the last few seconds, indicating the correlation range of your stereo signal.

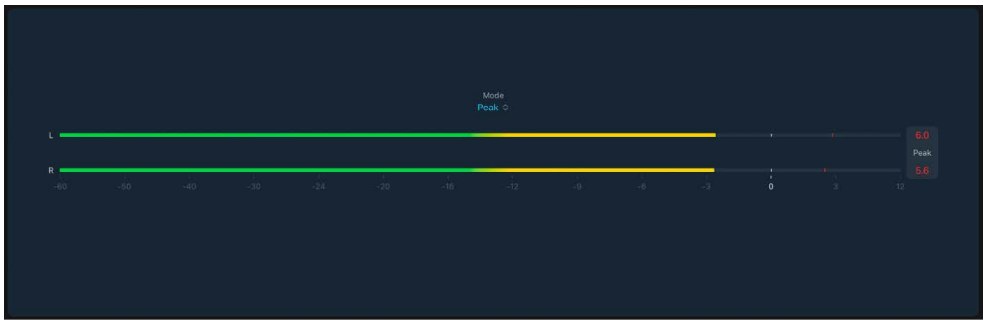
    A vertical orange to red line behaves as a peak indicator for values below 0. It shows the maximum divergence from 0.
- *Reaction pop-up menu:* Choose an item from the menu to set the reaction time (update speed) of the meter display.

Level Meter in Logic Pro for iPad

Level Meter shows the current signal level on a decibel scale.

Stereo Level Meter instances show independent left and right bars, whereas mono instances display a single bar.

To add Level Meter to your project, choose Metering > Level Meter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Peak level values are displayed numerically and graphically. You can reset these values by tapping them in the display.

Level Meter parameters

- *Mode pop-up menu:* Choose a display setting using Peak, RMS, Peak & RMS, True Peak, or True Peak & RMS characteristics.
  - *Peak:* Displays the highest value of the individual samples in your signal, also referred to as Sample Peak. This is the same meter type used on channel strips.
  - *RMS (root mean square):* Measures the average level of the signal. It provides an indication of the overall loudness, the way human hearing perceives sound.
  - *Peak & RMS:* Displays two meter bars per channel, showing the Peak and RMS values.
  - *True Peak:* Uses oversampling to detect peaks that occur between samples that can be higher than the sample peaks (also known as "Inter-sample Peaks").
  - *True Peak & RMS:* Displays two meter bars per channel, showing the True Peak and RMS values.
- *Peak Hold display:* At the top (or to the right) of the meter bars is a color-coded numeric display that shows the highest level for the selected Meter type (Peak, RMS, and True Peak). The values reset when you start playback or when you tap the numeric value.
- *Peak Hold line:* A line segment is temporarily shown at the highest peak value. It is displayed for a second and slowly reduces. This temporary peak hold display is a visual aid designed to help you to monitor short peaks.
- *Level Meter(s):* Displays the current signal level on a decibel scale. The signal level for each channel is represented by a green bar. Signals (above the target level) approaching the 0 dB level are represented by a yellow bar. When the level exceeds 0 dB, the portion of the bar above the 0 dB point turns red.

Choose a meter type

The section provides guidelines that may help you to choose a suitable meter type.

Human hearing is optimized for capturing continuous signals, making our ears RMS instruments, rather than peak reading instruments. Therefore, using RMS meters makes sense most of the time. Alternatively, you can use both RMS and Peak meters.

- Use a Peak meter when recording (to avoid clipping of the input signal) or during mixing to monitor signal peaks.
- Use a True Peak meter on your output channel strip to accurately measure the peak value when bouncing your mix (often required when delivering files to colleagues).
- Use an RMS meter to get an indication of the perceived loudness of a track or the overall mix.
- Use the separate Loudness Meter plug-in to measure audio based on loudness standards, which can be important for delivery of stems and other audio files to colleagues.

Loudness Meter in Logic Pro for iPad

Loudness Meter shows the momentary, short-term, and integrated loudness levels. Loudness indicates the perceived level of a signal that is indicative of human hearing, making it a useful reference tool when mixing or mastering. Loudness Meter conforms to the EBU R 128 specification.

Loudness is measured in Loudness Units, relative to Full Scale (LUFS). Each LU is equivalent to one decibel (dB).

To add Loudness Meter to your project, choose Metering > Loudness Meter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Loudness Meter parameters

- *M, S, and I meters and fields:* Indicate the current momentary, short-term, and integrated signal levels of incoming audio material. The loudness for each measurement (M, S, I) is represented by a green bar. A meter turns yellow when the measured loudness exceeds the target loudness line.
- *Target level marker and line:* Drag the yellow marker to set a target level between -30 LUFS and 0 LUFS.
- *Loudness Range field:* Indicates the loudness range during measurement (when the Start/Pause button is active).
- *Integrated field:* Indicates the integrated loudness level during measurement (when the Start/Pause button is active).
- *Start/Pause button:* Turn on to analyze and show the Integrated Loudness and the LU Range for a portion or the full length of the audio material. Pause retains the current LU Range and Integrated values. Tap again to resume real-time display.
- *Reset button:* Clear all values.

Use Tuner utility and plug-in in Logic Pro for iPad

You can tune instruments connected to your system with the Tuner utility or plug-in. This ensures that external instrument recordings are in tune with any software instruments, samples, or existing recordings in your projects.

If you're new to using plug-ins, see Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Tuner parameters

- *On/Off button:* Turn on or turn off the tuner.
- *Graphic Tuning display:* Indicates the pitch of the note. At the centered position, the note is correctly tuned. If the indicator moves to the left of center, the note is flat. If the indicator moves to the right of center, the note is sharp. Color is also used to indicate tuning accuracy, with green denoting a tuned signal, orange indicating a slightly detuned signal, and red indicating an out of tune signal.

Use the Tuner utility

1. In Logic Pro, tap the Tuner icon on the control bar.

   The Tuner utility opens.

2. Play a single note on the instrument and watch the Graphic Tuning display. If the note is flat or sharp of the keynote, this is indicated in the display.

3. Adjust the tuning of your instrument until the indicator is centered in the display.

   The display is shown in green when correctly tuned.

Use the Tuner plug-in

1. In Logic Pro, insert the Tuner plug-in into an audio channel strip Effect slot.

   The Tuner plug-in opens.

2. Play a single note on the instrument and watch the Graphic Tuning display. If the note is flat or sharp of the keynote, this is indicated in the display.

3. Adjust the tuning of your instrument until the indicator is centered in the display.

   The display is shown in green when correctly tuned.

MIDI plug-ins

MIDI plug-ins in Logic Pro for iPad

MIDI plug-ins are inserted in software instrument channel strips and process or generate MIDI data—played from a MIDI region or a MIDI keyboard—in real time. Included are the Arpeggiator, Chord Trigger, and Modulator, along with plug-ins for transposition, randomization and other processing. Scripter provides a number of MIDI processing and generation scripts.

MIDI plug-ins are connected in series *before* the audio path of a software instrument channel strip.

MIDI plug-ins have a MIDI input, the MIDI processor, and a MIDI output. The output signals sent from MIDI plug-ins are standard MIDI events such as MIDI note or controller messages. To learn how to record the output of MIDI plug-ins, see Record MIDI Output.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

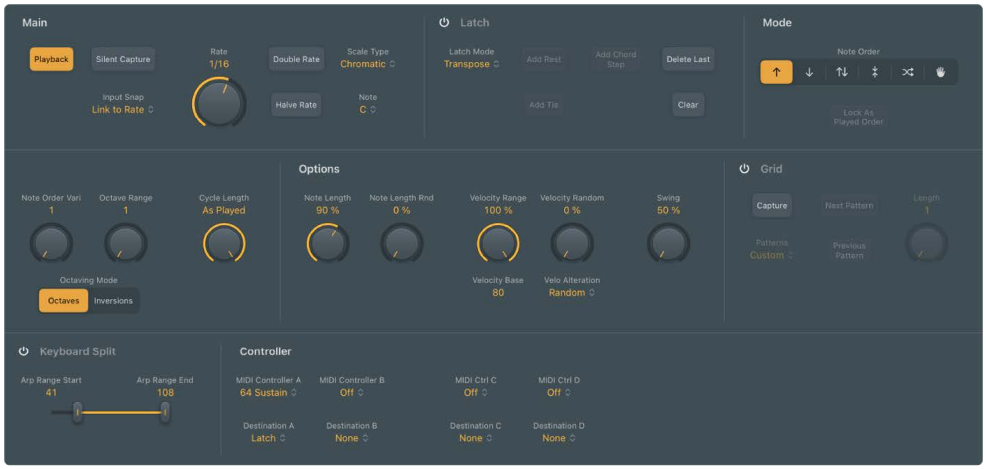
Throughout the guide, parameters available in Tile view are indicated by  .

Arpeggiator MIDI plug-in

Arpeggiator MIDI plug-in in Logic Pro for iPad

The Arpeggiator MIDI plug-in generates musically interesting arpeggios based on incoming MIDI notes. It provides split and remote features that let you control nearly all Arpeggiator functions without taking your hands off the keyboard, making it a powerful live performance tool.

An arpeggio is a succession of notes in a chord. Rather than all notes being played at one time, they are played one after the other in a pattern: up, down, random, and so on. The Arpeggiator plug-in provides a number of preset patterns, inclusive of switchable variations and inversions. Inversions change the root note of the chord from the lowest note, resulting in a different start note in arpeggiated patterns. These features let you quickly switch between patterns and feels when performing live, or when creating new projects in the studio.



The Arpeggiator MIDI plug-in is divided into four main function areas.

- *Main and Latch parameters:* This area contains the Play and Latch controls. See Arpeggiator main parameters and Arpeggiator latch parameters.
- *Mode parameters:* Here you can set note order parameters, can determine the arpeggio type and include four variations or inversions, the arpeggio octave range, and the arpeggio speed. See Arpeggiator note order parameters.
- *Options and Grid parameters:* The options parameters provide control of note lengths and velocities, and the overall swing amount of the Arpeggiator. The grid parameters let you capture and load arpeggiator patterns.
- *Control parameters:* Arpeggiator parameters and behavior can be modified with keyboard parameters and controller parameters.

Arpeggiator MIDI plug-in main parameters in Logic Pro for iPad

You can use the main parameters to start and stop the Arpeggiator, and to set the rate and scale. You can also capture a live arpeggio as a MIDI region.



Main parameters

- *Playback button:* Start or stop arpeggiated playback of note input from a MIDI keyboard or a MIDI region. The Playback button is highlighted when in play mode. When the Arpeggiator plug-in is stopped, incoming MIDI notes are passed through, and the settings of the split and remote keyboard parameters are retained. See keyboard parameters and Assign Arpeggiator controllers.
  - When Logic Pro is in play mode: The arpeggio starts playing whenever the Playback button is on. Arpeggio playback is linked to the project song position.
  - When Logic Pro is stopped: Arpeggio playback stops. Incoming MIDI notes are passed through, and keyboard split and remote settings are retained.

  Note: You can tap the Arpeggiator Playback button while Logic Pro is stopped to begin arpeggio playback from the first step in the arpeggio.
- *Silent Capture button:* Tap to capture an arpeggio step by step without being disturbed by the immediate response of the running arpeggiator.
  - When active, the arpeggiator is stopped and Latch/Add mode is engaged.
  - When inactive, the Playback button is re-engaged (if previously active) and Latch mode switches to Transpose.
- *Input Snap pop-up menu:* Choose a beat value to snap the first incoming note to a position, thus quantizing the arpeggio start point.

  The default Input Snap pop-up menu value is “Link to Rate,” which matches the set Arpeggiator Rate.
- *Rate control and field:* Set the arpeggiator rate. Choose from: 1/4, 1/8, 1/16 (including Triplet and Dotted notes), and 1/32.
- *Double/Halve Rate buttons:* Tap to double or halve the value set with the Rate knob.
- *Scale Type pop-up menu:* Choose a scale. Played keys are snapped to the nearest note in the chosen scale. Choose from: Chromatic (default), Major, Major Pentatonic, Major Blues, Lydian, Mixolydian, Klezmer, Minor Pentatonic, Minor Blues, Japanese, Natural Minor, Harmonic Minor, Melodic Minor, Dorian, Phrygian, Locrian, and South-East Asian.
- *Note pop-up menu:* Choose a root key for the chosen scale. C is the default key.

Arpeggiator MIDI plug-in latch parameters in Logic Pro for iPad

You can determine the latching behavior and can edit arpeggio steps with the latch parameters.

The Arpeggiator MIDI plug-in operates in two distinct functional modes: Live and Grid. The modes are mutually exclusive, so turning on one turns off the other. It also provides a unique Live Capture to Grid facility.

When Grid mode is active, it controls the arpeggio velocity, cycle length, step length, rests, ties, and chords. All live input of available grid parameters, such as velocities, is ignored. See Arpeggiator options parameters.

When in the default Live mode, the arpeggio performance is controlled by your input. For example, the velocities of arpeggiated notes are determined by the way you played them. Any existing grid values are retained but are inactive until you return to Grid mode.

Note: When you capture a live performance, grid values are not retained.

In Live mode, you can add rests, ties, and chords in real time by tapping the onscreen buttons or by using equivalent MIDI keyboard remote keys. See Assign Arpeggiator controllers.



Latch parameters

- *On/Off button:* Turn Latch mode on or off. This allows an arpeggio to run without you holding down keys. Latch mode behavior is determined with the Latch mode pop-up menu.
- *Latch Mode pop-up menu:* Choose a Latch mode.
  - *Reset:* The first key played clears the currently latched notes.
  - *Transpose:* Play a single key to transpose the arpeggio relative to the note value of the pressed key and the lowest arpeggiated note.

    Note: Pressing more than one key simultaneously clears currently latched notes and starts a new arpeggio.
  - *Gated Transpose:* This option is the same as Transpose Latch mode with the difference that the arpeggio only plays while a key is pressed. As soon as the key is released, the arpeggio is muted.
  - *Add:* Play keys—one by one, or simultaneously as a chord—to add them to the latched arpeggio. You can play the same key multiple times and the note repeats the number of times it is struck.
  - *Add Temporarily:* This option is the same as Add Latch mode except that played notes are added to the latched arpeggio only while held. When a temporarily added key is released, it is removed from the arpeggio.
  - *Through:* All incoming MIDI notes are passed through the Arpeggiator plug-in, enabling you to play along with a latched arpeggio.

- *Add Rest button:* Insert a rest at the current arpeggiator step position. A position identification number is assigned to the rest, ensuring that its rhythmic position (step number) within the arpeggio is retained, even when different note order presets are chosen.

  Note: Rests can only be added while building the arpeggio, which means that at least one key must be held if you want to add a rest. Once all keys are released, the Arpeggiator acts in accordance with the rules of the set Latch mode and expects to receive a MIDI note for transposition and so on. In Latch Add mode, this restriction does not apply because it allows you to add MIDI notes, rests, ties, and chords after all keys are released.

- *Add Tie button:* Insert a tie at the current arpeggiator step position. A position identification number is assigned to the tie, ensuring that its rhythmic position (step number) within the arpeggio is retained, even when different note order presets are chosen.

- *Add Chord Step button:* Insert a chord at the current arpeggiator step position. When the arpeggiator encounters a chord step, it simultaneously plays all notes, including their unique velocities, currently in memory (latched or held). A position identification number is assigned to the chord, ensuring that its rhythmic position (step number) within the arpeggio is retained, even when different note order presets are chosen.

- *Delete Last button:* Delete the last note, rest, or tie that was added to the arpeggio.

  Note: Each event is allocated a unique position identification number and the “last” event has the highest position identification number.

- *Clear button:* Remove all notes from the Arpeggiator plug-in latch memory. The arpeggio stops playing and all position identification numbers are reset to zero, enabling you to create a new arpeggio without turning off Latch mode, which can be useful in a live situation when preparing for a chord change.

Arpeggiator MIDI plug-in mode parameters in Logic Pro for iPad

The Mode parameters provide control of a pre-programmed order of notes that are played at a preset playback rate. Once all notes are played, the arpeggio cycles from the start. When you play a single key, it is repeated. When you play multiple keys, the held notes are played one after the other. As you play additional notes, these are seamlessly added to the arpeggio. When you release notes, they are removed from the arpeggio. The arpeggio stops when you release all played keys (unless Latch mode is turned on in the control parameters).

The Arpeggiator plug-in automatically assigns position identification numbers to each note in the order they are played. These position identification numbers associate an event, such as a note, rest, or a tie, with a particular step. This lets you switch between note order presets while retaining a rest on the third step, for example.



Mode parameters

All Mode parameters can be changed while an arpeggio is playing. Changes are immediate and are seamlessly applied to the running arpeggio.

- *Note Order buttons:* Set the arpeggio direction.
  - *Up:* The arpeggio is played from the lowest note to the highest note.
  - *Down:* The arpeggio is played from the highest note to the lowest note.
  - *Up & Down:* The arpeggio plays up and down, from the lowest note; the highest and lowest notes repeat.
  - *Outside-in:* The arpeggio plays the highest then the lowest notes, then the second highest and second lowest, the third highest and third lowest, and so on.
  - *Random:* Arpeggiated notes play in a random order.
  - *As Played:* All notes play in the order they were triggered. See Lock button parameter.
- *Lock button:* Works in conjunction with the “As Played” item in the Note Order pop-up menu. Tap once you have triggered an arpeggio to lock the current note order. This note order and feel is retained for any newly triggered arpeggios, but with new notes replacing the original notes. Tap again to clear the locked note order and to revert to the standard “as played” behavior. The lock state and note order can be saved with a setting.
- *Note Order Vari knob:* Determine the type of note order variation. See note order variations for details.
- *Octave Range knob:* Determine the octave range or the chord inversion pattern. See note order inversions for details on the four knob position behaviors in Inversions mode.

  In Octaves mode:
  - *Position 1:* The arpeggio repeats without transposition.
  - *Position 2:* The lowest note is transposed by one octave. Once repeated, the arpeggio restarts in the original octave.
  - *Position 3:* The first repetition is transposed by one octave, and the second repetition is transposed by two octaves. Once the second repetition is played, the arpeggio restarts in the original octave.
  - *Position 4:* The first repetition is transposed by one octave, the second by two octaves, and the third by three octaves. Once the third repetition is played, the arpeggio restarts in the original octave.

  In Inversions mode:
  - *Position 1:* The arpeggio repeats without inverting the held notes.
  - *Position 2:* The arpeggio is inverted once during the first repetition. Once repeated, the arpeggio restarts.
  - *Position 3:* The arpeggio is inverted twice, once each during the first and the second repetition. Once the second repetition is played, the arpeggio restarts.
  - *Position 4:* The arpeggio is inverted three times, once each during the first, second, and third repetitions. Once the third repetition is played, the arpeggio restarts.

- *Octaving Mode buttons:* Switch between two modes: Octaves or Inversions. The four-position Octave Range knob above the buttons is used to determine the octave range or the chord inversion pattern. See note order inversions.
- *Cycle Length knob:* Set a length for the arpeggio. You can choose from the following:
  - *By Grid:* Matches the arpeggio length to the host application division setting. This is useful for rhythmically synchronizing the arpeggio length with other regions.
  - *1 to 32:* Set the arpeggio length to the specified number of notes.
  - *As Played:* The arpeggio length is determined by the length of played notes.

Arpeggiator MIDI plug-in note order variations in Logic Pro for iPad

The table outlines the Arpeggiator behavior in each note order preset when the Note Order Vari(ation) knob is set to the four available positions.

Note order	Variation 1	Variation 2	Variation 3	Variation 4
Up	Plays from the lowest to highest note in consecutive order and restarts when all keys are played.	Plays the second step first. This variation consists of four steps; all pressed keys are divided into groups of four with the note order applied to all groups. If there are fewer than four notes, the steps without an assigned key are skipped. Once all keys are played, the arpeggio restarts with the lowest note.	Plays the third step first. This variation consists of four steps; all pressed keys are divided into groups of four with the note order applied to all groups. If there are fewer than four notes, the steps without an assigned key are skipped. Once all keys are played, the arpeggio restarts with the lowest note.	This variation, which consists of three steps, plays up and overlaps; all pressed keys are divided into groups of three with the note order applied to all groups. If there are fewer than three notes, the steps without an assigned key are skipped. Once all keys are played, the arpeggio restarts with the lowest note.
Down	Plays from the highest to lowest note in consecutive order and restarts when all keys are played.	Plays the second step first. This variation consists of four steps; all pressed keys are divided into groups of four with the note order applied to all groups. If there are fewer than four notes, the steps without an assigned key are skipped. Once all keys are played, the arpeggio restarts with the highest note.	Plays the third step first. This variation consists of four steps; all pressed keys are divided into groups of four with the note order applied to all groups. If there are fewer than four notes, the steps without an assigned key are skipped. Once all keys are played, the arpeggio restarts with the highest note.	This variation, which consists of three steps, plays down and overlaps; all pressed keys are divided into groups of three with the note order applied to all groups. If there are fewer than three notes, the steps without an assigned key are skipped. Once all keys are played, the arpeggio restarts with the highest note.

Note order	Variation 1	Variation 2	Variation 3	Variation 4
Up & Down	Plays from the lowest to highest note in consecutive order, then plays from the highest to the lowest note, and restarts when all keys are played.	Plays from the lowest to highest note in consecutive order, then plays from the second highest to the second lowest note, and restarts when all keys are played.	This two-step variation works with pairs of notes. The second note of the pair plays first. In a four-note chord, the order is 2, 1, 4, 3. Once the pattern is played, the note order is reversed, then the arpeggio restarts.	This three-step variation works with trios of notes. The note order is 1, 3, 2. Once the pattern is played, the note order is reversed, then the arpeggio restarts.
Outside-in	Plays the highest note, then the lowest note, then plays the second highest and the second lowest note, and so on. The arpeggio restarts when all keys are played.	Plays the lowest note, then the highest note, then plays the second lowest and the second highest note, and so on. The arpeggio restarts when all keys are played.	This is an inside-out variation. The number of played keys is divided by two (rounded up to the nearest whole number). The highest center note is played, then the low-center note, and so on. In a six-note chord, the order is 4, 3, 5, 2, 6, 1. The arpeggio restarts when all keys are played.	This is an inside-out variation. The number of played keys is divided by two (rounded up to the nearest whole number). The lowest center note is played, then the high-center note, and so on. In a six-note chord, the order is 3, 4, 2, 5, 1, 6. The arpeggio restarts when all keys are played.
Random	Played note order is randomly generated and can include duplicate notes.	Played note order is randomly generated but no note is played twice. The arpeggio restarts when all keys are played.	This variation favors low notes. Played note order is randomly generated and can include duplicate notes.	This variation favors high notes. Played note order is randomly generated and can include duplicate notes.
As Played	Plays all notes in the order they were played, then restarts.	Plays all notes in the reverse order they were played, then restarts.	Plays all notes in the order they were played, then plays notes in reverse order, doubling the first and last played notes. The arpeggio restarts once all notes are played.	Plays all notes in the order they were played, then plays notes in reverse order, but does not repeat the first and last played notes. The arpeggio restarts once all notes are played.

Arpeggiator MIDI plug-in note order inversions in Logic Pro for iPad

The table outlines the Arpeggiator behavior in each note order preset when the Octave Range knob is set to the four positions in Inversions mode (set when the Inversions button is active). Inversions change the root note of the chord, resulting in a different start note to arpeggiated patterns.

Note order	Inversion 1	Inversion 2	Inversion 3	Inversion 4
Up	Plays the original chord, then three inversions in consecutive order and restarts. Playback order: original, 1, 2, 3.	Plays the second inversion first. Playback order: 1, original, 2, 3.	Plays the third inversion first. Playback order: 2, original, 1, 3.	This variation, which consists of three steps, plays up and overlaps. Playback order: original, 2, 1, 3.
Down	Plays the original chord, then three inversions in consecutive order and restarts. Playback order: 3, 2, 1, original.	Plays the second step first. Playback order: 2, 3, 1, original.	Plays the third step first. Playback order: 1, 3, 2, original.	This variation, which consists of three steps, plays down and overlaps. Playback order: 3, 1, 2, original.
Up & Down	Plays the original chord, then three inversions in consecutive order, then reverses the order, repeating the first and last. Playback order: original, 1, 2, 3, 3, 2, 1, original.	Plays the second step first. Playback order: 1, original, 3, 2, 2, 3, original, 1.	Once the pattern is played, the order is reversed, then the arpeggio restarts. Playback order: original, 2, 1, 3, 3, 1, 2, original.	Once the pattern is played, the order is reversed, but the third inversion is not repeated. Playback order: original, 1, 2, 3, 2, 1.
Outside-in	Plays the highest inversion, then the original, then plays the second highest and the second lowest inversion, and so on. Playback order: 3, original, 2, 1.	Plays the original, then the highest inversion, then plays the second lowest and the second highest inversion, and so on. Playback order: original, 3, 1, 2.	This is an inside-out variation. Playback order: 1, 2, original, 3.	This is an inside-out variation. Playback order: 2, 1, 3, original.
Random	Played inversion order is randomly generated and can include duplicate chord inversions.	Played inversion order is randomly generated but no chord inversion is played twice.	This variation favors low chord inversions. Played inversion order is randomly generated and can include duplicate chord inversions.	This variation favors high chord inversions. Played inversion order is randomly generated and can include duplicate chord inversions.

Arpeggiator MIDI plug-in options parameters in Logic Pro for iPad

You can use the options parameters to set global Arpeggiator playback parameters, such as note length and velocity.



Options parameters

- *Note Length knob:* Define the length of arpeggiated notes. This ranges from 1 to 150%.

  Note: This is a global scaling parameter that retains the relative length differences between individual steps that may have been changed in Grid mode.

- *Note Length Rnd knob:* Set the amount of random note length variation.
- *Velocity Range knob:* Determine the maximum range of possible velocity values for arpeggiated notes. At the far right position (100%), the original velocities of recorded or played notes are retained. At the far left position (0%), the original velocities of recorded or played notes are ignored and all notes are output at a constant velocity.
- *Velocity Base field:* Drag vertically to set (or tap to type) a minimum velocity value used for random velocity modulations and (de-)crescendos.
- *(De-)Crescendo/Velocity Random knob:* Set the strength of the random or (de-)crescendo velocity variation for the mode chosen in the Velo Alteration pop-up menu.
  - *When Velo Alteration is set to Random:* The velocity values of all notes are randomized symmetrically by the set amount. At a value of 0% there is no randomization applied. At a value of 100% the velocity values are completely randomized.
  - *When Velo Alteration is set to (De-)Crescendo:* The set amount is added to, or subtracted from, the velocity of all notes on each arpeggio repetition, starting with the second cycle.
- *Velo Alteration pop-up menu:* Switch between two modes: Random and (De-)Crescendo. The amount of variation is controlled with the Velocity Random knob. The range of the (de-)crescendo or possible random velocities is set with the Velocity Range and Velocity Base parameters.
- *Swing knob and field:* Set the strength of note swing. Swing moves every second note closer to the nearest downbeat. A value of 0% results in no note movement, whereas a value of 100% results in extreme note movement.

Arpeggiator MIDI plug-in Grid mode in Logic Pro for iPad

The Arpeggiator MIDI plug-in operates in two distinct functional modes: Live and Grid. The modes are mutually exclusive, so turning on one turns off the other. It also provides a unique Live Capture to Grid facility.

When Grid mode is active, it controls the arpeggio velocity, cycle length, step length, rests, ties, and chords. All live input of available grid parameters, such as velocities, is ignored.

When in the default Live mode, the arpeggio performance is controlled by your input. For example, the velocities of arpeggiated notes are determined by the way you played them. Any existing grid values are retained but are inactive until you return to Grid mode.

Note: When you capture a live performance, grid values are not retained.

In Live mode, you can add rests, ties, and chords in real time by tapping the onscreen buttons or by using equivalent MIDI keyboard remote keys. See Assign Arpeggiator controllers.

The grid consists of 16 steps. Each step controls the step velocity as well as its length, rest, tie, and chord status. In addition, a cycle length can be set. The current grid pattern is automatically saved with the project or concert. You can also save and load your own or factory grid patterns. The Arpeggiator plug-in assigns incremental position identification numbers in the order they were received, regardless of the initially selected note order preset. These position identification numbers are used to “lock” an event, such as a note, a rest, or a tie to a particular step.



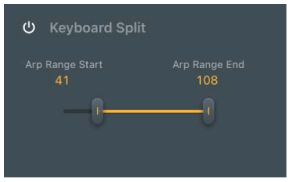
Grid mode parameters

- *On/Off button:* Turn on Grid mode. The grid has 16 steps. Each step controls velocity, length, rest, tie, and chord status.
- *Capture button:* Tap to capture the current arpeggiator settings as a grid pattern. This appears as the *Custom* entry in the Patterns pop-up menu.
- *Patterns pop-up menu:* Choose a menu item to load user grid patterns or to load a factory grid pattern.
  - *Custom:* This menu item is shown automatically when any pattern changes have been made. It can be considered the “current state” pattern preset.
  - *App Patterns submenu:* Tap to choose a factory pattern preset.
- *Next/Previous Pattern buttons:* Choose the next or previous pattern preset.
- *Length knob:* Change the grid length.

  Note: The (grid) Length value is independent from the Cycle Length parameter (which sets the length of the arpeggiated note pattern) described in the options parameters. The grid length cycles independently of the effective note pattern. This prevents disruptions to the perceived rhythmic pattern created by the grid, which can occur when you change the arpeggio length.

Use Arpeggiator MIDI plug-in keyboard parameters in Logic Pro for iPad

The Arpeggiator Keyboard Split parameters let you divide your keyboard into zones that are used for standard note playback, arpeggio note triggering, and remote control of the Arpeggiator plug-in parameters.



Keyboard Split parameters

- *On/Off button:* Divide your MIDI keyboard range into three zones.
- *Arp Range Start/End sliders:* Determine the keyboard range that is arpeggiated.
  - Notes below the Arp Range Start slider value can be used as remote control keys for Arpeggiator functions.
  - Notes between the Arp Range Start and End slider values can be arpeggiated.
  - Notes above the Arp Range End slider value can be played without arpeggiation.

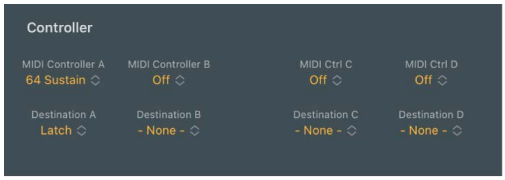
Set up a keyboard split in the Arpeggiator MIDI plug-in

By default, the complete MIDI key range (0–127) is used solely for arpeggiating. You can split your MIDI keyboard into three zones to control Arpeggiator plug-in functions with MIDI keys.

- In Logic Pro, tap the Keyboard Split On/Off button to divide your MIDI keyboard range into three zones.
  - *Remote zone:* Notes played in this lower keyboard zone trigger an Arpeggiator function. Drag the Arp Range Start slider to resize.
  - *Arpeggio zone:* Notes played in this central keyboard zone are arpeggiated. Drag the Arp Range Start and End sliders to resize. Drag the area between the sliders to move.
  - *Through zone:* Notes are passed through the Arpeggiator plug-in unprocessed. This zone covers all keys above the Arp Range End slider position.

Assign Arpeggiator controllers in Logic Pro for iPad

You can assign up to four MIDI controllers to Arpeggiator plug-in parameters.



Assign a MIDI controller to an Arpeggiator MIDI plug-in parameter

In Logic Pro, choose an option from both a MIDI Controller (MIDI Ctrl) pop-up menu and the corresponding Destination pop-up menu:

- *MIDI Ctrl A-D pop-up menus:* Choose a MIDI controller type.
- *Destination A-D pop-up menus:* Choose a target parameter: Note Length, Note Length Random, Velocity Range, Velocity Base, Velocity Random, and (De-)Crescendo. You can also assign the Latch On/Off and Silent Capture buttons as destinations, or can choose None.

Learn a MIDI controller in the Arpeggiator MIDI plug-in

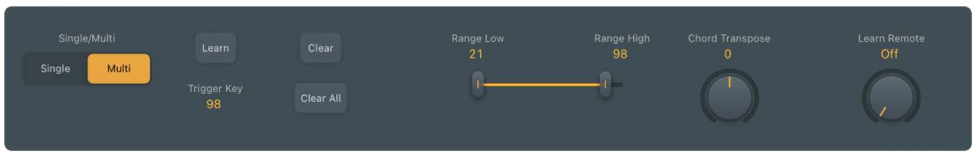
1. In Logic Pro, choose a parameter from any of the Destination pop-up menus.
2. Choose -Learn MIDI- from any of the MIDI Ctrl pop-up menus.
3. Move a controller on your MIDI keyboard to assign it to the Destination parameter.

   The Learn feature has a 20-second time out facility. If you do not move a controller on your MIDI device within 20 seconds, Learn mode is automatically turned off.

Chord Trigger MIDI plug-in

Chord Trigger MIDI plug-in in Logic Pro for iPad

The Chord Trigger MIDI plug-in lets you trigger chords by playing a single MIDI key.



Chord Trigger parameters

- *Single button:* Assign a single chord to a trigger key. Play up and down the keyboard to transpose the memorized chord in relation to the trigger key. This mimics the Chord Memo or Note Stack feature found on many classic synthesizers.
- *Multi button:* Assign a different chord to each key on the keyboard.
- *Learn button:* Turn on Learn mode. See Use the Chord Trigger MIDI plug-in for details on using Learn mode.
- *Trigger Key pop-up menu:* Define a target note number that you want to use for a chord assignment. This is also used to choose a note with an existing chord assignment that you want to clear.

- *Clear button:* Erase a Trigger Key note and the corresponding chord.
- *Clear All button:* Erase all Trigger Key notes and corresponding chords.
- *Range Low/High sliders and fields:* Set the lower and upper note range for a chord assignment. Each note chosen in the Trigger Key pop-up menu can have a defined range when used in Single or Multi chord mode.

  Note: Notes that fall within the chord trigger range that do not have chord assignments will not be heard, resulting in a dead zone on your MIDI keyboard. You should limit the trigger range to encompass only notes that you want to use for chord assignments.
- *Chord Transpose knob:* Choose an octave transposition value for chord playback.
- *Learn Remote knob:* Choose the MIDI note number you want to use as a remote control for the Learn button.

Use the Chord Trigger MIDI plug-in in Logic Pro for iPad

Chord Trigger is straightforward to use: choose a mode (single or multi), set a chord trigger range, select a trigger key, then set up a chord. You can also transpose chords and quickly assign multiple chords by playing keys on your MIDI keyboard or the onscreen keyboard.

Define the chord trigger range

The chord trigger range is indicated by the bar between the Range Low and Range High sliders. Incoming MIDI notes that fall within this range are interpreted as trigger keys that play the chord (Single Chord mode) or the chords (Multi Chord mode) assigned to them. Chords can be assigned to keys within the chord trigger range. Incoming MIDI notes that fall outside the defined chord trigger range are passed through Chord Trigger unaffected. This allows you to play a melody with the right hand while triggering/transposing memorized chords with the left, for example.

- In Logic Pro, drag the Range Low and Range High handles to define a keyboard range.
  - *In Single Chord mode:* Playing a MIDI note within the defined chord trigger range plays and transposes a single memorized chord. The transposition is performed in relation to the trigger key the chord is assigned to. For example, if a chord is assigned to C2, playing a D2 transposes the chord upward by two semitones. Playing a B1 transposes the chord down by a semitone.
  - *In Multi Chord mode:* Playing a MIDI note within the defined chord trigger range triggers the chord that is memorized for the played key. Keys that do not have a chord assigned to them are silent when played.

Note: If the chord trigger range is made shorter, memorized chords that fall outside the range become inaccessible but are not deleted. Lengthening the chord trigger range makes assigned chords accessible again.

Transpose chords in the chord trigger range (Multi Chord mode only)

You may want to transpose triggered chords in some circumstances. For example, in Multi Chord mode you can move the entire chord trigger range upward by two semitones to change a chord progression in C-Major (starting with the C trigger key) into a progression that plays in D-Major, starting with the D trigger key.

- In Logic Pro, drag the center of the chord trigger range left or right.

  All memorized chords are moved with the chord trigger range and are automatically transposed.

Transpose chords by semitones or octaves

- In Logic Pro, use the Chord Transpose knob to set a value.

  All memorized chords can be transposed up or down by up to four octaves.

Assign a chord to a key

1. In Logic Pro, tap the Learn button.
2. Choose a trigger key—within the chord trigger range— from either the Trigger Key pop-up menu or by playing a key on the onscreen keyboard or your MIDI keyboard.
3. Play the chord you want to assign to the trigger key on the onscreen keyboard or your MIDI keyboard.
4. To end chord assignment, tap the Learn button.

You can repeat these steps to assign a different chord to each key in the chord trigger range when in Multi Chord mode. In Single Chord mode, only one chord can be learned.

Clear a chord assignment

- In Logic Pro, choose the key from the Trigger Key pop-up menu, then tap the Clear button.

Clear all chord assignments

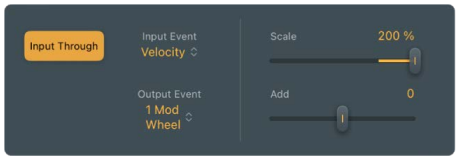
The following applies only to Multi Chord mode.

- In Logic Pro, tap the Clear All button.

  All chords on all trigger keys are erased.

Modifier MIDI plug-in in Logic Pro for iPad

The Modifier MIDI plug-in lets you quickly reassign or filter a single continuous controller (CC) or fader event. You can also scale or add to event values.



Modifier parameters

- *Input Through button:* Define whether or not the input event is sent to the output in addition to the reassignment.
- *Input Event pop-up menu:* Choose or learn the type of MIDI input event that you want to reassign or filter.
- *Output Event pop-up menu:* Choose or learn the type of MIDI output event. You can also learn parameters for plug-ins in the same channel strip. If set to Off, the event type chosen in the Input pop-up menu is filtered.
- *Add slider and field:* Set the offset amount for the output event type chosen in the Re-assign To pop-up menu.
- *Scale slider and field:* Set the scaling amount for the output event type chosen in the Re-assign To pop-up menu.

Assign a MIDI event to a plug-in parameter

You can assign and send MIDI events to plug-ins in the same channel strip, allowing you to control parameters without using MIDI CC messages.

1. In Logic Pro, choose -Learn Plug-in Parameter- from the Output Event pop-up menu.
2. Tap the parameter in the target plug-in.

Modulator MIDI plug-in

Modulator MIDI plug-in in Logic Pro for iPad

The Modulator MIDI plug-in can generate continuous controller, aftertouch, and pitch bend messages. It consists of a syncable LFO and Delay/Attack/Hold/Release envelope. See Modulator MIDI plug-in LFO and Modulator MIDI plug-in envelope.

Both the LFO and envelope can be assigned to output any continuous controller, aftertouch, plug-in parameter (in the same channel strip), or pitch bend message. You can also specify a step width for the continuous outputs of the LFO and envelope, resulting in modulations that are reminiscent of classic Sample & Hold circuits.



Modulator MIDI plug-in LFO in Logic Pro for iPad



LFO parameters

- *On/Off button:* Turn the LFO on or off.
- *Rate knob and field:* Set the cycle speed of the LFO in hertz or in beat values when the Sync button is on. The LFO rate can be modulated by the envelope. See Modulator MIDI plug-in envelope.
- *Sync button:* Synchronize the LFO rate to the project tempo.
- *Shape buttons:* Select a waveform shape. Choose from: triangle, sine, square, and random. Each is suited for different types of modulations.

- *Symmetry slider and field:* Adjust the symmetry of the waveform. This deforms the waveform in the following ways:
  - *Triangle:* Shapes the triangle waveform into either an upward-sawtooth or downward-sawtooth waveform. A symmetry value of 0 results in a perfect triangle waveform.
  - *Sine:* Changes the angle of the waveform, resulting in a sawtooth-like waveform with peaks that lean left or right. A symmetry value of 0 results in a perfect sine waveform.
  - *Square:* Symmetry acts as a pulse width control. A symmetry value of 0 results in a perfect square waveform.
- *Random Similarity slider and field:* Adjust the amount of deviation when a random waveform is chosen. This alters the waveform in the following way:
  - Random: Similarity determines the maximum deviation between two consecutive random values. Low symmetry settings result in random values that are minimally different from one to the next, whereas high symmetry settings result in random values that deviate significantly.
- *Smoothing knob and field:* Determine the number of steps per LFO cycle.

  By default, the LFO produces a smoothed continuous stream of controller events, but you can use this parameter to create a stepped controller signal that is similar to the output of a Sample and Hold circuit. When you set a manual step rate, the LFO rate can be changed without altering the number of steps.
- *Trigger buttons:* Determine how the LFO reacts to incoming MIDI note on messages.
  - *Single:* After all notes have been released, the LFO is reset by the first MIDI note on message it receives.

    Note: This means that legato playing does not reset the LFO, so keep this in mind during performances.
  - *Multi:* The LFO is reset by each received MIDI note on message.
  - *Free:* The LFO ignores MIDI note on messages.
- *Trigger Phase slider and field:* Set the LFO waveform phase startpoint.



LFO Output parameters

- *Output Level knob and field:* Scale the LFO output level.
- *LFO To pop-up menu:* Choose a continuous controller number, aftertouch, or pitch bend as the LFO output target. You can also learn a plug-in parameter.
- *Output Offset slider and field:* Set a positive or negative offset in order to tailor the output for the intended target.
- *MIDI Channel pop-up menu:* Choose a MIDI output channel.

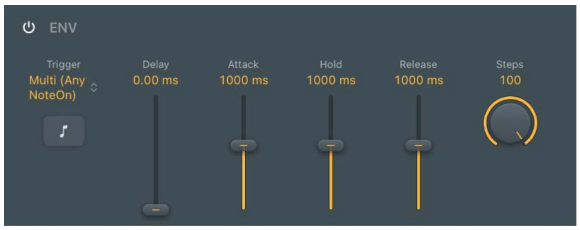
  Note: This applies to both the LFO and envelope.

Assign a MIDI event to a plug-in parameter

You can assign and send MIDI events to plug-ins in the same channel strip, allowing you to control parameters without using MIDI CC messages.

1. In Logic Pro, choose -Learn Plug-in Parameter- from the LFO To pop-up menu.
2. Tap the parameter in the target plug-in.

Modulator MIDI plug-in envelope in Logic Pro for iPad



Envelope parameters

- *On/Off button:* Turn the envelope on or off.
- *Trigger pop-up menu:* Determine if the envelope is triggered by the LFO or by incoming MIDI note on messages.
  - *Single:* After all notes have been released, the envelope is re-triggered by the first MIDI note on message it receives.

    Note: This means that legato playing does not reset the envelope, so keep this in mind during performances.
  - *Multi:* The envelope is re-triggered by each received MIDI note on message.
  - *LFO:* The envelope is retriggered when the LFO reaches its (positive) peak value. See Modulator MIDI plug-in LFO.

    Note: The envelope ignores incoming LFO triggers if it is currently completing an envelope pass.
- *Sync button:* Synchronize the envelope with project grid values. This snaps ADSR values to project bars, beats, and so on.
- *Delay slider and field:* Delay the onset of the envelope. Ranges from 0 to 10 seconds.
- *Attack slider and field:* Set the time required to reach the sustain level. Ranges from 0 to 10 seconds.
- *Hold slider and field:* Set the sustain level and duration. Ranges from 0 to 10 seconds.
- *Release slider and field:* Set the time required for the envelope to fall to a value of zero after the sustain phase of the envelope has finished. Ranges from 0 to 10 seconds.
- *Steps slider and field:* Determine the number of steps per envelope pass. By default, the envelope produces a smoothed continuous stream of controller events, but you can use this parameter to create a stepped controller signal that is similar to the output of a Sample and Hold circuit. When you set a manual step rate, the envelope time can be changed without altering the number of steps.

- *ENV to LFO Rate knob and field:* Set the maximum amount of LFO modulation (LFO depth). The LFO rate can be modulated by the Attack, Hold, and Release parameters (see above).
- *ENV to LFO Amp knob and field:* Set the maximum amount of LFO output modulation. This lets you fade the LFO in or out with the envelope.



Env Output parameters

- *Output Level knob:* Scale the envelope output level.
- *ENV To pop-up menu:* Choose a continuous controller number, aftertouch, or pitch bend as the envelope output target. You can also learn a plug-in parameter.
- *Output Offset slider:* Set a positive or negative offset in order to tailor the output for the intended target.
- *MIDI Channel pop-up menu:* Choose a MIDI output channel.

  Note: This applies to both the LFO and envelope.

Assign a MIDI event to a plug-in parameter

You can assign and send MIDI events to plug-ins in the same channel strip, allowing you to control parameters without using MIDI CC messages.

1. In Logic Pro, choose -Learn Plug-in Parameter- from the ENV To pop-up menu.
2. Tap the parameter in the target plug-in.

Note Repeater MIDI plug-in in Logic Pro for iPad

This plug-in mimics an audio delay by generating repeating MIDI notes.



Note Repeater parameters

- *Input Through button:* Turn on to pass incoming MIDI note events to the output in addition to the delayed note events. Turn off to send only the delayed notes to the output.
- *Sync button:* Synchronize the plug-in with the project tempo. Set the delay time with the Delay slider.

- *Delay knob and field:* Set the delay time in milliseconds or in bar/beat values when the Delay Sync button is on.

  Note: When the Sync button is on, only bar and beat values are available.

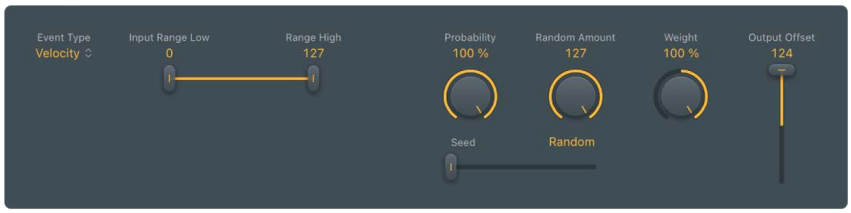
- *Note Range Min and Max sliders:* Move the sliders to set an input note range. Notes that fall within this range are processed (default range: 1–127). Notes outside the range are not processed.

  Note: You can position the Note Range Min slider above the Note Range Max slider and vice versa, which inverts the input note range behavior: note events that fall within the range are *not* processed and note events outside the range are processed.

- *Repeats knob and field:* Set the number of delay repetitions.
- *Transpose knob and field:* Transpose each delay repeat by the set amount.
- *Velocity Ramp knob and field:* Scale the velocity level of each delay repeat by the set amount.

Randomizer MIDI plug-in in Logic Pro for iPad

The Randomizer plug-in randomizes incoming MIDI events in real time.



Randomizer parameters

- *Event Type pop-up menu:* Choose the MIDI event type that you want to randomize.
- *Input Range Low and Range High sliders and fields:* Set the upper and lower limit for the range of values that are affected. Only parameter values that fall within the range are processed. All values outside the range pass through the plug-in.

  Note: You can position the Input Range Low slider above the Range High slider and vice versa, which inverts the input range behavior: events that fall within the range are *not* processed and events outside the range are randomized.

- *Probability knob and field:* Increase or decrease the likelihood that an event is randomized within the set range. This impacts the Weight parameter setting: a lower value means less chance, and a higher value means more chance to produce value changes in the respective range.
- *Random Amount knob and field:* Set the intensity of randomization.
- *Seed slider:* Specify a starting point (or seed) for randomization.

  An example is when using the Randomizer plug-in to randomize a piano melody. If you bounce the piano part, your randomized melody is saved as an audio file. If you bounce the song again, with Seed set to Random, the two bounces sound different. If Seed is set to the same specific value for both bounces, they are identical.

- *Weight knob and field:* Determine the event values that you want to favor for randomization. This works in concert with the Probability, Low/High Range, and Random Amount controls.
  - Set toward the left to increase the chance of low values being randomized.
  - Set toward the right to increase the chance of high values being randomized.
  - In the centered position, neither low or high values are favored, resulting in the entire range of values being randomly altered.
- *Output Offset slider and field:* Offset the (random) MIDI output of the plug-in. Offsets can be negative or positive.

Scripter MIDI plug-in

Use the Scripter MIDI plug-in in Logic Pro for iPad

The Scripter plug-in lets you load and use scripts to process or generate MIDI data in real time. A number of pre-built Scripter processors are included.

Parameters such as buttons, pop-up menus, and sliders are shown in the plug-in.

Note: Logic Pro for iPad Scripter provides compatibility with Logic Pro for Mac projects. You can load presets for this plug-in, but script editing is possible only in Logic Pro for Mac.



Load a pre-built Scripter processor

In Logic Pro, do one of the following:

- Load a setting from the Browser.
- Load a patch that contains a Scripter instance from the Browser.
- Load a channel strip setting that contains a Scripter instance from the channel strip Settings pop-up menu or Browser.
- Load a project that contains a Scripter plug-in with a running script.

  You do not need to explicitly save an active script as a setting, patch, and so on. Saving the project retains the script and status of all Scripter plug-ins.

Transposer MIDI plug-in in Logic Pro for iPad

The Transposer MIDI plug-in can transpose incoming MIDI notes in real time and can correct notes to a selected scale.



Transposer parameters

- *Transpose slider and field:* Transpose incoming MIDI Notes by ± 24 semitones.
- *Retrigger Held Notes button:* Retrigger held MIDI Notes when parameter changes are made.
- *Processing Order buttons:* Transpose incoming MIDI Notes before or after applying the value set with the Scale Type pop-up menu or a User scale set with the Keyboard.
- *Note pop-up menu:* Choose the root note for the scale.
- *Scale Type pop-up menu:* Choose one of several preset scales or create your own custom scale (User) with the onscreen Keyboard.
- *Keyboard:* Tap notes to turn them on or off. Notes that are turned off are excluded from the User scale.

Velocity Processor MIDI plug-in

Velocity Processor MIDI plug-in in Logic Pro for iPad

The Velocity Processor MIDI plug-in processes incoming MIDI velocity events—note on and note off—in real time. Among other applications, it allows velocity compression and expansion.



Velocity Processor global parameters

- *Note ON/OFF buttons:* Tap either button to process MIDI note on velocity or MIDI note off velocity. Both buttons can be active simultaneously.
- *Mode buttons:* Choose a velocity processing mode. The available parameters change depending on the mode selected. Mode-specific parameters are detailed in each section.
  - *Comp/Exp:* In Compress/Expand mode, the plug-in behaves like an audio compressor.
  - *Value/Range:* In Value/Range mode, the plug-in behaves like an audio limiter.
  - *Add/Scale:* In Add/Scale mode, the plug-in scales, adds to, or reduces the values of incoming MIDI velocity messages.
- *Note Range Min and Max sliders and fields:* Move the sliders to set an input note range. Notes that fall within the input note range are processed (default range: 1–127). Notes outside the input note range are not processed.

  Note: You can cross over the Note Range Min and Max sliders, which inverts the input note range behavior: note events that fall within the range are *not* processed and note events outside the range have their velocities processed.

Velocity Processor MIDI plug-in Compress/Expand in Logic Pro for iPad

In Compress/Expand mode, the Velocity Processor MIDI plug-in behaves like an audio compressor.



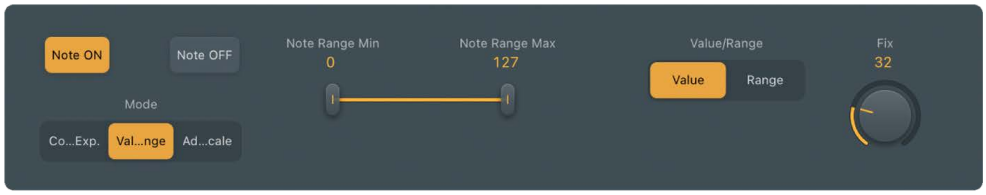
Compress/Expand mode parameters

- *Threshold knob and field:* Set a velocity value. Incoming velocities above the threshold are processed. MIDI notes with velocity values below the threshold pass through unaffected.
- *Ratio knob and field:* Determine the slope of compression/expansion above the threshold. Processing is done using a “soft knee” characteristic.
  - Ratios smaller than 1 result in an expansion of incoming velocity values.
  - Ratios greater than 1 result in compression of incoming velocity values.
- *Make-Up knob and field:* Set a velocity offset to compensate for the higher or lower overall velocity caused by compression/expansion. The velocity offset can be positive or negative, either adding to or subtracting from incoming velocity values.
- *Auto Gain button:* Automatically apply a maximum velocity reference level, set with the Make-Up knob.

  Note: When the Auto button is active, the Make-Up knob changes function: instead of setting the velocity offset value, it sets the maximum velocity reference level.

Velocity Processor MIDI plug-in Value/Range in Logic Pro for iPad

In Value/Range mode, the Velocity Processor MIDI plug-in can behave like an audio limiter.

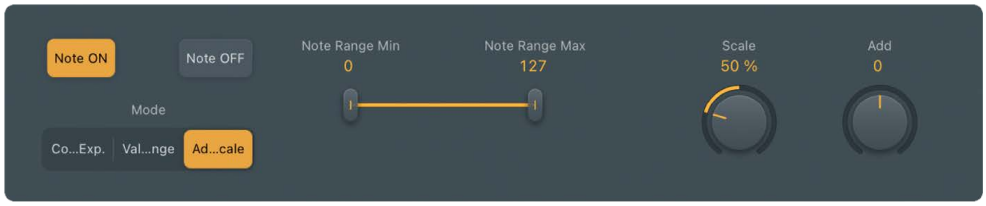


Value/Range mode parameters

- *Value/Range buttons:* Value limits all incoming MIDI velocities to the value set with the Fix knob. Range limits note velocities to only those within the range set with the Min/Max sliders.
- *Fix knob and field:* Set a fixed velocity for all processed notes.
- *Min/Max sliders and fields:* Set a note velocity range to be processed. You can cross over the sliders to create a note velocity range that is not processed.

Velocity Processor MIDI plug-in Add/Scale in Logic Pro for iPad

In Add/Scale mode, the Velocity Processor MIDI plug-in scales, adds to, or reduces the values of incoming MIDI velocity messages.



Add/Scale mode parameters

- *Scale knob and field:* Scale all incoming MIDI velocity values by a percentage from zero to 200%.
- *Add knob and field:* Add the set value to, or subtract it from, incoming MIDI velocity values.

Record MIDI plug-in output in Logic Pro for iPad

Record MIDI to Track Here lets you record the output of MIDI effects to a MIDI region on a track. For example, instead of just recording the notes you play to trigger the effects, Record MIDI to Track Here lets you record their real-time processed output, allowing precise editing of the resulting notes and controller data.

Add Record MIDI to Track Here

To capture the output of plug-ins, add Record MIDI to Track Here to the slot after the last MIDI plug-in you want to record. Any other plug-ins after the Record MIDI to Track Here slot will not be included in the recording.

To record the output of MIDI effect plug-ins, do the following:

1. In the Plug-ins area in Logic Pro, insert the MIDI plug-ins you want to record.
2. Touch and hold the plug-in name of the last MIDI plug-in in the chain that you want to record.
3. Choose Record MIDI to Track Here from the pop-up menu.
4. Record your sequence to a MIDI region.

   Note: Record MIDI to Track Here will appear as two small yellow triangles directly to the right of the plug-in where it was inserted.



Change the position of Record MIDI to Track Here

- Touch and hold the plug-in name of the last MIDI plug-in in the chain that you want to record, then choose Record MIDI to Track Here from the pop-up menu.

Remove Record MIDI to Track Here

- In the plug-ins area, touch and hold the plug-in name of the last MIDI plug-in in the chain containing Record MIDI to Track Here, then choose Record MIDI to Track Here from the pop-up menu.
- In the Mixer view, touch and hold the plug-in name of the last MIDI plug-in in the chain containing Record MIDI to Track Here, then in the plug-in's More menu (top right side), choose Record MIDI to Track Here from the pop-up menu.

Modulation effects

Modulation effects in Logic Pro for iPad

Modulation effects—such as Chorus, Flanger, or Tremolo are used to add motion and depth to your sounds.

Modulation effects typically delay the incoming signal by a few milliseconds and use an LFO to modulate the delayed signal. The LFO may also be used to modulate the delay time in some effects.

A low frequency oscillator (LFO) is similar to the sound-generating oscillators in synthesizers, but the frequencies generated by an LFO are so low that they can't be heard and are therefore used only for modulation purposes. LFO parameters include speed (or frequency) and depth—also called *intensity*—controls.

You can also control the ratio between the affected (wet) signal and the original (dry) signal. Some modulation effects include feedback parameters, which add part of the effect output back into the effect input.

Other modulation effects involve pitch. The most basic type of pitch modulation effect is vibrato, which uses an LFO to modulate the frequency of the sound. Unlike other pitch modulation effects, vibrato alters only the delayed signal.

More complex modulation effects such as Flanger and Ringshifter allow flanging and chorus effects, emulations of tape speed fluctuations and metallic, robot-like modulations.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

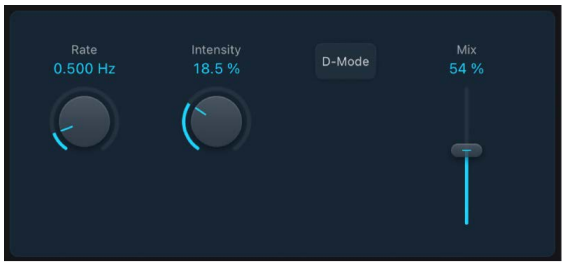
Throughout the guide, parameters available in Tile view are indicated by .

Chorus effect in Logic Pro for iPad

The Chorus effect delays the original signal, and the delay time is modulated with an LFO. The delayed, modulated signal is then mixed with the original, dry signal.

You can use the Chorus effect to enrich the incoming signal and create the impression that multiple instruments or voices are being played in unison. The slight delay time variations generated by the LFO simulate the subtle pitch and timing differences heard when several musicians or vocalists perform together. Using chorus also adds fullness or richness to the signal, and it can add movement to low or sustained sounds.

To add Chorus to your project, choose Modulation > Chorus in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Chorus parameters

- *Rate knob and field:* Set the frequency, or speed, of the LFO.
- *Intensity knob and field:* Set the modulation amount.
- *D-Mode button:* Turn on to introduce a spatial filtering effect that resembles a well-known vintage processor.
- *Mix knob and field:* Determine the balance between dry and wet signals.

Ensemble effect in Logic Pro for iPad

Ensemble can add richness and movement to sounds, particularly when you use a high number of voices. It is useful for thickening parts, but you can also use it for strong pitch variations between voices, resulting in a detuned quality to processed material. Ensemble combines up to eight chorus effects. Two standard LFOs and one random LFO let you create complex modulations.

To add Ensemble to your project, choose Modulation > Ensemble in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Ensemble parameters

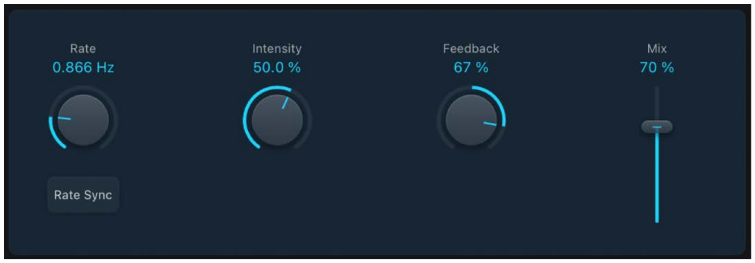
- *Voices control and field:* Set the number of chorus instances (voices) generated in addition to the original signal.
- *Spread knob and field:* Distribute voices across the stereo field. You can set a value of 200% to artificially expand the stereo base. Note that monaural compatibility may suffer if you do this.
- *Phase knob and field:* Control the phase relationship between the individual voice modulations. The value you choose here is dependent on the number of voices, which is why it is shown as a percentage value rather than in degrees. The value 100 (or –100) indicates the greatest possible distance between the modulation phases of all voices.
- *Effect Volume knob and field:* Compensate for effects signal volume changes caused by adjusting the Voices value.
- *Mix control and field:* Set the balance between dry and wet signals.
- *LFO 1/LFO 2/Random On/Off buttons:* Turn on or turn off LFO 1, LFO 2, or the random LFO independently.
- *LFO 1/LFO 2/Random Rate knobs and fields:* Set the frequency of LFO 1, LFO 2, and random modulation.
- *LFO 1/LFO 2/Random Intensity knobs and fields:* Set the amount of LFO 1, LFO 2, and random modulation.

Flanger effect in Logic Pro for iPad

The Flanger effect works in much the same way as the Chorus effect but uses a significantly shorter delay time. In addition, the effect signal can be fed back into the input of the delay line.

Flanging is typically used to add a spacey or underwater quality to input signals.

To add Flanger to your project, choose Modulation > Flanger in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Flanger parameters

- *Rate knob and field:* Set the frequency, or speed, of the LFO.
- *Rate Sync button:* Synchronize the modulation speed with the project tempo. Choose musical note values with the Rate knob.
- *Intensity knob and field:* Set the modulation amount.
- *Feedback knob and field:* Set the amount of the effect signal that is routed back to the input. This can change the tonal color and can make the sweeping effect more pronounced. Negative Feedback values invert the phase of the routed signal.
- *Mix control and field:* Determine the balance between dry and wet signals.

Microphaser in Logic Pro for iPad

Microphaser lets you quickly create swooshing, phasing effects.

To add Microphaser to your project, choose Modulation > Microphaser in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Microphaser parameters

- *LFO Rate knob and field:* Set the frequency, or speed, of the LFO.
- *LFO Sync button:* Synchronize the modulation speed with the project tempo. Choose musical note values with the Rate knob.
- *Intensity knob and field:* Set the modulation amount.
- *Feedback knob and field:* Set the amount of effect signal routed back to the input. This can change the tonal color and can make the sweeping effect more pronounced.

Modulation Delay in Logic Pro for iPad

Modulation Delay is based on the same principles as Flanger and Chorus effects, but you can set the delay time, allowing both chorus and flanging effects to be generated. It can also be used without modulation to create resonator or doubling effects. The modulation section consists of two LFOs with variable frequencies.

Although rich, combined flanging and chorus effects are possible, the Modulation Delay is capable of producing some extreme modulation effects. These include emulations of tape speed fluctuations and metallic, robot-like modulations of incoming signals.

To add Modulation Delay to your project, choose Modulation > Modulation Delay in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Delay and filter parameters

- *Mod Intensity knob and field:* Set the modulation amount.
- *Flanger/Chorus knob and field:* Set the basic delay time. Set to the far left position to create flanger effects, to the center for chorus effects, and to the far right to hear clearly discernible delays.
- *Feedback knob and field:* Set the amount of effect signal routed back to the input. Use a high Feedback value for strong modulations. If you want to double the signal, don’t use Feedback. Negative values invert the phase of the feedback signal, resulting in more chaotic effects.
- *De-Warble button:* Turn on to make sure the pitch of the modulated signal remains constant.

- *Constant Mod button:* Turn on to make sure the modulation width remains constant, regardless of the modulation rate.

  Note: When Constant Mod is turned on, higher modulation frequencies reduce the modulation width.

- *D-Mode button:* Turn on to introduce a spatial filtering effect that resembles a well-known vintage processor.
- *Filter On/Off button:* Turn on to introduce an additional allpass filter into the signal path. This filter shifts the phase angle of a signal, influencing its stereo image.
- *Low/High Cut sliders and fields:* Set the frequency at which the phase shift crosses 90°—the halfway point of the total 180°—for each of the stereo channels.

Modulation and output parameters

- *Rate LFO 1/2 L knobs and fields:* Set the modulation rate for the left channel independently for each LFO.
- *Rate LFO 1/2 R knobs and fields:* Set the modulation rate for the right channel independently for each LFO.

  Note: The right LFO Rate knob is available only in stereo instances, and it can be set separately only if the (Stereo) Free button is turned on.

- *LFO Phase knob and field:* Control the phase relationship between individual channel modulations. Available only in stereo instances.
  - At 0°, the extreme values of the modulation are achieved simultaneously for both channels.
  - At 180° or –180°, you achieve the greatest possible distance between the modulation phases of both channels.

  Note: The LFO Phase parameter is available for use only if the (Stereo) Link button is active.

- *Stereo buttons:* Tap Free to independently set the LFO Rate for each channel. Tap Link to link the modulation rates of the left and right stereo channels. Adjustment of either the Rate LFO 1/2 L or R knob affects the other channel when linked.
- *LFO Mix slider and field:* Determine the balance between the two LFOs.
- *Volume Mod knob and field:* Determine the impact of LFO modulation on the amplitude of the effect signal.
- *Output Mix control and field:* Set the balance between dry and wet signals.

Phaser effect in Logic Pro for iPad

The Phaser effect combines the original signal with a copy that is slightly out of phase with the original. This means that the amplitudes of the two signals reach their highest and lowest points at slightly different times. The timing differences between the two signals are modulated by two independent LFOs. In addition, Phaser includes a filter circuit and a built-in envelope follower that tracks volume changes in the input signal, generating a dynamic control signal. This control signal alters the sweep range.

Sonically, phasing is used to create whooshing, sweeping sounds that wander through the frequency spectrum. It is a commonly used guitar effect, but it is suitable for a range of signals.

To add Phaser to your project, choose Modulation > Phaser in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Sweep parameters

- *Sweep Mode buttons:* Choose a mode that determines the impact of incoming signal levels on the frequency range. Set the frequency range with the Sweep Floor and Ceiling controls.
- *Stages knob and field:* Choose phaser algorithms (even numbers) or comb filtering (odd numbers).
  - The 4, 6, 8, 10, and 12 settings switch between five different phaser algorithms. All are modeled on analog circuits, with each designed for a specific application.
  - The 5, 7, 9, and 11 settings don't generate actual phasing effects. The more subtle comb filtering effects produced by odd-numbered settings can, however, be useful.
- *Sweep Floor/Ceiling sliders and fields:* Determine the frequency range affected by LFO modulations.

Delay modulation parameters

- *Rate LFO 1/2 knobs and fields:* Set the speed for each LFO.
- *LFO 1/2 Sync buttons:* Synchronize the modulation speed of each LFO with the project tempo. Choose musical note values with the Rate 1 and Rate 2 knobs.
- *Phase knob and field:* Control the phase relationship between individual channel modulations. Available only in stereo instances. At 0°, extreme modulation values are achieved simultaneously for both channels. At 180° or –180°, there is the greatest possible distance between channel modulation phases.
- *LFO Mix slider and field:* Determine the ratio between the two LFOs.

Feedback and out parameters

- *Feedback knob and field:* Determine the amount of effect signal routed back to the input.
- *Warmth button:* Turn on or turn off a distortion circuit, suitable for warm overdrive effects.
- *HP/LP Cutoff knobs and fields:* Set the cutoff frequency of the lowpass (LP) and highpass (HP) filters.
- *FB Filter button:* Turn on or turn off the filter section.
- *Output Mix slider and field:* Determine the balance of dry and wet signals. Negative values result in a phase-inverted mix of the effect and direct (dry) signal.

Ringshifter

Ringshifter in Logic Pro for iPad

Ringshifter combines a ring modulator with a frequency shifter effect. Both effects were popular during the 1970s and are currently experiencing a renaissance.

The ring modulator modulates the amplitude of the input signal using either the internal oscillator or a side chain signal. The frequency spectrum of the resulting effect signal equals the sum of, and the difference between, the frequency content in the two original signals. Its sound is often described as *metallic* or *clangorous*.

The frequency shifter moves the frequency content of the input signal by a fixed amount and thereby alters the frequency relationship of the original harmonics. The resulting sounds range from sweet and spacious phasing effects to robot-like timbres.

Note: Do not confuse frequency shifting with pitch shifting. Pitch shifting transposes the original signal, leaving its harmonic frequency relationship intact.



To add Ringshifter to your project, choose Modulation > Ringshifter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Ringshifter oscillator parameters in Logic Pro for iPad

In both frequency shifter modes and Ringmodulation Sine mode, the internal sine wave oscillator is used to modulate the amplitude of the input signal.

- In the frequency shifter modes, the Frequency parameter controls the amount of frequency shifting, either up or down, applied to the input signal.
- In Ringmodulation Sine mode, the Frequency parameter controls the frequency content, or timbre, of the resulting effect. This timbre can range from subtle tremolo effects to clangorous metallic sounds.



Oscillator parameters

- *Operating Mode pop-up menu:* Choose an operating mode for Ringshifter:
  - *Ringmodulation Sine:* Turn on to use the internal sine wave oscillator to modulate the input signal.
  - *Ringmodulation Sidechain:* Turn on to modulate the amplitude of the input signal with the audio signal assigned via the side chain input.

    The sine wave oscillator is switched off, and the Frequency controls are unavailable when Side Chain mode is active.
  - *Frequency Shift Single:* Turn on to generate a single, shifted effect signal.

    The oscillator Frequency control determines whether the signal is shifted to a positive value on the right side of the Frequency knob or to a negative value on the left side.

- *Frequency Shift Dual:* Turn on to produce one shifted effect signal for each stereo channel—one is shifted up, the other is shifted down.

  The oscillator Frequency control determines the shift direction towards the left or the right channel.

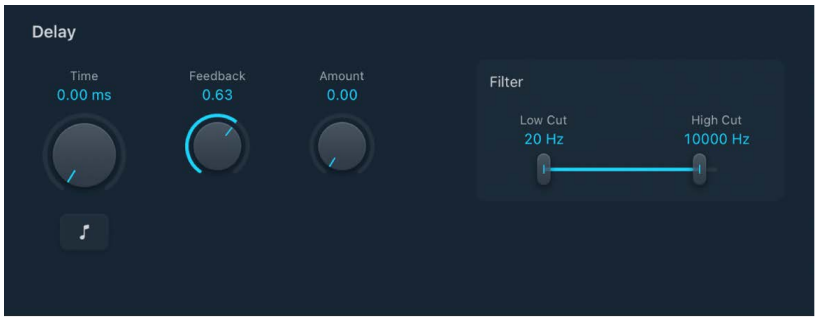
- *Freq Shift Mode buttons:* Switch the scaling of the Frequency control.
  - *Exponen(tial):* Exponential scaling provides extremely small increments around the 0 point, which is useful for programming slow-moving phasing and tremolo effects.
  - *Linear:* Linear scaling is even across the entire control range.
- *Frequency knob and field:* Set the frequency of the sine oscillator.

Oscillator frequency modulation parameters

- *Env slider and field:* Determine the impact of incoming signal levels on the oscillator modulation depth.
- *LFO slider and field:* Determine the amount of oscillator modulation by the LFO.

Ringshifter delay parameters in Logic Pro for iPad

The effect signal is routed through a delay, following the oscillator.



Delay parameters

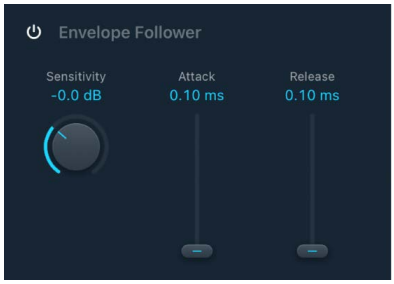
- *Time knob and field:* Set the delay time. You can choose from: hertz values, when running freely, or note values, including triplet and dotted notes, when the Sync button is active.
- *Sync button:* Synchronize the delay with the project tempo. You can choose musical note values with the Time knob.
- *Feedback knob and field:* Set the amount of signal routed back to the effect input. Feedback adds an edge to the Ringshifter sound and is used for a variety of special effects.
  - Feedback, in combination with a slow oscillator sweep, produces a rich phasing sound.
  - A high Feedback setting with a short delay time of less than 10 ms produces comb-filtering effects.
  - A high Feedback setting with a longer delay time produces continuously rising and falling frequency shift effects.

- *Amount knob and field:* Set the level of the delay added to the ring-modulated or frequency-shifted signal. A Level value of 0 passes the effect signal directly to the output (bypass).
- *Filter Low/High Cut sliders and fields:* Cut frequencies below the Low Cut value and above the High Cut value to shape the sound of delay repeats with highpass and lowpass filters. The filters are located in the feedback circuit, which means that the filtering effect increases in intensity with each delay repeat. If you want an increasingly muddy and confused tone, move the High Cut slider toward the left. For ever thinner echoes, move the Low Cut slider toward the right.

Ringshifter envelope follower in Logic Pro for iPad

The oscillator Frequency and Dry/Wet parameters can be modulated with the internal envelope follower—and the LFO. The oscillator frequency even allows modulation through the 0 Hz point, thus changing the oscillation direction.

The envelope follower analyzes the amplitude (volume) of the input signal to create a continuously changing control signal—a dynamic volume envelope of the input signal. This control signal can be used for modulation purposes.



Envelope Follower parameters

- *On/Off button:* Turn the envelope follower on or off. When it is turned on, you can access the following parameters.
- *Sensitivity knob and field:* Determine how responsive the envelope follower is to the input signal. At lower settings, the envelope follower reacts only to the most dominant signal peaks. At higher settings, the envelope follower tracks the signal more closely but may react less dynamically.
- *Attack slider and field:* Set the response time of the envelope follower.
- *Release slider and field:* Set the time it takes the envelope follower to return from a higher to a lower value.

Ringshifter LFO in Logic Pro for iPad

The oscillator Frequency and Dry/Wet parameters can be modulated with the LFO—and the envelope follower. The oscillator frequency even allows modulation through the 0 Hz point, thus changing the oscillation direction. The LFO produces continuous, cycled control signals.



Ringshifter LFO parameters

- *On/Off button:* Turn the LFO on or off. When it is turned on, you can access the following parameters.
- *Rate knob and field:* Set the waveform cycle speed of the LFO.
- *Sync button:* Synchronize the LFO rate with the project tempo, using musical note values.
- *Symmetry/Smooth sliders and fields:* Change the shape of the LFO waveform.

Ringshifter output parameters in Logic Pro for iPad

Ringshifter output parameters set the balance between the effect and input signals and also set the width and feedback level. You can modulate the output dry/wet balance with a dedicated LFO and envelope.



Output parameters

- *Dry/Wet knob and field:* Set the mix ratio of the dry input signal and the wet effect signal.
- *Stereo Width knob and field:* Determine the breadth of the effect signal in the stereo field. Stereo Width affects only the effect signal of Ringshifter, not the dry input signal.

Dry/Wet modulation parameters

- *Env slider and field:* Determine the amount of Dry/Wet parameter modulation by the input signal level.
- *LFO slider and field:* Set the LFO modulation depth of the Dry/Wet parameter.

Rotor Cabinet effect

Rotor Cabinet effect in Logic Pro for iPad

The Rotor Cabinet effect emulates the rotating loudspeaker cabinet of a Hammond organ. Also known as the *Leslie effect*, it simulates both the rotating speaker cabinet, with and without deflectors, and the microphones that pick up the sound.

To add Rotor Cabinet effect to your project, choose Modulation > Rotor Cabinet in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Rotor and Cabinet parameters

- *Cabinet pop-up menu:* Choose a cabinet model.
  - *Wood:* Mimics a Leslie with a wooden enclosure. It sounds like the Leslie 122 or 147 model.
  - *Proline:* Mimics a Leslie with a more open enclosure, similar to a Leslie 760 model.
  - *Single:* Simulates the sound of a Leslie with a single, full-range rotor. It sounds like the Leslie 825 model.
  - *Split:* Routes the bass rotor signal slightly to the left and the treble rotor signal toward the right.
  - *Wood & Horn IR:* Uses an impulse response of a Leslie with a wooden enclosure.
  - *Proline & Horn IR:* Uses an impulse response of a Leslie with a more open enclosure.
  - *Split & Horn IR:* Uses an impulse response of a Leslie with the bass rotor signal routed slightly to the left and the treble rotor signal routed more to the right.
- *Horn Deflector button:* Tap to emulate a Leslie cabinet with the horn deflectors removed or attached. A Leslie cabinet contains a double horn, with a deflector at the horn mouth. This deflector makes the Leslie sound. You can remove the deflector to increase amplitude modulation and decrease frequency modulation.
- *Acc/Dec Scale knob and field:* Set the time it takes to get the rotors up to speed (set with the Max Rate knob) and the length of time it takes for them to slow down. The Leslie motors need to physically accelerate and decelerate the speaker horns in the cabinets, and their power to do so is limited. Turn Acceleration to the far left position to switch to the preset speed immediately. As you rotate the knob to the right, it takes more time to hear the speed changes. At the default centered position, the behavior is Leslie-like.
- *Rotor Fast Rate knob and field:* Set the maximum possible rotor speed.

- *Motor Control pop-up menu:* Choose different speeds for the bass and treble rotors. Use the Rotation switch to choose slow, brake, or fast mode.
  - *Normal:* Both rotors use the speed determined by the Rotation switch position.
  - *Inv (inverse):* In fast mode, the bass compartment rotates at a fast speed, while the horn compartment rotates slowly. This is reversed in slow mode. In brake mode, both rotors stop.
  - *910:* The 910 (also known as "Memphis"), stops the bass drum rotation at slow speed, while the speed of the horn compartment can be switched. This is useful when you're after a solid bass sound but still want treble movement.
  - *Sync:* The acceleration and deceleration of the horn and bass drums are roughly the same. This sounds as if the two drums are locked, but the effect is clearly audible only during acceleration or deceleration.

  Note: If you choose Single Cabinet from the (Cabinet) Type pop-up menu, the Motor Control setting is not relevant because there are no separate bass and treble rotors in a single cabinet.
- *Rotor Speed buttons:* Change the rotor speed between Slow, Brake, or Fast.

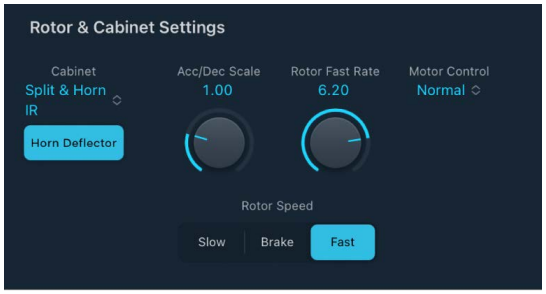
Rotor Cabinet effect microphone types in Logic Pro for iPad

The Rotor Cabinet effect provides modeled microphones that pick up the sound of the Leslie cabinet. You can specify the microphone type with these parameters.

- *Horn/Drum Mic pop-up menus:* Choose a microphone type for the horn and drum speakers when Real Cabinet is chosen in the Cabinet pop-up menu.
  - *Dynamic:* Emulates the sound of a dynamic cardioid microphone. This microphone type sounds brighter and more cutting than the Condenser mic.
  - *Condenser:* Emulates the sound of a studio condenser microphone. The sound of condenser microphones is fine, transparent, and well-balanced.
  - *Mid-Side Mic:* A Middle and Side (MS) configuration where two microphones are positioned closely together. One is a cardioid (or omnidirectional) microphone that directly faces the cabinet—in a straight alignment. The other is a bidirectional microphone, with its axes pointing to the left and right of the cabinet at 90° angles. The cardioid microphone captures the middle signal to one stereo side. The bidirectional microphone captures the side signal to the other stereo side.
- *Mic Position buttons:* Choose either the front or rear position for the virtual microphone.

Rotor Cabinet effect mic settings in Logic Pro for iPad

The Rotor Cabinet effect provides the following microphone processing parameters.



Mic processing parameters

- *When Real Cabinet is chosen in the Cabinet pop-up menu:*
  - *Horn Width knob and field:* Set the stereo width of the Horn deflector microphone.
  - *Drum Width knob and field:* Set the stereo width of the Drum deflector microphone.
- *When other cabinets are chosen in the Cabinet pop-up menu:*
  - *Mic. Distance knob and field:* Determine the distance of the virtual microphones (the listening position) from the emulated speaker cabinet. Turn to the right for a darker and less defined sound.
  - *Mic. Angle knob and field:* Define the stereo image, by changing the angle of the simulated microphones between 0 and 180 degrees.
- *Balance knob and field:* Set the balance between the horn and drum microphone signals.

Scanner Vibrato effect in Logic Pro for iPad

Scanner Vibrato simulates the scanner vibrato section of a Hammond organ. Scanner Vibrato is based on an analog delay line consisting of several lowpass filters. The delay line is scanned by a multipole capacitor that has a rotating pickup. It is a unique effect that cannot be simulated with simple LFOs.

You can choose between three different vibrato and chorus types. The stereo version of the effect features two additional parameters—Stereo Phase and Rate Right. These set the modulation speed independently for the left and right channels.

To add Scanner Vibrato to your project, choose Modulation > Scanner Vibrato in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



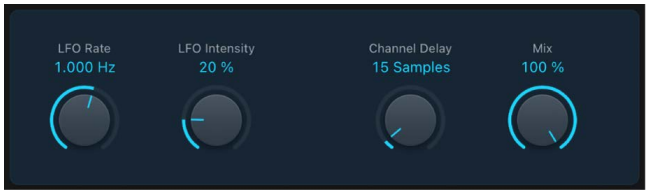
Scanner Vibrato parameters

- *Type knob and field:* Choose from three Vibrato positions (V1, V2, and V3) or three Chorus positions (C1, C2, and C3).
  - In each of the Vibrato positions, only the delay line signal is heard. Each vibrato type has a different intensity.
  - In the three Chorus positions (C1, C2, and C3), the signal of the delay line is mixed with the original signal. Mixing a vibrato signal with an original, statically pitched signal results in a chorus effect. This organ-style chorus sounds different from the Chorus .
  - In the C0 setting, neither the chorus nor the vibrato is turned on.
- *Depth knob and field:* Set the intensity of the chosen chorus effect type. If a vibrato effect type is chosen, this parameter has no effect.
- *Stereo Phase knob and field:* Determine the phase relationship between left and right channel modulations. If you set the knob to free, you can set the modulation speed of the left and right channels independently.
- *Left Rate knob and field:* Set the modulation speed of the left channel when Stereo Phase is set to free. If Stereo Phase is set to a value between 0° and 360°, Rate Left sets the modulation speed for both the left and right channels. The Rate Right knob has no function when in this mode.
- *Right Rate knob and field:* Set the modulation speed of the right channel when Stereo Phase is set to free.

Spreader effect in Logic Pro for iPad

Spreader widens the stereo spectrum of a signal by periodically shifting the frequency range of the original signal, thus changing the perceived width of the signal. You can also use Spreader to specify the delay between channels in samples, which adds to the perceived width and channel separation of a stereo input signal.

To add Spreader to your project, choose Modulation > Spreader in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Spreader parameters

- *LFO Rate knob and field:* Set the rate of the integrated LFO.
- *LFO Intensity knob and field:* Set the modulation amount.
- *Channel Delay knob and field:* Set the delay time in samples.
- *Mix knob and field:* Set the balance between the effect and input signals.

Tremolo effect in Logic Pro for iPad

Tremolo modulates the amplitude of the incoming signal, resulting in periodic volume changes. Tremolo is commonly used in vintage guitar combo amps, where it is sometimes incorrectly referred to as *vibrato*. The graphic waveform display shows all parameters except Rate.

To add Tremolo to your project, choose Modulation > Tremolo in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Tremolo parameters

- *Rate knob and field:* Set the frequency of the LFO.
- *Sync button:* Synchronize the modulation speed with the project tempo. Choose musical note values with the Rate knob.
- *Depth knob and field:* Determine the modulation amount.
- *Smoothing knob and field:* Change the shape of the LFO waveform. Also see Symmetry.
- *Offset knob and field:* Set the amount of left or right movement for the modulation (cycle). This results in small or large tremolo variations.
- *Symmetry knob and field:* Skew the balance toward the upward or downward phase of waveform cycles.

  Note: If Symmetry is set to 50% and Smoothing to 0%, the LFO waveform becomes rectangular. The timing of the highest volume signal is then equal to the timing of the lowest volume signal, with the switch between both states occurring abruptly.
- *Stereophase knob and field:* Control the phase relationship between individual channel modulations in stereo signals. At 0, modulation values are reached simultaneously for both channels. At values of 180 or –180, there is the greatest possible distance between the modulation phases of both channels.

Multi effects

Multi effects in Logic Pro for iPad

The multi-effect units provide a one-stop solution for a number of musical situations where you need to highlight or enhance a musical part or song section. The included multi-effect processors can be used subtly or traditionally, but they are truly creative tools that excel at transforming your music.

- Beat Breaker is an audio plug-in that reorders incoming audio in real time, allowing you to slice up your audio, rearrange it, and add scratching effects. Not only can you use it to play back audio in a different slice order, but you can also set the speed, direction, and volume with a given number of repeats. See Beat Breaker.
- Phat FX is a “coloring” multi-effect unit designed primarily for use with drum, bass, and guitar parts. It can add warmth, punch, and presence, along with some heavy distortion if you want it. You can use it with any type of signal that needs some extra “flavor.” See Phat FX.
- Step FX is a multi-effect unit that provides deep modulation control, courtesy of three independent built-in 128-step modulators. It can be used with any type of signal and is capable of subtle or heavy rhythmic enhancements to musical parts, dance-floor gating effects, and warped manipulations that can turn your audio and instrument tracks into something completely new. See Step FX.
- Remix FX is a flexible multi-effect unit that combines several DJ-style effects, such as a filter, gater, downsampler, reverse, scratch, tape stop, and more. It’s designed primarily for use on the stereo bus to give electronic-style music a live dance-floor groove, but you can use it on any type of signal. See Remix FX.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

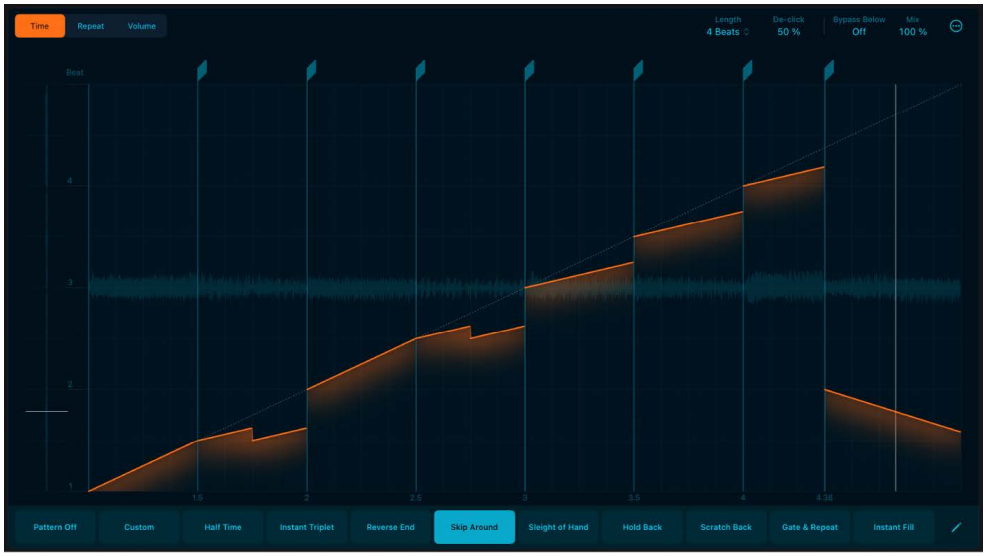
Beat Breaker

Beat Breaker in Logic Pro for iPad

Beat Breaker is an audio plug-in that reorders incoming audio in real time, allowing you to slice up your audio, rearrange it, and add scratching effects. Not only can you use it to play back audio in a different slice order, but you can also set the speed, direction, and volume with a given number of repeats for each slice. All these slice playback features define patterns that you can change on the fly.

Beat Breaker is not just an effect you add to a track but an effect you can perform with onstage or in the studio. This unique plug-in excels at EDM and hip-hop, and it can help you overcome “writer’s block” during production. In addition, it’s great for coming up with new ideas for your beats and subsequent variations.

To add Beat Breaker to your project, choose Multi Effects > Beat Breaker in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



When you open Beat Breaker, it displays the Main Editor, which consists of three sections:

- The upper section contains the Edit Mode buttons, which you can use to select the types of effects you want to add to a slice. When you tap a slice, its effect parameters become visible in the middle section, and you can change values using gestures. In addition, the upper section contains parameters such as Length, De-click, and Mix that you can use to fine-tune your pattern.
- The middle section contains the input buffer on the left, which displays the incoming audio from an audio region, live audio, or a virtual instrument. In the center is the audio waveform, where you can use gestures on slices to change the effect parameters. Above the audio waveform is the Slice Editor strip, where you can add, delete, and move slices using slice markers. See Create a Beat Breaker pattern.
- The lower section contains the Pattern buttons for quickly switching between patterns and accessing the Pattern Slot menu, which you can use to load, save, and rename patterns in each pattern slot. See Work with Beat Breaker patterns.

Beat Breaker Main Editor in Logic Pro for iPad

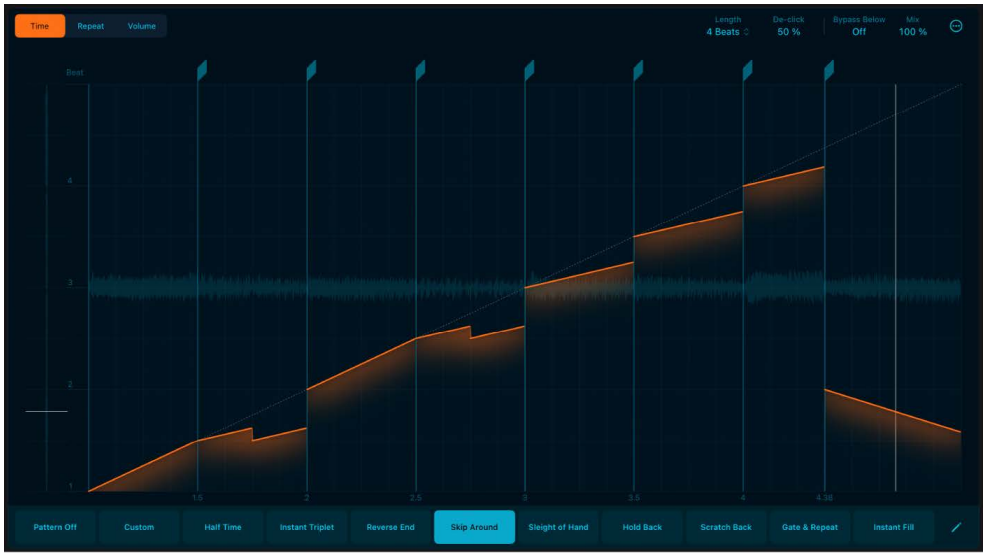
The Main Editor is the working area of Beat Breaker and where you can interact with its effects. On the far left, incoming audio enters the input buffer. In the center, the output waveform is visible, and slices represent where you can add effects to the audio. These slices are flexible; you can add, delete, and move them in relation to the Snap value using slice markers in the Slice Editor strip situated above the output waveform.

There are three types of effects, or edit modes: Time, Repeat, and Volume. You can select an effect using the Edit Mode buttons. When selected, each mode appears as a color: Time mode is orange, Repeat mode is magenta, and Volume mode is yellow.

When you select an edit mode and tap a slice, the parameters for the selected slice are visible at the top of the Main Editor. You can adjust a parameter level using a gesture or directly drag the parameter value sliders.

When you use gestures on the slices in Time mode, a mapping line indicates which instant in the input buffer will play back in the output pattern, allowing you to select how to "chop" your audio and change its speed. You can use Repeat mode to add up to eight repetitions of the selected slice to create stutter effects, the rhythmic repetition of small audio fragments. With Volume mode, you can change the volume over the duration of a slice to create swells and changes in dynamics.

Finally, you use the Pattern Slot menu to save and organize your patterns. See Work with patterns.



Main Editor parameters

- *Edit Mode buttons:* Tap to select one of the three edit modes. When an Edit Mode button is selected, you can edit its effect parameters in the Main Editor. See Edit modes.
  - *Time button:* Change the input position and speed of a slice. See Set the Input Beat parameter.
  - *Repeat button:* Change the number of repetitions for a slice to create stutter effects. See Set the Repeats parameter.
  - *Volume button:* Change the volume of a slice. See Set the Volume parameter.

- *Input buffer:* During playback, the input buffer on the left side displays the incoming audio, and its playhead shows which part of the input buffer is currently playing.
- *Slice Editor strip:* This area contains slice markers. Here you can add, move, and delete slice markers for the selected pattern. See Work with Beat Breaker slices.
- *Output Beat:* Set the position of the selected slice marker. This defines the beat at which the input beat is played back. See Move a slice.
- *Global controls:* A collection of controls such as Length, De-click, and Mix that you can use to fine-tune your pattern.
  - *Length pop-up menu:* Set the length of the current pattern in beats.
  - *De-click value:* Reduce clicks at locations where the playhead jumps by having a fast fade-out and fade-in. Decrease the value to hear more hard-hitting transients. Increase the value to remove audio clicks.
  - *Bypass Below field:* Set the frequency threshold below which the effect is bypassed. Frequencies below this threshold remain unaffected, while the effect is applied to frequencies above it.
  - *Mix value:* Control the balance between the original and processed audio signals. Set to 100% to hear only the processed signal.
  - *More button:* Tap the More button to choose how quantized values are used when setting parameters on the Slice Editor strip.
    - *Snap Output Beat:* Set the snap value for the Output Beat parameter, allowing precise adjustment of parameters to quantized values when editing slices on the Main Editor.
    - *Snap Input Beat:* Set the snap value for the Input Beat parameter, allowing precise adjustment of parameters to quantized values when editing slices on the Main Editor.
    - *Snap Speed:* Set quantized values for the Speed parameter in the Main Editor, with Time for musical divisions, Pitch for semitone increments, and Off for no snapping.
- *Pattern buttons:* Select a new preset pattern, or use Pattern Off to turn off all pattern effects. Each Pattern button contains settings for Time mode, Repeat mode, Volume mode, and Length. You can use Pattern buttons to quickly switch Beat Breaker settings while performing or a recording.
- *Pattern Off button:* Turn off all pattern effects. You can use this button to hear audio from Beat Breaker without any processing.
- *Pattern Slot Edit button:* Tap the Pattern Slot Edit button to turn on Pattern Slot Edit mode. In this mode, you can use the Pattern pop-up menu to load, save, and rename patterns in each pattern slot. See Work with Beat Breaker patterns.

Create a Beat Breaker pattern in Logic Pro for iPad

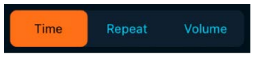
Here's an overview of the pattern-making process in Beat Breaker:

- Tap the Pattern Slot Edit button to enter Pattern Slot Edit mode.
- Tap a Pattern button, then tap Recall Default to reset the pattern to its default settings. See Work with pattern slots.
- Select an edit mode (Time, Repeat, or Volume). See Edit modes.

- Drag to change effect parameters for each edit mode. See Work with Beat Breaker slices.
- Set values such as Pattern Length, De-click, and Mix to fine-tune your pattern. See Main Editor parameters.
- Tap the Pattern Slot Edit button to organize and save your patterns. See Work with pattern slots.

Edit modes

Use the Edit Mode buttons (Time, Repeat, and Volume) to switch between each effect type. When you select a mode, you can see the slices and lines representing the effects. When you select a slice, the Main Editor updates to display its effect parameters, and you can adjust their values using gestures.

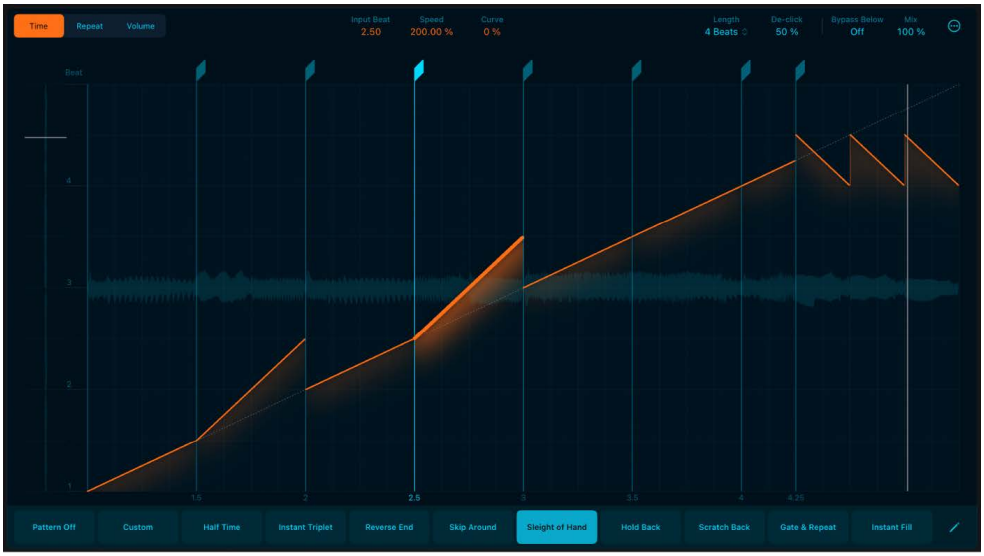


- *Time button:* Select Time mode to change the input beat and speed of a slice. See Time mode.
- *Repeat button:* Select Repeat mode to change the number of repetitions for a slice. See Repeat mode.
- *Volume button:* Select Volume mode to change the volume of a slice. See Volume mode.

Time mode in Logic Pro for iPad

Using Time mode in Beat Breaker, you can change the Input Beat, Speed, and Curve parameter for each slice.

- Tap the Time button to select Time mode.



Time mode parameters

- *Input Beat:* Set the start position of the selected slice. By changing the start position of slices, you can “chop up” your audio and rearrange it.
- *Speed:* Change the speed of the selected slice. Negative values play the audio in reverse.
- *Curve:* Change the speed of playback throughout the selected slice.

Set the Input Beat parameter

- Drag the slice up or down to change the Input Beat value.

Set the Speed parameter

- Drag the slice to the left or right to change the Speed value.

Set the Curve parameter

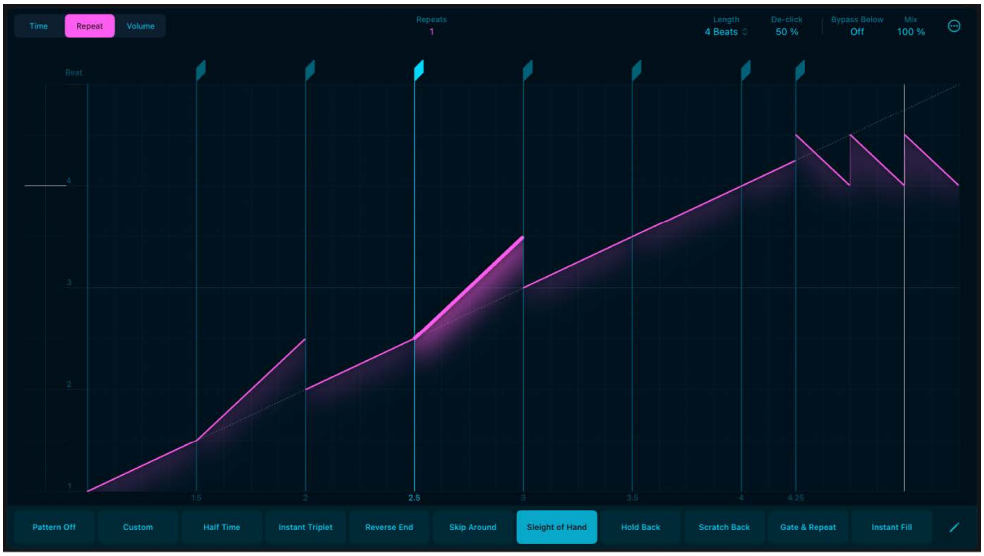
- Place two fingers on the slice, then turn your hand in the direction you want to rotate the curve. After you start the rotation, you can continue by dragging with a single finger.

  Tip: When a slice is selected, you can also drag the Curve parameter to adjust the value. This is useful if the slice is too narrow to use a gesture.

Repeat mode in Logic Pro for iPad

Using Repeat mode in Beat Breaker, you can set the number of repeats for a slice. Repeat mode is useful for creating repetitions and stutter effects.

- Tap the Repeat button to select Repeat mode.



Repeat mode parameters

- *Repeats:* Set the number of repeats for the selected slice. You can add up to eight repeats per slice.

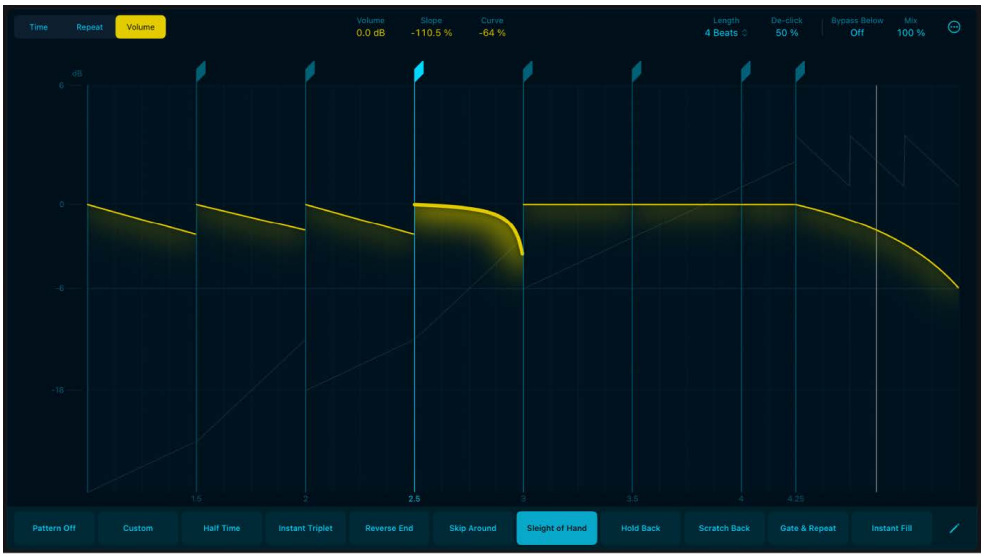
Set the Repeats parameter

- Drag the slice up or down to change the Repeats value.

Volume mode in Logic Pro for iPad

Using Volume mode in Beat Breaker, you can set the Volume, Slope, and Curve values of a slice.

- Tap the Volume button to select Volume mode.



Volume mode parameters

- *Volume:* Change volume for the selected slice.
- *Slope:* Change volume over time for the selected slice.
- *Curve:* Change the curve of the volume ramp over time for the selected slice.

Set the Volume parameter

- Drag the slice up or down to change the Volume value.

Set the Slope parameter

- Drag the slice to the left or right to change the Slope value.

Set the Curve parameter

- Place two fingers on the slice, then turn your hand in the direction you want to rotate the curve. After you start the rotation, you can continue by dragging with a single finger.

  Tip: When a slice is selected, you can also drag the Curve parameter to adjust the value. This is useful if the slice is too narrow to use a gesture.

Work with Beat Breaker slices in Logic Pro for iPad

The Slice Editor strip lets you create, move, and delete slices. You can add up to 32 slice markers per pattern.

Create a slice

- Tap the Slice Editor strip to create a new slice marker.

Move a slice

- Drag the slice marker to the left or right.

  Tip: To snap the movement of slices, tap the More button, then choose a Snap Output Beat value.

Delete a slice

- Double-tap the slice handle to delete a slice marker.

Work with pattern slots in Logic Pro for iPad

In Logic Pro, tap the Pattern Slot Edit button to access all Beat Breaker presets and file operations.

Pattern Slot Edit parameters

- *Pattern Slot Edit button:* Turn on Pattern Slot Edit mode. In this mode, you can use the Pattern pop-up menu to load, save, and rename patterns in each pattern slot.
- *Pattern pop-up menu:* Choose a menu item to load, save, delete, copy, paste, and rename patterns.
  - *Rename Pattern:* Change the name of the current pattern.
  - *Copy Pattern:* Copy the current pattern.
  - *Paste Pattern:* Paste the copied pattern into the current slot.
  - *Save Pattern:* Save the current pattern settings. If you've edited an existing pattern and use this command, the existing filename is used, and the original pattern is overwritten.
  - *Save Pattern As:* Save the current pattern settings under a different name. Use this command when you want to save a copy or multiple versions of an edited pattern, rather than overwriting the original version.
  - *Recall Default:* Reset all values to their default state. This option is a good starting point when creating new patterns from scratch.
  - *Delete Selected User Pattern:* Delete the current user pattern.
  - *Previous Pattern:* Swipe down on a pattern slot to load the previous preset pattern.
  - *Next Pattern:* Swipe up on a pattern slot to load the next preset pattern.
  - *Custom:* This menu item is shown automatically when any pattern changes have been made. It can be considered the "current state" pattern preset.
  - *Preset pattern list:* Choose a pattern from the list of presets.
  - *User:* Contains a list of all your saved patterns.

Load a pattern

1. Tap the Pattern Slot Edit button.
2. Tap a Pattern button, then choose a pattern from a folder.

Save a pattern

1. Tap the Pattern Slot Edit button.
2. Tap the button of the pattern you're currently editing, then tap Save Pattern.

   Note: All of your saved patterns are stored in the User folder.

Delete a user pattern

1. Tap the Pattern Slot Edit button.
2. Tap a Pattern button, then tap the pattern you want to delete from the User folder.
3. Tap the Pattern button again, then tap Delete Selected User Pattern.

   Note: You can only delete a user pattern after selecting it from the User folder.

Rename a pattern

1. Tap the Pattern Slot Edit button.
2. Tap a Pattern button, then tap Rename Pattern.
3. Enter a new name for the pattern, then tap Rename.

Recall the default pattern

1. Tap the Pattern Slot Edit button.
2. Tap a Pattern button that you want to reset, then tap Recall Default.

Phat FX

Phat FX in Logic Pro for iPad

Phat FX is a powerful "coloring" multi effect designed primarily for use with drum, bass, and guitar parts, adding warmth, punch, and presence where required. It can, of course, be used with any type of signal. Phat FX combines several effect processors, filters, and modulators in a flexible tool that can be used to quickly enhance your projects.

Three distortion units are included, which can be used separately or blended together to create an endless variety of tones.

The bass enhancer and bandpass filter circuits can be used to enhance low frequencies, making for great kick drum and bass guitar sweetening.

In addition, an easy-to-use multi-modeled compressor, a multimode resonant filter, and a modulation effect unit are included.

Two LFOs and an envelope follower, coupled with the assignable XY pad, allow powerful automatic and real-time manipulation of the most important parameters.

Phat FX processors work in series—where the output of one effect is fed into the next in an effects chain. The routing order lets you choose whether a distorted signal should be filtered or the filtered sound should be distorted, for example.

Horizontally drag the name of the effect in the Effects order strip at the top to determine the order of the effects chain.

To add Phat FX to your project, choose Multi Effects > Phat FX in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



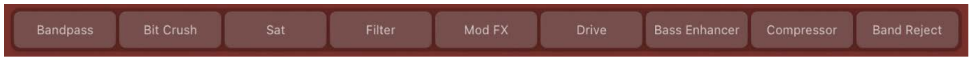
Phat FX global controls in Logic Pro for iPad

The Phat FX global controls include the Effects order strip, which you can use to turn on or turn off individual effects and to reposition effects within the effects chain. The XY pad provides real-time control of up to four target parameters. The Master section parameters provide global input, output, and mix level control.

Effects order strip

The order and status of active and inactive effects units are indicated in the strip. Inactive effects are dimmed, and active effects are illuminated. The signal flow runs from left to right.

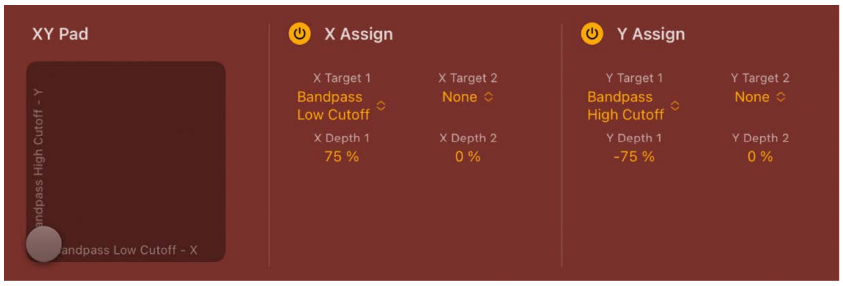
Tap an effect name to turn it on or to turn it off.



Effects order strip: Drag the name of an active (lit) or inactive (dimmed) effect horizontally to change the effects order.

XY pad parameters

The XY pad provides real-time control of up to four target parameters. Drag the gray control point to simultaneously modulate your targets.



- *XY pad:* Drag the gray control point horizontally or vertically to change the value of the assigned X or Y target parameters.
- *X and Y Assign On/Off buttons:* Turn on or turn off the X or Y controller. You can assign two targets to each axis, for a total of four modulations with the XY pad.
- *X Target 1/2 pop-up menus:* Choose one or two modulation targets from any active effect processor, modulation source, or the master control section.
- *X Depth 1/2 fields:* Drag vertically to set the modulation amount/range for the chosen X target(s).
- *Y Target 1/2 pop-up menus:* Choose one or two modulation targets from any active effect processor, modulation source, or the master control section.
- *Y Depth 1/2 fields:* Drag vertically to set the modulation amount/range for the chosen Y target(s).

Master controls

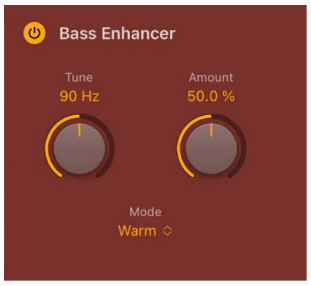


- *Input Gain knob and field:* Set the overall input level of the plug-in.
- *Output knob and field:* Set the overall output level of the plug-in.
- *Mix knob and field:* Set the level of the original versus processed signal. This is essentially a wet/dry balance control.
- *Limiter pop-up menu:* Choose soft or hard limiting, or turn off limiting.

Phat FX processors in Logic Pro for iPad

The parameters of all Phat FX processors are described in the respective sections below.

Bass Enhancer parameters



Bass Enhancer boosts the signal around a defined frequency.

- *Bass Enhancer On/Off button:* Turn on or turn off the bass enhancer effect. You can also tap the button in the Effects order strip to activate or deactivate the processor.
- *Tune knob and field:* Set the center frequency for bass enhancement. Signals surrounding this frequency are boosted.
- *Amount knob and field:* Set the level of the effect signal.
- *Mode pop-up menu:* Choose a bass enhancement characteristic. Each option provides a different tonal color and response.

Compressor parameters

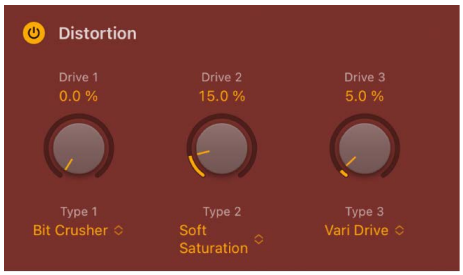


The compression unit tightens up your audio by smoothing out dynamics and increasing the overall volume.

- *Compressor On/Off button:* Turn on or turn off the compressor effect. You can also tap the button in the Effects order strip to activate or deactivate the processor.
- *Release knob and field:* Set the time it takes for the compression circuit to stop reducing the signal.
- *Amount knob and field:* Set the level of compression.
- *Mode pop-up menu:* Choose an emulated compressor circuit. The choices are Classic, Clip, Platinum, Studio VCA and FET, Classic VCA, or Vintage VCA, FET, and Opto.
  - *FET models:* Field Effect Transistor compressors are known for their fast transient response. They can deliver a clean or warm tone (notably midrange), and can be pushed toward a “crunchy” tone on transients. FET compressors are ideal for drums, vocals, and guitars. FET compressors can only attenuate the signal.

- *VCA models:* Voltage Controlled Amplifier compressors can respond slowly or quickly to incoming transients. They tend toward a clean tone and are suited for bass guitars and low-frequency signals. VCA compressors can attenuate or amplify the signal.
- *Opto model:* Optical compressors are known for their fast transient response and nonlinear release handling. They are very clean and are ideal for vocals and guitars.

Distortion parameters



The three distortion units can be used independently or combined to create a huge variety of tones.

- *Distortion On/Off button:* Turn on or turn off the distortion effect module. You can also tap the button in the Effects order strip to activate or deactivate the processor.
- *Drive knobs and fields:* Set the level for each of the three distortion units.
- *Type pop-up menus:* Choose a distortion characteristic for effect unit 1, 2, or 3. Each option provides a different tonal color and response.
  - Bitcrusher is a harsher-sounding digital effect.
  - Diode gently clips and saturates the tone.
  - Dirt and Grit are distortions that can saturate heavily when you use higher Amount values.
  - Downsampler is a lo-fi digital effect (similar to Bitcrusher but frequency dependent).
  - Exciter hypes and emphasizes high-frequency content.
  - Scream is a classic tube distortion effect that emphasizes high-frequency content.
  - Soft Saturation is a tube-like distortion effect that can warm and thicken the tone.
  - Squared can be used to hard clip the tone.
  - Tube is a classic tube distortion effect.
  - Vari Drive emulates a tube-based distortion effect that is great for clean boost.

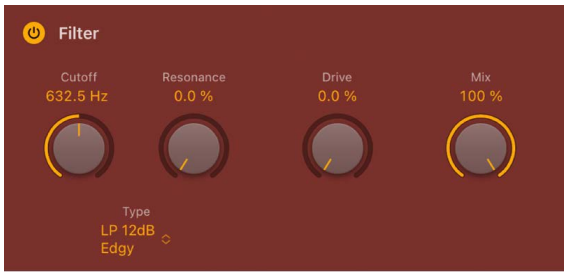
Mod FX parameters



The modulation unit provides four types of chorus-like effects, ranging from soft through to doubling or ensemble type processing.

- *Mod FX On/Off button:* Turn on or turn off the Mod FX unit. You can also tap the button in the Effects order strip to activate or deactivate the processor.
- *Rate knob and field:* Set the speed of the modulation effect.
- *Mix knob and field:* Set the level of the original versus modulated signal. This is a modulation amount control.
- *Mode pop-up menu:* Choose a modulation characteristic. Each option provides a different tonal color and effect depth.

Filter parameters



The filter unit provides dozens of filter types. See Phat FX filter types.

- *Filter On/Off button:* Turn on or turn off the filter effect. You can also tap the button in the Effects order strip to activate or deactivate the processor.
- *Cutoff knob and field:* Set the cutoff frequency for the filter. Higher frequencies are attenuated and lower frequencies are allowed to pass in a lowpass (LP) filter. The reverse is true in a highpass (HP) filter. When in a bandpass (BP) mode, cutoff determines the center frequency of the band that is allowed to pass. The comb and other filter types change the names and behaviors of the filter controls.
- *Resonance knob and field:* Boost or cut signals in the frequency band that surrounds the cutoff frequency.
- *Type pop-up menu:* Choose a filter characteristic. Each option provides a different tonal color and response to Cutoff, Drive, and Resonance control values.

  Note: The chosen filter type can alter the names and functions of the default Cutoff, Resonance, and Drive knobs.
- *Drive knob and field:* Overdrive the filter. This can lead to intense distortions, depending on filter type.
- *Mix knob and field:* Set the level of the original versus filtered signal.

Bandpass parameters



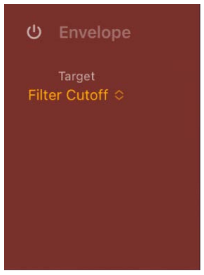
The Bandpass unit passes the portion of a signal occupying a band surrounding the cutoff frequency and rolls off the portions above and below that band. The Reject Mix knob lets you restore (mix in) the signal that was not band passed at the Bandpass unit position within the overall signal chain. This allows you to apply one or more effects to a specific frequency range only, leaving other frequencies unchanged.

- *Bandpass On/Off button:* Turn on or turn off the bandpass filter. You can also tap the button in the Effects order strip to activate or deactivate the processor.
- *Type pop-up menu:* Choose a filter characteristic. Each option provides a different tonal color and response to High and Low Resonance control values.
- *Low/High Cutoff knobs and fields:* Set the lowest and highest frequencies allowed to pass by the filter. Frequencies outside these values are cut.
- *Low/High Resonance knobs and fields:* Determine the basic sonic character of filtering around the low and high frequencies set with the Low/High knobs. Higher Resonance settings emphasize the frequency, resulting in a sharper, brighter character. Lower Resonance settings result in a softer character.
- *Reject Mix knob:* Mix in (restore) the signal that was not band passed at the Bandpass unit position within the signal chain.

Phat FX modulators in Logic Pro for iPad

Phat FX modulators provide automatic control of Phat FX processor parameters. The parameters of all Phat FX modulators are described in the respective sections below.

Envelope follower parameters



The envelope follower tracks incoming signal levels and generates a control signal that is used to modulate other Phat FX parameters.

A common use of the envelope follower is to track a side chain input signal that is used to control filter parameters.

- *Envelope On/Off button:* Turn on or turn off the envelope follower.

- *Target pop-up menu:* Choose a modulation target from any active effect processor or master control.
- *Attack slider and field:* Determine how quickly the envelope follower reacts to rising signal levels (transients).

  Longer attack times result in a slower tracking response to transients—level spikes—of the input signal. A long attack time on percussive input signals, such as a spoken word or hi-hat part, results in less accurate analysis.
- *Release slider and field:* Determine how quickly the envelope follower reacts to falling signal levels, after the initial transient spike.

  Longer release times cause the analyzed input signal transients to sustain for a longer period at the envelope follower output. A long release time on percussive input signals, such as a spoken word or hi-hat part, results in less accurate analysis. Use of extremely short release times can result in “choppy” sounds, depending on the chosen modulation target.
- *Depth knob and field:* Set the modulation amount. This determines the intensity of the control signal sent from the envelope follower.

  At a value of 100%, with a sine wave, white noise, or another signal that frequently reaches zero dB (and Attack set to zero), the output signal will reach the maximum amount. Most signals, however, are quieter than this and won’t reach zero dB, so the extended Depth knob range between 100% and 1000% helps to make the envelope effect sufficiently sensitive on quieter signals. When loading presets which use the envelope follower, you should experiment with the Depth parameter.

LFO 1/2 parameters



- *LFO 1/2 On/Off buttons:* Turn on or turn off LFO 1 or 2.
- *Target pop-up menus:* Choose a modulation target from any active effect processor or Master control for LFO 1 or 2.
- *Shape pop-up menus:* Set the waveform type used by LFO 1 or 2.
- *Rate knobs and fields:* Set the modulation speed of LFO 1 or 2. Values are in hertz—cycles per second. When the Sync button is on, bar/beat values—synchronized with the host tempo—are shown.
- *Sync buttons:* Turn on or turn off synchronization of LFO 1 or 2 with the host application.

  Note: The ability to use synchronous bar values could be used to perform a filter sweep every four bars on a cycled one-bar percussion part, for example. Alternatively, you could perform the same filter sweep on every eighth-note triplet within the same part. Either option can generate interesting results.
- *Depth knobs and fields:* Set the amount of LFO 1 or 2 modulation.

Phat FX filter types in Logic Pro for iPad

Phat FX provides dozens of filter types.

Phat FX filter types: lowpass, bandpass, highpass

A lowpass (LP) filter passes the portion of a signal below a specified cutoff frequency and rolls off the portion above that frequency. A bandpass (BP) filter passes the portion of a signal occupying a band surrounding the cutoff frequency and rolls off the portions above and below that band. A highpass (HP) filter passes the portion of a signal above a specified cutoff frequency and rolls off the portion below that frequency.

There are multiple two-pole, four-pole, multi-pole state-variable and analog-modeled LP, BP, and HP filter designs in Phat FX, each with distinctive characteristics that you may prefer for a given purpose. The available LP, BP, and HP filter designs include Smooth, Edgy, Rich, Sharp, Clean, and Gritty variants.

- *Sharp:* Two-pole analog-modeled filters.
- *Smooth:* Two- or multi-pole state-variable filters.
- *Edgy:* Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- *Rich:* Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- *Clean:* Bi-Quad filters. These filters have no Drive option.
- *Gritty:* Two-pole filters designed to saturate heavily at higher Resonance and Drive settings.

The three principal filter controls have standard functions for all filter types.

- *Cutoff:* Controls the filter cutoff frequency.
- *Resonance:* Controls the filter resonance or emphasis. Higher settings boost frequencies in the immediate vicinity of the cutoff frequency.
- *Drive:* Allows the filter to be overdriven; the precise effect varies with each filter design.

Phat FX filter types: notch and peaking

A notch filter cuts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

- *Cutoff:* Sets the frequency of the cut band.
- *Mix:* Controls the amount of attenuation.

A peaking filter boosts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

- *Cutoff:* Sets the frequency of the boosted band.
- *Mix:* Controls the amount of boost. Higher values are generally the most effective.
- *Resonance:* Sets the bandwidth around the cutoff frequency.

Phat FX filter types: comb filters

A comb filter mixes the original signal with one or more copies of the signal, which are delayed by a very short time interval. At some frequencies this mixture causes phase cancelations, while at other frequencies it causes reinforcements. The result is a spiky frequency spectrum with multiple resonant peaks. Graphically, these peaks resemble the teeth of a comb, which gives this filter type its name.

Phat FX offers three comb filter designs, each with its own character. The best choice depends on your preference and the type of sound you're trying to create. That said, there are some distinguishing characteristics that may help guide you.

Comb Pos uses positive feedback on the delay lines, while Comb Neg uses negative feedback to produce less extreme effects, often with a hollow quality. These two are the less powerful combs and offer a much more gradual increase in resonance. They can be useful when you require either a less dramatic effect or you want to hear more of the exciter signal character in your sound. The latter point is noteworthy as this trait can be useful when you want a more naturalistic sound.

Comb PM uses bipolar feedback on the delay lines. The resonance control is bipolar, allowing you to freely shift from negative (hollow sound) on the left to positive (bright and peaky) on the right. This comb is useful for classic bright Karplus-Strong style sounds, where the exciter impulse is not easily heard and the comb is more prominent. Take care with your resonance level because it is capable of quickly going to extremes, which can lead to feedback. Start with a resonance level of zero and increase (or decrease) slowly to find a suitable effect strength.

- *Cutoff:* Controls the delay time in the comb circuit. Lower cutoff values equate to a longer delay.
- *Drive:* Controls the amount of feedback in the comb circuit.
- *Resonance:* Controls the frequency peaks in the comb-filtered spectrum.

  Note: Sending a percussive sound into a highly resonant comb filter causes it to ring at a frequency determined by the delay time you have set with the Cutoff knob.

Phat FX filter types: ring modulation

Ring modulation is a process in which a modulator and a carrier signal are multiplied. Each frequency component of the modulator interacts with each frequency component of the carrier to produce two sidebands: a sum and a difference (carrier – modulator). When a filter is set to the RingMod type, the signal entering the filter acts as the modulator, while the carrier is supplied internally by the filter.

- *Cutoff:* Controls the carrier frequency.
- *Mix:* Applies a constant offset to the carrier.
  - At 0%, the carrier wave varies between –1 and +1, resulting in classic ring modulation.
  - At 100%, the carrier wave varies between 0 and 1, resulting in classic amplitude modulation. In this case, the carrier signal itself is present alongside the sum and difference sidebands.

Phat FX filter types: distortion

Phat FX filters offer several distortion effects.

- Bitcrusher is a harsher-sounding digital effect.
- Dirt is a classic tube distortion effect.
- Downsampler is a lo-fi digital effect (similar to Bitcrusher but frequency dependent).
- Grit is a transistor distortion.

The filter controls work as follows when the filter type is set to a distortion effect:

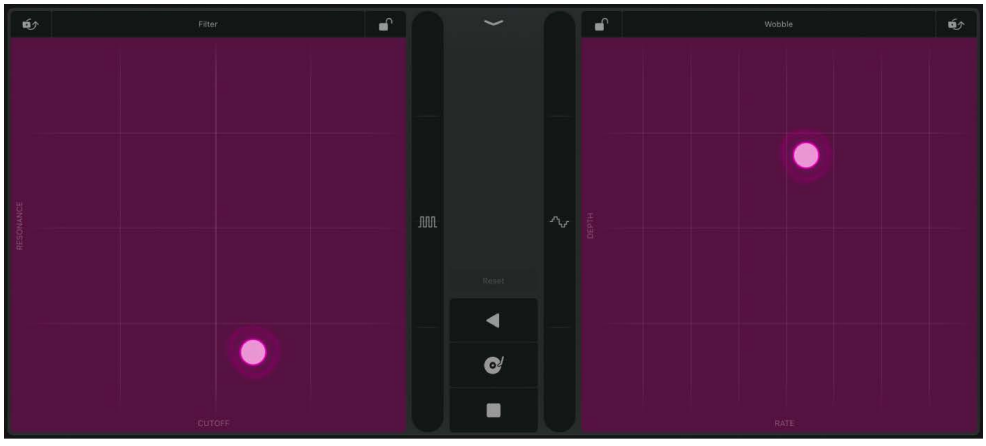
- *Drive:* Controls the intensity of the distortion effect.
- *Mix:* Controls the mix between clean and distorted signals. A 0% value results in the clean signal only. A 50% value results in an equal mix of clean and distorted signal. A 100% value results in the distorted signal only.
- *Cutoff:* Sets the frequency for the Downsampler distortion type.

Remix FX in Logic Pro for iPad

Remix FX includes a set of buttons, sliders, and XY pads you can use to control several real-time effects common to electronic and dance music. It makes it easy to scratch mix your project, much like a DJ using a turntable, to play short pieces of audio in reverse, to stop or downsample the song, and to apply a variety of other effects. It is intended mainly for use on the stereo output bus, but you can insert the plug-in on any type of signal in your project.

To add Remix FX to your project, choose Multi Effects > Remix FX in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Remix FX can be fully automated so you can record, edit, and play back any movement of the Remix FX parameters. See Intro to automation.



Use the XY pads on the left and right to control various time-based and modulation effects. Drag horizontally (X axis) or vertically (Y axis) to set the value of the parameter shown on the bottom or left side of each pad.

XY pad pop-up menus: Tap the name of the effect at the top of either XY pad to open a grid of effect types. Tap a grid name to choose an effect type for either XY pad.

- *Settings button:* Tap the Settings button to show or hide additional effect parameters for the currently selected effect.
- *Filter:* Removes frequencies above a cutoff frequency and accentuates frequencies around the resonance value. X sets the cutoff frequency and Y sets the resonance value. Tap the Settings button to access the following additional parameter:

  Mode: Choose between Phat, a warm-sounding filter with a 24 dB lowpass and 24 dB highpass filter, and Classic, a clean, state-variable filter with a slope of 12 dB/octave.
- *Wobble:* Modulates the audio signal through a vintage-style filter effect. X sets the modulation rate and Y sets the modulation depth. Tap the Settings button to access the following additional parameter:

  Time: Choose from options for note division, note division with an added triplet, or a triplet of the note division.
- *Orbit:* Modulates the audio signal through a flanger effect, phaser effect, or a mix of both. X sets the modulation rate and Y sets the modulation depth. Tap the Settings button to access the following additional parameter:

  Mode: Choose between a phaser effect, a modulation effect that is a mix of both a phaser and flanger, or a flanger effect.
- *Repeater:* Creates a stuttering effect. X sets the repeat rate and Y sets the mix amount. Tap the Settings button to access the following additional parameter:

  Time: Choose from options for note division, note division with an added triplet, or a triplet of the note division.
- *Reverb:* Adds ambience to your audio signal. X sets the reverb time and Y sets the mix amount. Tap the Settings button to access the following additional parameter:

  Color: Choose the character for the reverb. Dark rolls off the higher frequencies. Medium offers a relatively neutral ambience. Bright rolls off the lower frequencies.
- *Delay:* Adds echoes to your audio signal. X sets the modulation rate and Y sets the feedback depth. Tap the Settings button to access the following additional parameter:

  Time: Choose from options for note division, note division with an added triplet, or a triplet of the note division.

Remix FX parameters

- *FX Lock button:* Tap the FX Lock button to freeze the current X and Y values when the pointer is removed from the pad.

  The Locked button is shown when X and Y values are frozen. Tap it to unlock.
- *Reset button:* Immediately halts all XY pad effects. Any active XY pad locks remain active.
- *Gater slider:* Drag the Gater slider to apply a gate-style effect on the incoming signal. Tap the Settings button to access the following additional parameters:

  Gater: Choose from options for note division, note division with an added triplet, or a triplet of the note division.

  Noise: Injects a small amount of soft, noninvasive noise into your signal, so that even without any audio signal you can still hear some gating.

- *Downsampler slider:* Drag the Downsampler slider to change the resolution of incoming audio, making the sound thinner, gritty, or peaky, similar to Bitcrusher distortion. Tap the Settings button to access the following additional parameter:

  Downsampler: Extreme introduces a sympathetic, ringing frequency to your audio signal. Classic downsamples the audio to “roughen it up.”

- *Reverse button:* Tap the Reverse button to reverse playback of incoming audio. Touch-sensitive effect variations are available on the left and right sides of the button. Tap the Settings button to access the following additional parameter:

  Time: Choose a note division for the reverse effect.

- *Scratch button:* Tap the Scratch button to simulate a record scratch on the incoming audio. Touch-sensitive effect variations are available on the left and right sides. Tap the Settings button to access the following additional parameter:

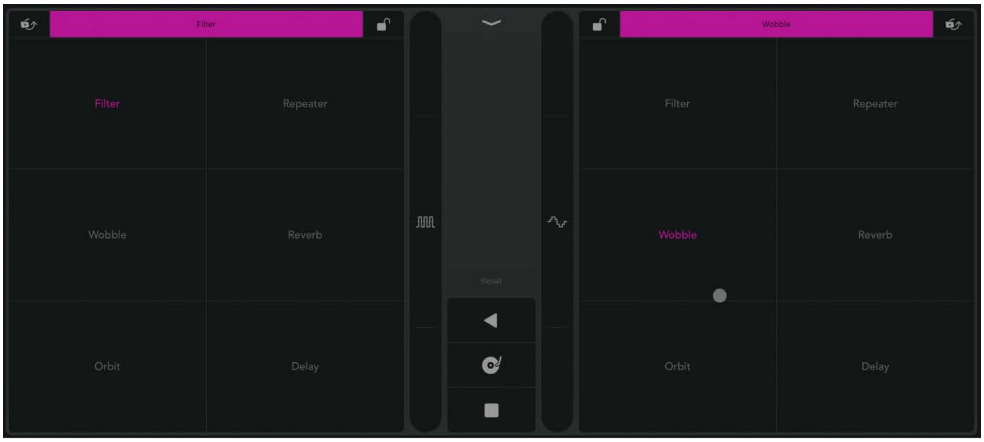
  Time: Choose a note division for the scratch effect.

- *Tape Stop button:* Tap the Tape Stop button to simulate the slow down and stop of the incoming audio. Touch-sensitive effect variations are available on the left and right sides of the button. Tap the Settings button to access the following additional parameter:

  Time: Choose a note division for the tape stop effect.

Assign effects to XY pads

1. Tap the name of the effect at the top of either XY pad to open a grid of effect types.
2. Tap a grid name to choose an effect type for either the left or right XY pad.



Lock effects on the XY pads

You can lock the XY pads so they retain their current values when you remove your finger from the pad. Once an XY pad is locked, you can choose a different XY effect for the same pad and use it in combination with the locked effect. When an XY pad is locked, you can tap a different spot on the XY pad and instantly change the parameter values. When you release the pad, the locked value is used.

1. Tap the FX Lock button at the top of the XY pad.
2. Do any of the following:
   - *Combine effects on a locked XY pad:* Tap the name of the effect at the top of the XY pad, then choose a different effect from the grid.
   - *Reset all XY pad effect parameters:* Tap the Reset button. Any active XY pad locks remain active.
3. Tap the Locked button to unlock the XY pads.

Record Remix FX

You can record Remix FX parameter changes as automation curves.

1. In Logic Pro, tap the Automation View button in Tracks view (for track automation) or the Editors area (for region automation).
2. On the track where Remix FX is inserted, choose the automation mode from the Automation pop-up menu. Touch mode is probably best suited because any existing automation curves are overwritten only when you change Remix FX parameters. Otherwise, it follows any existing automation on the track.
3. Move the playhead to the point where you want to start recording automation, then start playback.
4. Change parameters in the Remix FX plug-in.

   Parameter changes are written as automation curves to the track.
5. Stop playback when done.

When you're finished, you can manually edit the automation curves. In order to avoid unwanted changes to the automation curves during further playback, change the automation mode back to Read.

Step FX

Step FX in Logic Pro for iPad

Step FX is a powerful multi-effect unit that provides deep modulation control, courtesy of three independent step modulators. It can be used with any type of signal and is capable of subtle or heavy rhythmic enhancements of musical parts, dance floor gating effects, and warped manipulations that can turn your audio and instrument tracks into something completely new.

The three independent step modulators—each with an envelope—provide up to 128 steps that can be used to control effects parameters, gate, and pan. Multiple step modulators can be used to control the same parameter, allowing for interesting polyrhythms. Control is further enhanced with the assignable XY pad that allows real time manipulation of up to four parameters. See the sections on Step FX modulator toolbar, playback controls, and display controls.

Effects include a multimode filter, a modulation FX unit, delay, reverb, and distortion units. All effects parameters can be modulated.

Step FX processors work in series—where the output of one effect is fed into the next in an effects chain. The routing order lets you choose whether a delayed signal should be filtered or the filtered sound should be delayed—as an example.

Horizontally drag the name of the effect in the Effects order strip to determine the order of the effects chain.

To add Step FX to your project, choose Multi Effects > Step FX in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

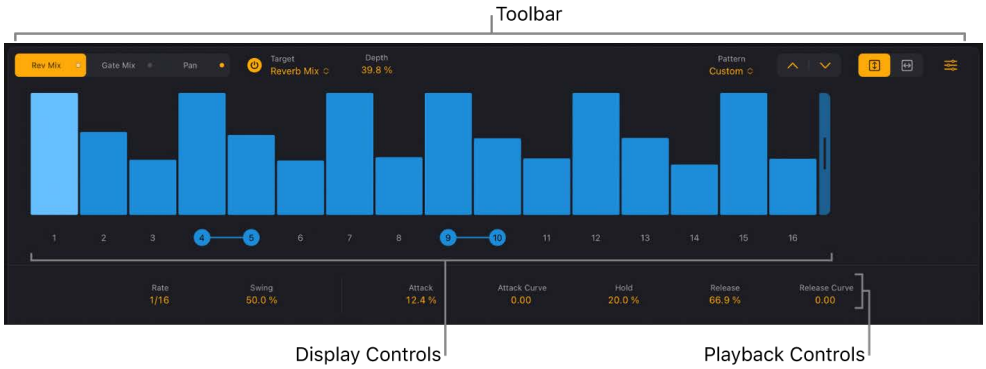


Step modulator toolbar in Step FX in Logic Pro for iPad

The Step Modulator is the heart of Step FX. It offers three independent step modulators that each provide up to 128 steps. Each modulator can be assigned to modulate effects unit parameters or to modulate gate or pan. It is also possible to assign multiple step modulators to the same parameter to create interesting polyrhythmic effects.

In addition to defining the number of steps in each modulator, you can change the level and length (gate time) of individual steps, and you can also tie steps. Each modulator provides independent Depth, Rate, and Swing amount controls, and also features an Attack, Hold, and Release envelope that defines the overall step shape for each modulator. See the sections on Step FX modulator playback controls and display controls.

A number of modulator pattern presets are included, along with menu commands to help you quickly create new and interesting rhythmic modulation patterns.



Step modulator toolbar controls

- *Step Modulator select buttons:* Tap to select step modulator 1, 2, or 3. All parameters in the step modulator, envelope, and so on, update to show values for the chosen modulator. A light on each button indicates the on/off state.
- *On/Off button:* Turn on or turn off step modulator 1, 2, or 3. The button is shared by all three modulators and activates or deactivates the selected modulator.
- *Modulator Target pop-up menu:* Choose a target parameter for step modulator 1, 2, or 3. The chosen modulator target name is shown on the corresponding button. The Target pop-up menu is shared by all three modulators and shows the target for the selected modulator.

  It is possible to assign the same target for multiple modulators. Because each modulator can have a different pattern and length, along with independent Depth, Rate, Swing, and envelope control, this can lead to complex polyrhythmic modulations. There are two gate modes available that facilitate different playback behaviors:

  - *Gate Mix:* Gate Mix is the best Gate choice in most cases. In this mode, a Depth value of 0% results in no change to the sound. As the Depth value increases, the volume associated with the minimum step value decreases until at 100% it results in silence. Negative Depth values invert step values. When multiple Gate modulators are used, the Gate Mix value is multiplied by existing Gate values.
  - *Gate Add:* In Gate Add mode, a single Gate Add step modulator with a Depth value of 0% results in silence, and a Depth value of 100% sounds identical to Gate Mix. As you increase the Depth value, the amplitude of existing steps increases. Negative Depth values invert step values. When multiple Gate modulators are used, the Gate Add value is added to existing Gate values. For example, a Gate Add Depth value of +10 changes a step value of 50 to 60.

- *Depth field:* Drag vertically to set the intensity of modulation for step modulator 1, 2, or 3.
- *Pattern pop-up menu:* Choose a menu item to save or load your own modulation pattern or to load a factory modulation pattern.
  - *Save As:* Opens a name field. Enter a name, then tap the Save button to save your modulation pattern. Tap Cancel to stop the save operation and to exit the Save name field.

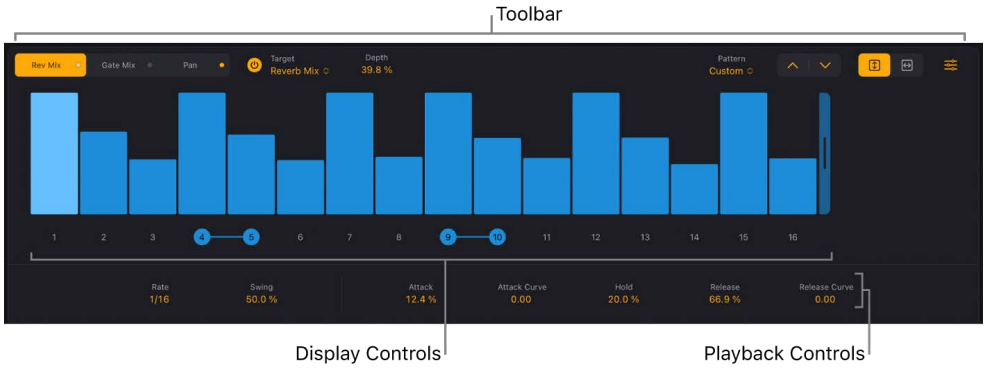
    User patterns are shown at the bottom of the Preset pop-up menu.
  - *Recall Default:* Initializes all steps and the envelope in the current user pattern to default (null) values.
  - *Copy/Paste:* Store the current modulation pattern in the Clipboard. Paste applies the modulation pattern currently found on the Clipboard.
  - *Delete Selected User Pattern:* Deletes the current user pattern.
  - *Custom:* This menu item is shown automatically when any pattern changes have been made. It can be considered the “current state” pattern preset.
  - *LFO:* Choose an LFO shape preset.
  - *App Patterns:* Choose a factory pattern preset.
- *Previous/Next buttons:* Tap the Previous button ⌃ to choose the preceding modulation pattern preset. Tap the Next button ⌄ to choose the next modulation pattern preset.
- *Value/Duration buttons:* Tap the Value button ↕ or tap the Duration button |↔| to limit editing to one direction.
  - *Value:* Limits edits to vertical changes, enabling you to adjust a step value without changing its length.
  - *Duration:* Limits edits to horizontal changes, enabling you to adjust a step length without changing its value.
- *More button:* Open a pop-up menu where you can choose an item that affects the modulation pattern. These include randomize, shift, reverse, and other functions.
  - *Random Full:* Apply full-range random offsets to modulation pattern step values. Use this command to create truly random modulation patterns.
  - *Random Deviation:* Apply limited-range random offsets to modulation pattern step values. Use this command to create slight variations of existing step values.
  - *Shift Left/Right:* Move all modulation pattern steps one position (a step) to the left or right. Steps at the first and last position “wrap around,” so step 16 would become step 1 if you used the Shift Right command on a 16-step modulation pattern.
  - *Double Note Length:* Doubles the length of all steps. Full-length steps are tied to the next step. Steps of 25% length become 50% length steps, 50% length steps become 100% length steps, and so on.
  - *Reverse:* Reverse the position of all steps. Step 1 becomes step 16, step 2 becomes step 15, step 3 becomes step 14, and so on in a 16-step modulation pattern.
  - *Invert:* Invert the level of all steps. A step with a level of 40% becomes a step with a level of 60%, a step with a level of 10% becomes a step with a level of 90%, a step with a level of 0% becomes a step with a level of 100%, and so on.

- *Append Duplicate:* Duplicate all active steps and copy them to the step immediately following the last step. For example, steps 1 to 10 would be copied to create a 20-step modulation pattern.
- *Append Reverse Duplicate:* Duplicate all active steps, reverse their order, then copy them to the step immediately following the last step. For example, steps 1 to 4 with values of 15, 20, 30, and 70 would be copied to create an 8-step modulation pattern with values of 15, 20, 30, 70, 70, 30, 20, and 15.

Display controls for step modulator in Step FX in Logic Pro for iPad

These parameters are available for each of the three step modulators. Tap a Select button to choose the modulator you want to edit. The active Select button is orange.

Also see the sections on Step FX modulator toolbar and playback controls.



Step modulator pattern display controls

- *Pattern display:* Use to change the modulation pattern length, edit the level and length of individual steps, tie steps, and to activate or deactivate steps.
- *Level/length bars:* Drag vertically to set the level/amount for each active step. Drag left to reduce step length. Drag right to increase step length or to create a tie to the next step. The currently playing step is brightly illuminated.
  - Where multiple level/length bars exist, drag across them to draw in the level of several steps.
  - Drag a level/length bar toward the left to reduce the step length. Drag to the right to increase the step length. This lets you create different grooves. Dragging snaps to fixed positions at 25%, 50%, 75%, or 100% of the step length. Hold down Shift, then drag to set the step length freely. Edits are reflected immediately in the display with a shaded bar that indicates the step length.
  - Drag a level/length bar toward the right until it overlaps the next step to create a tie to that step. If the step to the right is a rest (an inactive step), this step is automatically turned on to create the tie. A step can be tied to multiple steps in a row. The original velocity values of tied steps are replaced by the velocity of the first step they are tied to, indicated graphically by the level bar extending over all tied steps. Edits are reflected immediately in the display with a shaded bar that indicates the tie length.

    Tied steps are indicated by blue dots, connected by lines, on the step number buttons below the steps. To remove or create a tie, tap the line between two dots.

    Note: The Value ↕ and Duration |↔| buttons in the toolbar can affect the behavior of edits to level/length bars.

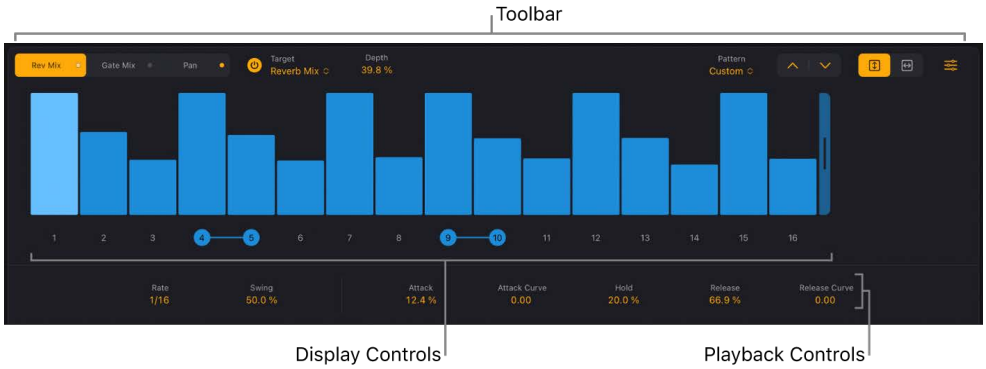
- *Pattern length handle:* Drag the handle to the right of the last step to change the modulation pattern length. A maximum of 128 steps is available for each modulator. Each modulation pattern can have a different length.
- *Step number buttons:* Tap to turn each of the available steps on or off. The associated number of inactive steps (and level/length) is dimmed. Active steps (and level/length) are illuminated. You can drag horizontally across multiple steps to reverse their current state. Any existing step length or level is restored if an inactive step is turned on. Tap between step numbers to create or remove a tie. Tied steps are indicated by blue dots connected by lines.
  - *If a step is turned on:* A step is triggered at the respective modulator position.
  - *If a step is turned off:* The modulator position is silent and is perceived as a rest.
- *Scroll bar:* Swipe left or right *below* the step number buttons to move to steps that are not visible in the display.

  Important: Take care to swipe *below* the step number buttons when scrolling, or you may accidentally create a number of ties across swiped steps.

Playback controls for step modulator in Step FX in Logic Pro for iPad

These parameters are independently available for *each* of the three step modulators. Tap a Select button to choose the modulator you want to edit. The active Select button is orange.

Also see the sections on Step FX modulator toolbar and display controls.



Step modulator playback controls

- *Rate field:* Drag vertically to set the speed of step modulator 1, 2, or 3.
- *Swing field:* Drag vertically to set the swing amount for step modulator 1, 2, or 3. Values over 0% increase the duration of odd-numbered steps (1, 3, 5, and so on) while decreasing even-numbered step lengths.
- *Envelope controls:* You can set an independent envelope shape for each step modulator. Values of the following parameters are expressed as a percentage of step length and apply to all steps in the selected modulation pattern.
  - *Attack field:* Drag vertically to set the envelope attack time for step modulator 1, 2, or 3.
  - *Attack Curve field:* Drag vertically to set the attack curve shape.
  - *Hold field:* Drag vertically to set the envelope hold time for step modulator 1, 2, or 3.

- *Release field:* Drag vertically to set the envelope release time for step modulator 1, 2, or 3.
- *Release Curve field:* Drag vertically to set the release curve shape.

Step FX global controls in Logic Pro for iPad

The Step FX global controls include the Effects order strip, which you can use to turn on or turn off individual effects and to reposition effects within the effects chain. The XY pad provides real-time control of up to four target parameters. Drag the gray control point to simultaneously modulate your targets. The parameters of the XY pad and the Master controls are described in the respective sections below.

Effects order strip

The order and status of active and inactive effects units are indicated in the strip. Inactive effects are dimmed, and active effects are illuminated. The signal flow runs from left to right.



Effects order strip: Drag the name of an active (lit) or inactive (dimmed) effect horizontally to change the effects order.

XY pad parameters



- *XY pad:* Drag the gray dot horizontally or vertically to change the value of the assigned X or Y target parameters.
- *Assign X and Y On/Off buttons:* Turn on or turn off the X or Y controller.
- *X Target 1/2 pop-up menus:* Choose one or two modulation targets from any active effect processor, modulation source, or Master control section.
- *X Depth 1/2 fields:* Set the modulation amount/range for the chosen X target(s).
- *Y Target 1/2 pop-up menus:* Choose one or two modulation targets from any active effect processor, modulation source, or Master control section.
- *Y Depth 1/2 fields:* Set the modulation amount/range for the chosen Y target(s).

Master controls

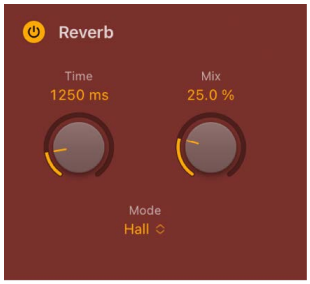


- *Input Gain knob and field:* Set the input level of the plug-in.
- *Mix knob and field:* Set the level of the original versus processed signal. This is essentially a wet/dry balance control.
- *Output knob and field:* Set the overall output level of the plug-in.

Step FX processors in Logic Pro for iPad

The parameters of all Step FX processors are described in the respective sections below.

Reverb parameters



A simple reverb unit that can add space to your parts.

- *Reverb On/Off button:* Turn on or turn off the reverb effect.
- *Time knob and field:* Set the length of the reverb tail.
- *Mix knob and field:* Set the level of the original versus reverb signal.
- *Mode pop-up menu:* Choose a reverb characteristic. Each option provides a different tonal color and response.

Multimode Filter parameters

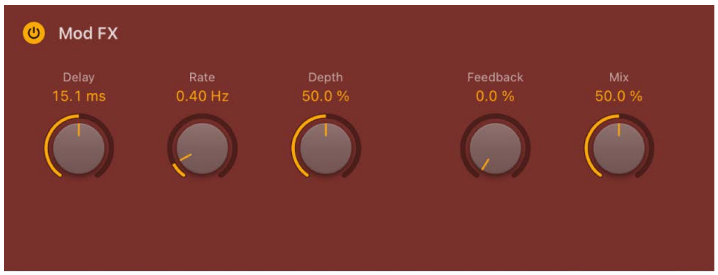


The filter unit provides dozens of filter types. See Step FX filter types.

- *Multimode Filter On/Off button:* Turn on or turn off the filter effect.
- *Cutoff knob and field:* Set the cutoff frequency for the filter. Higher frequencies are attenuated and lower frequencies are allowed to pass in a lowpass (LP) filter. The reverse is true in a highpass (HP) filter. When in a bandpass (BP) mode, cutoff determines the center frequency of the band that is allowed to pass. The comb and other filter types change the names and behaviors of the filter controls.
- *Resonance knob and field:* Boost or cut signals in the frequency band that surrounds the cutoff frequency. Very high Resonance values cause the filter to begin oscillating at the cutoff frequency. This self-oscillation occurs before you reach the maximum resonance value.
- *Type pop-up menu:* Choose a filter characteristic. Each option provides a different tonal color and response to the Cutoff and Resonance control values.

  Note: The chosen filter type can alter the names and functions of the default Cutoff and Resonance knobs.
- *Mix knob and field:* Set the level of the original versus filtered signal.

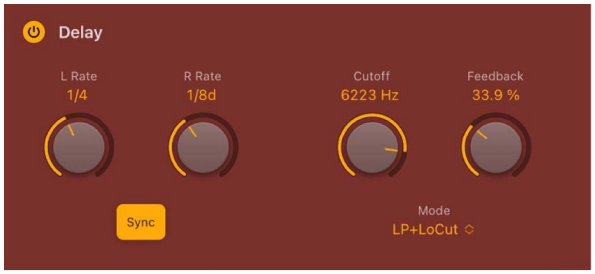
Mod FX parameters



The modulation FX unit provides chorus-like effects, ranging from soft through to heavy tone warping.

- *Mod FX On/Off button:* Turn on or turn off the Mod FX unit.
- *Delay knob and field:* Set the initial delay time.
- *Rate knob and field:* Set the LFO speed of the modulation effect.
- *Depth knob and field:* Set the intensity of the modulation effect.
- *Feedback knob and field:* Set the amount of the effect signal that is routed back to the input. Use high levels if you're going for weird sounds.
- *Mix knob and field:* Set the level of the original versus modulated signal. This is a modulation amount control.

Delay parameters



A syncable stereo delay unit with integrated filter. See Step FX filter types.

- *Delay On/Off button:* Turn on or turn off the delay effect.
- *L/R Rate knobs and fields:* Set the delay time in milliseconds or in beat/division values when synchronized with the project tempo.
- *Sync button:* Turn on to synchronize delay repeats with the project tempo. Turn off to set delay times freely. Set time/beat/division values with the Delay L/R Rate knobs.
- *Cutoff knob and field:* Set the cutoff frequency for the chosen filter type. This filters the selected frequencies from the overall signal.
- *Feedback knob and field:* Set the amount of feedback for the left and right delay signals. Higher values result in more delay repeats.
- *Mode pop-up menu:* Choose a lowpass (LP), bandpass (BP), highpass (HP), or lowpass/low cut hybrid (LP+LoCut) filter type.
- *Mix knob and field:* Set the level of the source versus delay signal.

Distortion parameters



The distortion unit can add color and a saturated tone to your parts.

- *Distortion On/Off button:* Turn on or turn off the distortion effect.
- *Exciter knob and field:* Set the amount of excitation. Exciter generates high frequency components that are not part of the original signal by introducing a nonlinear distortion.
- *Dirt knob and field:* Set the amount of this saturated, gritty distortion characteristic.

Step FX filter types in Logic Pro for iPad

Step FX provides dozens of filter types.

Step FX filter types: lowpass, bandpass, highpass

A lowpass (LP) filter passes the portion of a signal below a specified cutoff frequency and rolls off the portion above that frequency. A bandpass (BP) filter passes the portion of a signal occupying a band surrounding the cutoff frequency and rolls off the portions above and below that band. A highpass (HP) filter passes the portion of a signal above a specified cutoff frequency and rolls off the portion below that frequency.

There are multiple two-pole, four-pole, multi-pole state-variable and analog-modeled LP, BP, and HP filter designs in Step FX, each with distinctive characteristics that you may prefer for a given purpose. The available LP, BP, and HP filter designs include Smooth, Edgy, Rich, Sharp, Clean, and Gritty variants.

- *Sharp:* Two-pole analog-modeled filters.
- *Smooth:* Two- or multi-pole state-variable filters.
- *Edgy:* Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- *Rich:* Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- *Clean:* Bi-Quad filters. These filters have no Drive option.
- *Gritty:* Two-pole filters designed to saturate heavily at higher Resonance and Drive settings.

The two principal filter controls have standard functions for all filter types.

- *Cutoff:* Controls the filter cutoff frequency.
- *Resonance:* Controls the filter resonance or emphasis. Higher settings boost frequencies in the immediate vicinity of the cutoff frequency.

Step FX filter types: notch and peaking

A notch filter cuts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

- *Cutoff:* Sets the frequency of the cut band.
- *Resonance:* Controls the amount of attenuation.

A peaking filter boosts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

- *Cutoff:* Sets the frequency of the boosted band.
- *Resonance:* Controls the amount of boost. Higher values are generally the most effective.

Step FX filter types: comb filters

A comb filter mixes the original signal with one or more copies of the signal, which are delayed by a very short time interval. At some frequencies this mixture causes phase cancelations, while at other frequencies it causes reinforcements. The result is a spiky frequency spectrum with multiple resonant peaks. Graphically, these peaks resemble the teeth of a comb, which gives this filter type its name.

Step FX offers three comb filter designs, each with its own character. The best choice depends on your preference and the type of sound you're trying to create. That said, there are some distinguishing characteristics that may help guide you.

Comb Pos uses positive feedback on the delay lines, while Comb Neg uses negative feedback to produce less extreme effects, often with a hollow quality. These two are the less powerful combs and offer a much more gradual increase in resonance. They can be useful when you require either a less dramatic effect or you want to hear more of the exciter signal character in your sound. The latter point is noteworthy as this trait can be useful when you want a more naturalistic sound.

Comb PM uses bipolar feedback on the delay lines. The resonance control is bipolar, allowing you to freely shift from negative (hollow sound) on the left to positive (bright and peaky) on the right. This comb is useful for classic bright Karplus-Strong style sounds, where the exciter impulse is not easily heard and the comb is more prominent. Take care with your resonance level because it's capable of quickly going to extremes, which can lead to feedback. Start with a resonance level of zero and increase (or decrease) slowly to find a suitable effect strength.

- *Cutoff:* Controls the delay time in the comb circuit. Lower cutoff values equate to a longer delay.
- *Resonance:* Controls the frequency peaks in the comb-filtered spectrum.

  Note: Sending a percussive sound into a highly resonant comb filter causes it to ring at a frequency determined by the delay time you have set with the Cutoff knob.

Step FX filter types: ring modulation

Ring modulation is a process in which a modulator and a carrier signal are multiplied. Each frequency component of the modulator interacts with each frequency component of the carrier to produce two sidebands: a sum and a difference (carrier – modulator). When a filter is set to the RingMod type, the signal entering the filter acts as the modulator, while the carrier is supplied internally by the filter.

- *Cutoff:* Controls the carrier frequency.
- *Mix:* Applies a constant offset to the carrier.
  - At 0%, the carrier wave varies between –1 and +1, resulting in classic ring modulation.
  - At 100%, the carrier wave varies between 0 and 1, resulting in classic amplitude modulation. In this case, the carrier signal itself is present alongside the sum and difference sidebands.

Step FX filter types: distortion

Phat FX filters offer several distortion effects.

- Bitcrusher is a harsher-sounding digital effect.
- Dirt is a classic tube distortion effect.
- Downsampler is a lo-fi digital effect (similar to Bitcrusher but frequency dependent).
- Grit is a transistor distortion.

The filter controls work as follows when the filter type is set to a distortion effect:

- *Cutoff:* Sets the frequency for the Downsample distortion type.
- *Resonance:* Controls the intensity of the distortion effect.
- *Mix:* Controls the mix between clean and distorted signals. A 0% value results in the clean signal only. A 50% value results in an equal mix of clean and distorted signal. A 100% value results in the distorted signal only.

Pitch effects

Pitch effects in Logic Pro for iPad

You can use the pitch effects to transpose or correct the pitch of audio signals. These effects can also be used for creating unison or slightly thickened parts, or even for creating harmony voices.

You can also define a scale to automatically correct some, but not all, sung notes in a vocal performance, for example. This lets you effectively perfect an imperfect vocal take.

You can also use pitch correction effects creatively, modifying all pitched notes in a performance to a single pitch or a particular key.

Learn how you can use plug-ins.

User Guide conventions

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Pitch Correction effect

Pitch Correction effect in Logic Pro for iPad

You can use the Pitch Correction effect to fix the pitch of incoming audio signals. Improper intonation is a common problem with vocal tracks, for example. The sonic artifacts that can be introduced by the process are minimal and are almost silent when making moderate corrections.

Pitch correction works by accelerating and slowing down the audio playback speed, matching the input signal (sung vocal) with the correct note pitch. If you try to correct larger intervals, you can create special effects. Natural articulations of the performance, such as breath noises, are preserved.

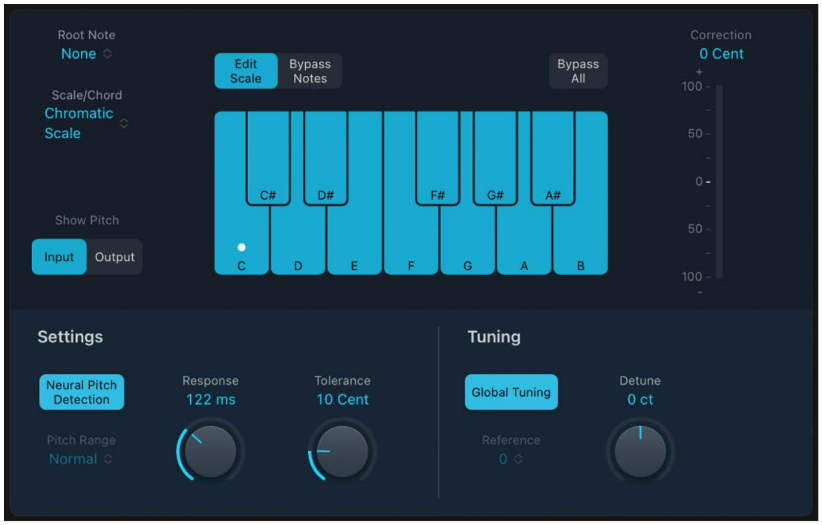
Any scale can be defined as a pitch reference (technically speaking, this is known as a *pitch quantization grid*). Improperly intonated notes are corrected in accordance with this scale.

The Pitch Correction effect can be fully automated. This means that you can automate the Scale/Chord and Root Note parameters to follow harmonies in the project. Depending on the accuracy of the original intonation, setting the appropriate key with the Scale/Chord parameter may suffice. Less precise intonations may need more significant changes to the Scale/Chord and Root Note parameters.

Note: Polyphonic recordings, such as choirs, and highly percussive signals with prominent noisy portions cannot be corrected to a specific pitch. Despite this, you may want to try the plug-in on some drum sounds, such as toms and congas because it can deliver interesting results.

To add Pitch Correction to your project, choose Pitch > Pitch Correction in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Pitch Correction effect parameters in Logic Pro for iPad



Pitch Correction parameters

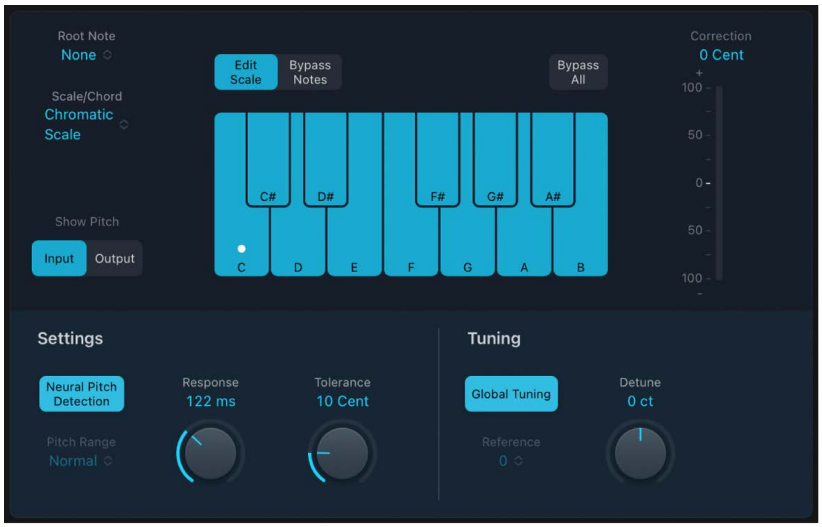
- *Root Note pop-up menu:* Choose the root note of the scale.
- *Scale/Chord pop-up menu:* Choose a pitch quantization grid.
- *Show Pitch buttons:* Show the pitch of the input or output signal, respectively, on the notes of the keyboard.
- *Edit Scale and Bypass Notes buttons:* Choose a mode that allows you to change the scale and/or exclude notes from pitch correction.
- *Bypass All button:* Quickly compare the corrected and original signals or audition automation changes.
- *Keyboard:* Tap a key to exclude the corresponding note from pitch quantization grids. This effectively removes this key from the scale, resulting in note corrections that are forced to the nearest available pitch (key). See Exclude notes from Pitch Correction.
- *Correction display:* Indicates the amount of pitch change. The marker indicates the average correction amount over a longer time period. You can use the display when discussing (and optimizing) the vocal intonation with a singer during a recording session.
- *Neural Pitch Detection button:* Turn on pitch detection to automatically detect the Pitch Range. You can turn it off to set the pitch range manually in the Pitch Range pop-up menu.
- *Pitch Range pop-up menu and field:* Choose a low or normal pitch range that is scanned (for notes that need correction). See Pitch Correction effect quantization.

  Note: When Neural Pitch Detection is turned on, it is not necessary to set Pitch Range manually.
- *Response knob and field:* Determine how quickly the voice reaches the corrected destination pitch.

  Singers use portamenti and other gliding techniques. If you choose a Response value that's too low, seamless portamenti turn into semitone-stepped glissandi, but the intonation is perfect. If the Response value is too high, the pitch of the output signal won't change quickly enough. The optimum setting for this parameter depends on the singing style, tempo, vibrato, and accuracy of the original performance.
- *Tolerance knob and field:* Set a zone around the core frequency where no correction takes place. A low value results in more extreme or faster corrections, and higher values allow for more pitch variation (for example, vibrato) to happen before any correction is applied.
- *Global Tuning button:* Turn on to use project Tuning settings for the pitch correction process. Turn off to manually set tuning with the Reference parameter. See Use Pitch Correction reference tuning.
- *Reference pop-up menu:* Set the reference tuning in cents (relative to the root).
- *Detune knob and field:* Detune the output signal by the set value.

Pitch Correction effect quantization in Logic Pro for iPad

The Neural Pitch Detection button should generally be left on to handle pitch tracking. When Neural Pitch Detection is turned off, you can use the Pitch Range pop-up menu to set the pitch range that is scanned. Normal is the default range and works for most audio material. Low should be used only for audio material that contains extremely low frequencies (below 100 Hz), which may result in inaccurate pitch detection. These parameters have no effect on the sound; they are simply optimized tracking options for the chosen target pitch range.



The Scale/Chord pop-up menu allows you to choose different pitch quantization grids. The default setting is the chromatic scale.

The user scale is the scale that is set manually with the onscreen keyboard in the plug-in. If you're unsure of the intervals used in any given scale, choose from the Scale/Chord pop-up menu and look at the onscreen keyboard. You can alter any note in the chosen scale by tapping the keyboard keys while in Edit Scale mode. Any such adjustments overwrite the existing user scale settings.

There is only one user scale per project. You can, however, create multiple user scales and save them as Pitch Correction plug-in settings files.

Tip: The Drone scale uses a fifth as a quantization grid, and the Single scale defines a single note. Neither of these scales is meant to result in realistic singing voices, but try them if aiming for interesting effects.

Choose the root note of the scale from the Root Note pop-up menu. You can freely transpose the major and minor scales and scales named after chords.

Exclude notes from Pitch Correction in Logic Pro for iPad

You can choose whether to edit the scale with the keyboard keys or to bypass notes with the keyboard keys.

When you first open the effect, all notes of the chromatic scale are selected. This means that every incoming note is altered to fit the next semitone step of the chromatic scale. If the intonation of the singer is poor, this might lead to notes being incorrectly identified and corrected to an unwanted pitch. For example, the singer may have intended to sing an E, but the note is actually closer to a D#. If you do not want the D# in the song, tap the D# key on the keyboard while in Edit Scale mode. The key will change from bright to dark blue to show that the note is no longer part of the scale. Because the original pitch was sung closer to an E than a D, it is corrected to an E.

Note: The settings made with the Pitch Correction effect onscreen keyboard are valid for all octave ranges. Individual settings for different octaves are not provided.

Bypass individual notes in a scale in the Pitch Correction effect

In the majority of working situations, you choose a scale from the Scale/Chord menu. You can also bypass individual notes by activating the Bypass Notes button, but this is a less common use case scenario.



- In Logic Pro, tap the Bypass Notes button.

  To exclude notes from correction, tap the keyboard keys.

  Bypassed notes are orange.

  This is particularly useful for “blue” notes. Blue notes are notes that slide between pitches, making the major and minor status of the keys difficult to identify. As you may know, one of the major differences between C minor and C major is the Eb (E flat) and Bb (B flat), instead of the E and B. Blues singers glide between these notes, creating an uncertainty or tension between the scales. Use of the bypass buttons allows you to exclude particular keys from changes, leaving them as they were.

Tip: It’s often best to correct only the notes with the most harmonic gravity. For example, choose Sus4 from the Scale/Chord pop-up menu, and match the project key with your Root Note pop-up menu selection. This limits correction to the root note, the fourth, and the fifth of the key scale. Bypass all other notes and only the most important and sensitive notes are corrected, while all other singing remains untouched.

Bypass all pitch correction in the Pitch Correction effect

Not all audio material can be effectively pitch corrected. In some cases, you may need to use pitch manipulation and automation features to process a portion of an audio performance.

- In Logic Pro, tap the Bypass All button to pass the input signal through unprocessed and uncorrected.

  This is useful for spot corrections to pitch through use of automation. Bypass All is optimized for near-instant, seamless operation in all situations.

Use Pitch Correction reference tuning in Logic Pro for iPad

Turn on the Global Tuning button to use Logic Pro Tuning settings for the pitch correction process. This ensures that all software instruments and your tuned vocal part are in tune with each other. See Tuning project settings.

If Global Tuning is turned off, you can use the Reference pop-up menu to set the reference tuning to the root key or note.

As an example of where choosing a value with the Reference pop-up menu can be effective, consider that the intonation of a vocal line is often slightly sharp or flat throughout an entire song. You can use the Reference pop-up menu to address this issue at the input of the pitch-detection process by setting it to reflect the constant pitch deviation in cent values. This allows for more accurate pitch correction.

Note: Tunings that differ from software instrument tuning can be interesting when you want to individually correct the notes of singers in a choir. If all voices are individually and perfectly corrected to the same pitch, the choir effect is partially lost. You can prevent this by (de)tuning the pitch corrections individually.

Pitch Shifter

Pitch Shifter in Logic Pro for iPad

Pitch Shifter provides a simple way to combine a pitch-shifted version of the signal with the original signal. See Use Pitch Shifter.

To add Pitch Shifter to your project, choose Pitch > Pitch Shifter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Pitch Shifter parameters

- *Semitones knob and field:* Set the pitch shift value in semitones.
- *Cents knob and field:* Control detuning of the pitch shift value in cents (1/100th of a semitone).
- *Mode pop-up menu:* Choose an algorithm to determine how timing is derived.
  - *Drums:* Maintains the groove (rhythmic feel) of the source signal.
  - *Speech:* Provides a balance between both the rhythmic and harmonic aspects of the signal. This is suitable for complex signals such as spoken-word recordings, rap, and hybrid signals such as rhythm guitar.
  - *Vocals:* Retains the intonation of the source, making it well-suited for signals that are inherently harmonic or melodious, such as string pads.
  - *Manual:* Uses the settings of the Delay, Crossfade, and Stereo Link parameters.
  - *Pitch Tracking:* Follows the pitch of incoming audio material.

Note: The Delay and Crossfade parameters are active only when Manual is chosen from the Mode pop-up menu.

- *Delay knob and field:* Set the amount of delay applied to the input signal. The lower the frequencies of the input signal, the higher (longer) a delay time is required—to effectively pitch shift the signal.
- *Crossfade knob and field:* Set the range (shown as a percentage of the original signal) used to analyze the input signal.
- *Mix control and field:* Set the balance between the effect and original signals.
- *Latency Compensation button:* Turn on to compensate for delays that may be introduced by some algorithms with particular types of source material.
- *Stereo Link buttons:* Normal retains the source stereo signals. Invert swaps (inverts) stereo channel signals, with right channel processing occurring on the left, and vice versa.

Use Pitch Shifter in Logic Pro for iPad

Pitch Shifter is used most effectively when you take a structured approach.

Use pitch shifting

1. In Logic Pro, you can set the amount of transposition, or pitch shift with the Semitones knob.
2. To set the amount of detuning, alter the Cents knob value.
3. Choose the algorithm that best matches the material you're working with from the Mode pop-up menu.

   If you're working with material that does not fit any of these categories, experiment with each of the algorithms (starting with Speech), then compare the results and use the one that best suits your material.

   Tip: While auditioning and comparing different settings, temporarily set the Mix parameter to 100% because this makes Pitch Shifter artifacts easier to hear.

Vocal Transformer

Vocal Transformer in Logic Pro for iPad

Vocal Transformer can be used to transpose the pitch of a vocal line, to augment or diminish the range of the melody, or even to reduce it to a single note that mirrors the pitches of a melody. No matter how you change the pitches of the melody, the constituent parts of the signal (formants) remain the same.

You can shift the formants independently, which means that you can turn a vocal track into a Mickey Mouse voice, while maintaining the original pitch. Formants are characteristic emphases of certain frequency ranges. They are static and do not change with pitch. Formants are responsible for the specific timbre of a given human voice.

Vocal Transformer is well suited to extreme vocal effects. The best results are achieved with monophonic signals, including monophonic instrument tracks. It is not designed for polyphonic voices—such as a choir on a single track—or other chordal tracks.

See Vocal Transformer parameters and Use Vocal Transformer.

To add Vocal Transformer to your project, choose Pitch > Vocal Transformer in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Vocal Transformer parameters in Logic Pro for iPad

Vocal Transformer includes the following parameters.



Vocal Transformer parameters

- *Pitch knob and field:* Determine the amount of transposition applied to the input signal. See Use Vocal Transformer.
- *Fine Pitch knob and field:* Detune the input signal by the set value. This parameter is of particular benefit when automated.
- *Glide knob and field:* Determine the time vocal transformation takes, allowing sliding transitions to the set Pitch value.
- *Formant knob and field:* Shift the formants of the input signal.
- *Grain Size knob and field:* The effect algorithm is based on granular synthesis. Drag to set the size of the grains and thus affect the precision of the process. Experiment to find the best setting. Try Auto first.
- *Formants pop-up menu:* Choose how Vocal Transformer processes formants.
  - *Process always:* All formants are processed.
  - *Keep unvoiced formants:* Only voiced formants are processed. This retains sibilant sounds in a vocal performance and produces a more natural-sounding transformation effect with some signals.

- *Pitch Base knob and field:* Available only in Robotize mode. Transpose the note that the Tracking parameter is following.
- *Pitch Tracking knob and field:* Available only in Robotize mode. Control how the melody is changed.
- *Robotize button:* Turn Robotize mode on or off. This mode is used to augment, diminish, or mirror the melody.
- *Mix control and field:* Define the level ratio between the original (dry) and effect signals.

Use Vocal Transformer in Logic Pro for iPad

You can change the pitch of performances, inclusive of, or independent from, formants. Robotize mode can augment or diminish the melody.

Use the Vocal Transformer Pitch and Formant parameters

- In Logic Pro, rotate the Pitch knob to transpose the pitch of the signal upward or downward. Adjustments are made in semitone steps.

  Transpositions of a fifth upward (Pitch = +7), a fourth downward (Pitch = –5), or by an octave (Pitch = ±12) are the most useful harmonically.

  As you alter the Pitch parameter, you might notice that the formants don't change.

  The Pitch parameter is expressly used to change the pitch of a voice, not its character. If you set negative Pitch values for a female soprano voice, you can turn it into an alto voice without changing the specific character of the singer's voice.
- To shift the formants while maintaining—or independently altering—the pitch, rotate the Formant knob. If you set this parameter to positive values, the singer sounds like Mickey Mouse. By altering the parameter downward, you can achieve vocals reminiscent of Darth Vader.

  Tip: If you set Pitch to 0 semitones, Mix to 50%, and Formant to +1 (with Robotize turned off), you can effectively place a singer (with a smaller head) next to the original singer. Both will sing with the same voice, in a choir of two. This doubling of voices is quite effective, with levels easily controlled by the Mix parameter.

Use Vocal Transformer Robotize mode

1. In Logic Pro, tap the Robotize button to turn on Robotize mode. In this mode, Vocal Transformer can augment or diminish the melody.
2. You can control the intensity of this processing with the Pitch Tracking knob.
   - Set the knob to –100%. All intervals are mirrored.
   - Set the knob to 0%. Delivers interesting results, with every syllable of the vocal track being sung at the same pitch. Low values turn sung lines into spoken language.
   - Set the knob to 100%. The range of the melody is maintained. Higher values augment, and lower values diminish, the melody.
   - Set the knob to 200%. The intervals are doubled.

   The Pitch Base parameter is used to transpose the note that the Pitch Tracking parameter is following. For example, with Pitch Tracking set to 0%, the pitch of the (spoken) note is transposed to the chosen base pitch value.

Reverb effects

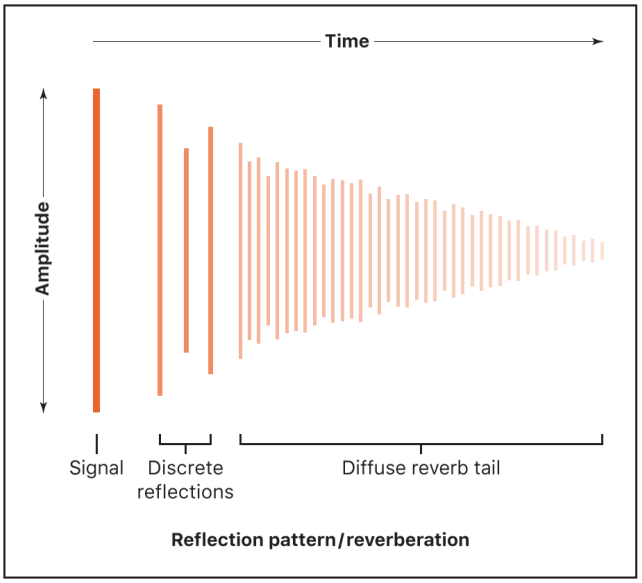
Reverb effects in Logic Pro for iPad

You can use reverb effect plug-ins to simulate the sound of acoustic environments such as rooms, concert halls, cathedrals, or caverns.

Learn how you can use plug-ins.

Sound waves repeatedly bounce off the surfaces—walls, ceilings, windows, and so on—of any space, or off objects within a space, gradually losing signal strength through absorption until they are inaudible. These bouncing sound waves result in a reflection pattern, more commonly known as a reverberation (or *reverb*).

The starting portion of a reverberation signal consists of a number of discrete reflections that you can clearly distinguish before the diffuse reverb tail builds up. These early reflections are essential in human perception of spatial characteristics, such as the size and shape of a room.



Rooms, plates, digital reverb effects, and convolution reverbs

The first form of added reverb used in music production was in 1947 when engineer Bill Putnam used a bathroom next to the recording studio as an echo chamber. Later, many studios had a purpose-built room with hard surfaces to function as a dedicated echo chamber. It was used to add realistic room information to the signal.

Starting in the 1950s, mechanical devices, including metal plates and springs, were used to add reverberation to the signal of musical instruments and microphones.

It's also possible to replicate how sound waves behave in different acoustic environments using algorithmic reverb technology. These digital reverbs are used since the 1970s. They consist of thousands of delays of varying lengths and intensities. The time differences between the original signal and the arrival of the early reflections can be adjusted by a parameter known as predelay. The average number of reflections in a given period of time is determined by the density parameter. The regularity or irregularity of the density is controlled with the diffusion parameter. Included among the digital reverbs in Logic are the unique EnVerb, SilverVerb, and ChromaVerb.

The Quantec Room Simulator, introduced in 1982, represents a special type of algorithmic reverb that simulated the resonant modes of natural spaces, offering highly accurate and realistic reverbs. The Quantec Room Simulator plug-in uses the original code of that algorithm, providing two reverb models, QRS and YardStick.

Computers made it possible to sample and analyze the reverb characteristics of real spaces using convolution reverbs that became available beginning of 2000. These room characteristic sample recordings are known as impulse responses. Convolution reverbs work by combining an audio signal (your recording) with the impulse response recording of reverb characteristics for a given space. Space Designer was one of the first convolution reverbs.

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ChromaVerb

ChromaVerb in Logic Pro for iPad

ChromaVerb features fourteen discrete room type algorithms.

The fundamental approach behind ChromaVerb diverges from other methods of reverb creation. It is based on the principle of a circular structure in which the sound is gradually absorbed, much like in a real room. The absorption characteristics are dependent on the chosen room type and reverb parameter settings.

Each room type offers a unique tonal color, ranging from dense rooms to wide spaces and large halls.

The ChromaVerb interface is divided into several sections.

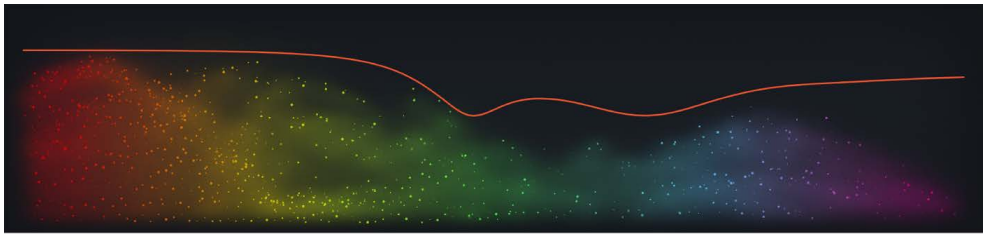
- *Display and Damping EQ parameters:* A visualization of the reverb output is overlaid with a Damping EQ curve. See ChromaVerb display and Damping EQ.
- *Main parameters:* Shows common reverb parameters such as Attack, Size, Density, Distance, and Decay.
- *Details parameters:* You can use advanced parameters such as Width, Quality, and Modulation to alter reverb characteristics.
- *EQ parameters:* You can use Output EQ controls to shape the ChromaVerb output signal.

To add ChromaVerb to your project, choose Reverb > ChromaVerb in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



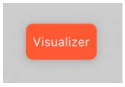
ChromaVerb display and Damping EQ in Logic Pro for iPad

The Damping equalizer curve is overlaid in the graphic display when the Visualizer button is active.



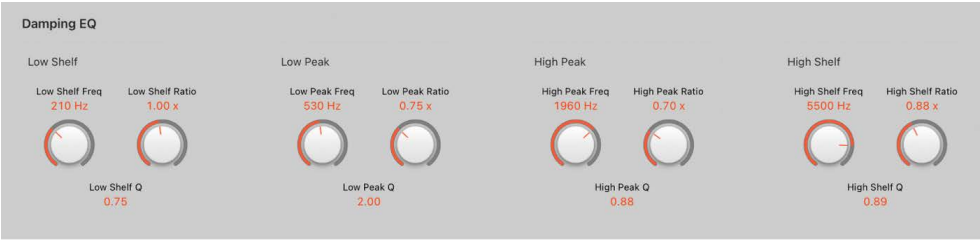
ChromaVerb display parameters

- *Visualizer button:* Turn on or turn off the real time visualization in the graphic display.



- *Graphic display:* Shows a real time visualization of changes to Damping EQ curve values and the incoming signal.

ChromaVerb Damping EQ parameters



The Damping EQ adjusts the frequencies of the decay signal. It is divided into four bands, with independent High and Low Shelf EQ bands, and two Peak EQ bands.

- *Low Shelf EQ:* Adjust the ratio of the low shelving band in the Damping EQ.
  - *Low Shelf Freq knob and field:* Set the Damping EQ band center frequency. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Shelf Ratio knob and field:* Set the Decay parameter timing ratio of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Shelf Q field:* Drag vertically to set the band width surrounding the center frequency of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad.
- *Low Peak EQ:* Adjust the ratio of the low peak band in the Damping EQ.
  - *Low Peak Freq knob and field:* Set the Damping EQ band center frequency. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Peak Ratio knob and field:* Set the Decay parameter timing ratio of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Peak Q field:* Drag vertically to set the band width surrounding the center frequency of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad.
- *High Peak EQ:* Adjust the ratio of the high peak band in the Damping EQ.
  - *High Peak Freq knob and field:* Set the Damping EQ band center frequency. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Peak Ratio knob and field:* Set the Decay parameter timing ratio of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Peak Q field:* Drag vertically to set the band width surrounding the center frequency of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad.

- *High Shelf EQ:* Adjust the ratio of the high shelving band in the Damping EQ.
  - *High Shelf Freq knob and field:* Set the Damping EQ band center frequency. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Shelf Ratio knob and field:* Set the Decay parameter timing ratio of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Shelf Q field:* Drag vertically to set the band width surrounding the center frequency of the Damping EQ band. You can also tap the field to enter a value in the numeric keypad.

ChromaVerb main controls in Logic Pro for iPad

The main section contains the most commonly used ChromaVerb parameters.



ChromaVerb main parameters

- *Room Type pop-up menu:* Choose the type of reverb space you want to recreate. See ChromaVerb room types.
- *Freeze button:* Turn on to recirculate the signal infinitely inside the chosen room type.
- *Predelay knob and field:* Set the time between the start of the original signal and the arrival of the early reflections. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.

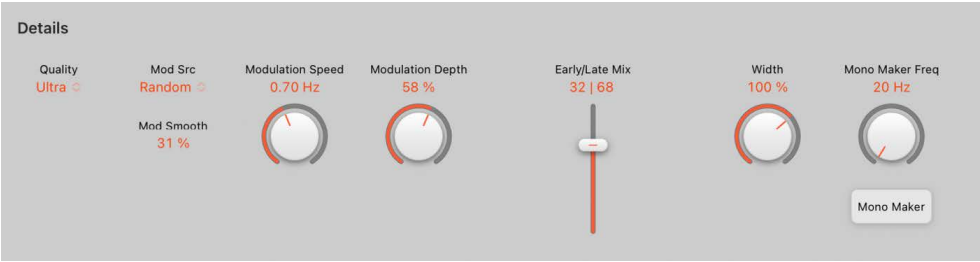
  A short predelay setting tends to push sounds away and longer predelay settings tend to bring sounds more to the forefront.

  An extremely short predelay setting can color the sound and make it difficult to pinpoint the position of the signal source. A very long predelay setting can be perceived as an unnatural echo and can divorce the original signal from its early reflections, leaving an audible gap between them. An optimal predelay setting depends on the type of input signal—or more precisely, the envelope of the input signal. Percussive signals generally require shorter predelays than signals where the attack fades in gradually. A good working method is to use the longest possible Predelay value before you start to hear side effects, such as an audible echo. When you reach this point, reduce the Predelay setting slightly.
- *Predelay Sync button:* Turn on to restrict Predelay values to divisions synchronized with the host application tempo.

- *Decay Time knob and field:* Set the decay time. The decay for certain frequencies is dependent on damping parameter values. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Decay Time Sync button:* Turn on to restrict Decay values to divisions synchronized with the host application tempo.
- *Attack knob and field:* Set the attack phase of the reverb. This affects either the volume or the density build-up time, depending on the chosen room type. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - For the following room types the Attack parameter increases volume over time: Theatre, Dense Room, Smooth Space, Reflective Hall, Strange Room, Airy.
  - For the following room types the Attack parameter sets the amount of time it takes for the reverb to reach the maximum density value, determined with the Density knob: Room, Chamber, Concert Hall, Synth Hall, Digital, Dark Room, Vocal Hall, Bloomy.
- *Size knob and field:* Determine the dimensions of the room. Higher values correspond to a larger space. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Density knob and field:* Adjust the density of the early and late reflections simultaneously, depending on room type. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Distance knob and field:* Set the perceived distance from the source by altering early and late energy. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Dry control and field:* Independently set the level of the source signal. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Wet control and field:* Independently set the level of the effect signal. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.

ChromaVerb details controls in Logic Pro for iPad

The Details section contains advanced ChromaVerb parameters and modulation options.



ChromaVerb details and modulation parameters

- *Quality pop-up menu:* Choose a quality level. Low produces a grainy reverb with noisy modulation. High sounds clean and precise. Ultra delivers a smooth, expensive-sounding reverb.
- *Mod Src pop-up menu:* Choose a sine, random, or noise waveform for the LFO.
- *Mod Smooth field:* Drag vertically to change the shape of the LFO waveform. The random waveform is smoothed and the sine and noise waveforms are saturated. You can also tap the field to enter a value in the numeric keypad.
- *Mod Speed knob and field:* Set the speed of the built in LFO. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Mod Depth knob and field:* Set the depth of LFO modulation. The range is determined by the chosen room type.
- *Early/Late Mix slider and field:* Set the level of early and late reflections. These vary depending on the Distance parameter value. See main window controls. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Width knob and field:* Set the stereo width of the reverb. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *MonoMakerFreq knob and field:* Set a frequency below which stereo information is removed. This compensates for perceived level losses in the overall low frequency range. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
- *Mono Maker button:* Turn on to remove stereo information below the frequency set with the MonoMakerFreq knob.

ChromaVerb Output EQ in Logic Pro for iPad

ChromaVerb features a built-in six band Output EQ.



ChromaVerb Output EQ parameters

- *Output EQ On/Off button:* Turn on or turn off the Output EQ, to adjust the frequencies of the overall combined reverb and source signal.
- *Low Cut On/Off button:* Turn on a highpass filter that allows high frequencies to pass and cuts the level of low frequencies below the set frequency.
  - *Low Cut Freq knob and field:* Set the frequency of the selected EQ band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Cut Order knob and field:* Set the order (filter slope) for the Low Cut EQ band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Cut Q field:* Set the Q factor—the width—for the Low Cut band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band. Drag vertically to set the band width surrounding the center frequency of the selected EQ band. You can also tap the field to enter a value in the numeric keypad.
- *Low Shelf On/Off button:* Turn on the low shelving filter to increase or decrease the frequencies below/above the Frequency value.
  - *Low Shelf Freq knob and field:* Set the frequency of the Low Shelf band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Shelf Gain knob and field:* Set the level of the Low Shelf band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Shelf Q field:* Set the Q factor—the width—for the Low Shelf band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.
- *Low Peak On/Off button:* Switch on a low parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *Low Peak Freq knob and field:* Set the frequency of the Low Peak band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Peak Gain knob and field:* Set the level of the Low Peak band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *Low Peak Q field:* Set the Q factor—the width—for the Low Peak band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band. Drag vertically to set the band width surrounding the center frequency of the selected EQ band. You can also tap the field to enter a value in the numeric keypad.

- *High Peak On/Off button:* Switch on a high parametric filter with three controls. Frequency sets a center frequency. Q sets the width of the frequency band around the center frequency. Gain sets the level of the band.
  - *High Peak Freq knob and field:* Set the frequency of the High Peak band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Peak Gain knob and field:* Set the level of the High Peak band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Peak Q field:* Set the Q factor—the width—for the High Peak band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band. Drag vertically to set the band width surrounding the center frequency of the selected EQ band. You can also tap the field to enter a value in the numeric keypad.
- *High Shelf On/Off button:* Switch on a high shelving filter that adjusts the level of high frequencies and has a minimal impact on frequencies below the cutoff (set) frequency.
  - *High Shelf Freq knob and field:* Set the frequency of the High Shelf band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Shelf Gain knob and field:* Set the level of the High Shelf band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Shelf Q field:* Set the Q factor—the width—for the High Shelf band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band. Drag vertically to set the band width surrounding the center frequency of the selected EQ band. You can also tap the field to enter a value in the numeric keypad.
- *High Cut On/Off button:* Turn on a lowpass filter that allows low frequencies to pass and cuts the level of high frequencies above the set frequency.
  - *High Cut Freq knob and field:* Set the frequency of the High Cut band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Cut Order knob and field:* Set the order (filter slope) for the High Cut band. You can also tap the field to enter a value in the numeric keypad. Double tap to reset to the default value.
  - *High Cut Q field:* Set the Q factor—the width—for the High Cut band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band. Drag vertically to set the band width surrounding the center frequency of the selected EQ band. You can also tap the field to enter a value in the numeric keypad.

ChromaVerb room types in Logic Pro for iPad

The chosen room type defines the basic color of the reverb and determines the ranges in which controls operate. It also sets the absorption characteristics of the space and determines how the Size, Density, and other parameters behave.

Room Type	Description
Room	Natural-sounding room with a rapid build-up of dense reflections.
Chamber	A punchy reverb that emulates a small to medium room. It has a fast attack and high echo density with low coloration.
Concert Hall	A large space with long delays in the initial sound, a slow build, minimal high end response, and moderate diffusion build.
Theater	A medium to large dry room with medium reflection density.
Synth Hall	Wider than the Room model with the sparsest reflections of all room types.
Digital	A medium room with midrange reflection density. It has a slower attack than the Room model. The decay is brighter and creates a lush-sounding chorus-like reverb. It has a dense reverb tail, with extended high and low response.
Dark Room	A small to medium sized, dark sounding, less dense room reverb.
Dense Room	A small room with a dense reflection pattern that builds very quickly.
Smooth Space	Smooth sounding reverb that emulates a medium size space.
Vocal Hall	A medium to large, smooth vocal hall with a midrange number of reflections.
Reflective Hall	A medium to large, highly reflective hall reverb with a low reflection density.
Airy	A large space with sparse reflections.
FX - Strange Room	A medium space with midrange reflection density and a distinct color.
FX - Bloomy	A large space reverb with moderate reflection density that creates blooming decays.

EnVerb in Logic Pro for iPad

EnVerb is a versatile reverb effect with a unique feature: it allows you to adjust the envelope—the shape—of the diffuse reverb tail.

- *Delay parameters:* These controls determine the timing of the dry signal and the first reflection.
- *Envelope parameters:* You can adjust levels over time (the envelope) of the reverb. You can control the delay time of the original signal and can change the reverb tail over time.
- *Reverberator parameters:* You can shape the sound of the reverb signal. You can split the incoming signal into two bands with the Crossover parameter and can set the low frequency band separately.
- *Output parameters:* These controls set the overall output level.

To add EnVerb to your project, choose Reverb > EnVerb in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



EnVerb Delay and Envelope parameters

- *Dry Signal Delay knob and field:* Determine the delay of the original signal. Set a suitable level with the Dry slider in the Mix section.
- *Predelay knob and field:* Set the time between the original signal and the start point of the reverb attack phase—the very beginning of the first reflection.
- *Attack slider and field:* Set the time it takes for the reverb to climb to its peak level.
- *Decay slider and field:* Set the time it takes for the level of the reverb to drop from its peak to the sustain level.
- *Sustain slider and field:* Set a constant reverb level for the sustain phase. It is expressed as a percentage of the full-scale volume of the reverb signal.
- *Hold slider and field:* Set the duration of the reverb sustain phase.
- *Release slider and field:* Set the time it takes for the reverb to fade out completely, after the sustain phase.

EnVerb Reverberator and Output parameters

- *Density knob and field:* Set the reverb density.
- *Spread knob and field:* Control the width of the reverb stereo image. At 0% the effect generates a monaural reverb. At 200% the stereo base is artificially expanded.
- *Low Freq Level knob and field:* Set the relative level of (reverb signal) frequencies below the crossover frequency. In most cases you get better-sounding results when you set negative values for this parameter.
- *Crossover knob and field:* Set the frequency used to split the input signal into two frequency bands for independent processing.
- *High Cut knob and field:* Filter reverb tail frequencies above the value set with the Crossover knob.
- *Dry/Wet controls and fields:* Determine the balance between the effect (wet) and direct (dry) signals.

Quantec Room Simulator

Quantec Room Simulator in Logic Pro for iPad

The Quantec QRS (Quantec Room Simulator), introduced in the early 1980s, is a groundbreaking digital reverb renowned for its ability to create natural and transparent reverbs that convincingly simulate real acoustic spaces. Utilizing a newly developed algorithm, the QRS avoided the harsh, metallic artifacts common in other digital reverbs of its time. This made it a preferred choice for film scoring, television production, and music recording calling for realistic sound.

The QRS quickly became a favorite in the music industry, embraced by top artists and studios for its ability to push the boundaries of spatial sound. The QRS's Freeze feature was particularly popular, allowing musicians to layer voices and create an organic, infinite reverb that added depth and texture. This feature helped shape the sound of entire albums, making the QRS a crucial tool for music production professionals and artists. Its realistic and immersive sound became a distinctive element in the creation of many iconic records.

In the late 1990s, Quantec introduced the YardStick 2402, featuring an updated QRS algorithm in a fully digital format. The YardStick embodied the evolution of the Quantec Room Simulator, retaining the legendary QRS algorithm at its core. This line was further refined in 2008 with the YardStick 249x series, which leveraged advancements in signal-processing technology to offer improved room simulation and more accurate spatial modeling. The YardStick delivers a natural and immersive reverb experience and is designed for seamless integration into modern studio setups, with contemporary I/O options and control interfaces. Its versatility makes it a favorite in post-production, capable of handling everything from intimate rooms to vast concert halls.

Today, the Quantec Room Simulator plug-in contains both the QRS and the YardStick models, which use the original algorithms from the hardware. You can use it to incorporate the Quantec Room Simulator into your projects with ease, utilizing its transparent sound to create space and depth and to enhance your tracks with atmosphere.

To add Quantec Room Simulator to your project, choose Reverb > Quantec Room Simulator in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

QRS model controls in Logic Pro for iPad

The QRS model remains a significant development in algorithmic reverb technology. It was one of the first digital reverberation units to use complex algorithms to accurately simulate the acoustic properties of various environments.

The QRS has three different features to create various reverb effects:

- *Reverb:* This traditional reverb effect replicates the natural acoustics of a room, incorporating early reflections and a reverb tail, all controlled by eight parameters.
- *Freeze:* This feature lets you capture a snapshot of the reverb tail and loop it for any length of time, giving the effect of the sound being trapped in the room. It's ideal for creating ambient textures and soundscapes.
- *Enhance:* Instead of creating a typical reverb tail, Enhance creates a dense cluster of reflections that improves the clarity and spatial quality of the source signal. This feature can also be used to transform mono signals into a stereo image or to produce a binaural effect.



QRS main parameters

- *Quantec logo:* Tap the logo to open the Quantec Room Simulator information window, which provides details about the inventor and the development of the QRS and YardStick reverbs.
- *Reverb model buttons:* Select a reverb model: QRS or YardStick. The QRS is the original classic vintage unit, and the YardStick represents the evolution and modernization of Quantec's reverb technology.
- *Reverb Time knob and field:* Adjust the reverb duration in conjunction with the Room Size control. The ring around the knob displays the reverb time range based on the chosen room size.
- *Freeze button:* Tap the Freeze button to capture and sustain the reverb tail, an ideal way to create organic soundscapes. Once captured, the audio routes only through Freeze, bypassing the main reverb.
- *Add button:* Touch and hold to capture another portion of the reverb tail. How long you hold determines how much audio is captured and added to the existing freeze effect. Repeat to layer sounds.
- *Clear button:* Tap to clear the audio captured in the Freeze effect.
- *Enhance button:* Turn the Enhance effect on/off for the QRS model. It replaces the reverb tail with a dense reflection cluster, adding spatial depth. Adjust the effect using the Room Size parameter. While Enhance is turned on, the reverb time parameters are dimmed and inaccessible.

- *In meter:* Displays the level of the incoming audio signal sent to the reverb effect. This helps monitor signal strength and prevent distortion in the source signal feeding the reverb.
- *Out meter:* Displays the combined output level of all signals within the plug-in.

QRS reverb time multiplier parameters

The multiplier curve is used to adjust and visualize the room's reverb response across the frequency spectrum. This feature lets you create either brighter or darker reverbs, simulating rooms with more reflective or absorbent walls.

The graph shows reverb time on the y-axis. The right scale reflects the reverb time, which changes with the reverb time knob. Two control points adjust reverb time for low frequencies (below 500 Hz) and high frequencies (above 1 kHz) relative to the set reverb time. The left scale indicates this factor, ranging from a maximum increase of 10 x to a decrease of 0.1 x.

These multipliers offer control over the reverb tail's frequency response, achieving a natural room reverb effect that can't be replicated with EQ alone.



- *Low control point and field:* Set the multiplier for the reverb time to affect low frequencies. Adjust it by dragging the control point or by dragging up or down in the value field.
- *High control point and field:* Set the multiplier for the reverb time to affect high frequencies. Adjust it by dragging the control point or by dragging up or down in the value field.

QRS primary parameters



- *Primary button:* Access frequently used reverb settings.
- *Room Size slider and field:* Set the room dimensions in cubic meters, from 1 m³ to 1,000,000 m³. Changing this parameter also adjusts the range of the Reverb Time knob.
- *1st Reflection Delay slider and field:* Adjust the time between the direct sound and the first reflection to influence the spatial perception of the room.

- *Reverb Delay slider and field:* Increasing the Reverb Delay value introduces a delay between the source signal and the reverb onset. Use this parameter to add up to 200 ms of delay, affecting spatial perception and timing in the mix.
- *Dry Level slider and field:* Set the level of the dry signal at the plug-in output independently from the first reflection and the reverb tail.
- *1st Reflection Level slider and field:* Set the level of the first reflection at the plug-in output independently from the dry signal and the reverb tail. Raising the level adds intimacy and presence, and lowering it creates a more open, spacious feel, shaping the reverb's depth.
- *Reverb Level slider:* Set the level of the reverb tail at the plug-in output independently from the dry signal and the first reflection.

QRS secondary parameters



- *Secondary button:* Access additional settings for detailed adjustments and fine-tuning options. Note that this button and its settings are unavailable when using the Quantec Room Simulator on a mono channel strip.
- *AD/DA Converters button:* Turn the emulation of the original QRS hardware converters on or off; these converters are known for their distinctive sonic character when overdriven.
- *AD/DA Converters Drive slider:* Add up to 30 dB of gain to recreate the character of 1980s QRS digital converters and hardware, from subtle saturation to harsh clipping, with automatic gain compensation for consistent output levels.
- *1st Reflection Source pop-up menu:* Set the channel assignment for the output of the first reflection. Maintain the original order (L R) or swap the left and right channels (R L).
- *1st Phase Reverse button:* Turn on to reverse the phase of the 1st Reflection audio output in relation to the dry and reverb signals.

YardStick controls in Logic Pro for iPad

The YardStick model builds upon the QRS model with updated algorithms that enhance the accuracy of acoustic simulations and provide more precise control over reverb characteristics. It includes improved controls for early reflections, diffusion, and modulation. This design supports more dynamic and evolving reverb effects, allowing for the creation of complex reverb tails with greater depth and richness.

The main view of the YardStick contains the most commonly used parameters.



YardStick main parameters

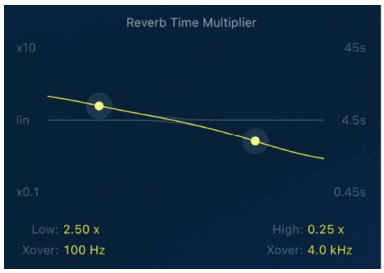
- *Quantec logo:* Tap the logo to open the Quantec Room Simulator information sheet, which provides details about the inventor and the development of the QRS and YardStick reverbs.
- *Reverb model buttons:* Select a reverb model: QRS or YardStick. The QRS is the original classic vintage unit, and the YardStick represents the evolution and modernization of Quantec's reverb technology.
- *Reverb Time knob and field:* Adjust the reverb duration in conjunction with the Room Size control. The ring around the knob displays the reverb time range based on the chosen room size.
- *Freeze button:* Use Freeze to capture and sustain the reverb tail, an ideal way to create organic soundscapes. Once captured, the audio routes only through Freeze, bypassing the main reverb.
- *Add button:* Touch and hold to capture another portion of the reverb tail. How long you hold determines how much audio is captured and added to the existing freeze effect. Repeat to layer sounds.
- *Clear button:* Tap to clear the audio captured in the Freeze effect.
- *Mode pop-up menu:* Choose from three levels of reverb complexity: Complex offers rich, detailed reflections for immersive sound; Medium provides balanced, natural reverberation; Simple delivers a subtle effect.
- *In meter:* Displays the level of the incoming audio signal sent to the reverb effect. This helps monitor signal strength and prevent distortion in the source signal feeding the reverb.
- *Out meter:* Displays the combined output level of all signals within the plug-in.

YardStick reverb time multiplier parameters

The multiplier curve is used to adjust and visualize the room's reverb response across the frequency spectrum. Additionally, the YardStick provides precise control over the crossover points between low and high frequencies, giving you more flexibility in shaping the overall sound. This feature lets you create either brighter or darker reverbs, simulating rooms with more reflective or absorbent walls.

The graph shows frequency on the x-axis and reverb time on the y-axis. The right scale reflects the reverb time, which changes with the Reverb Time knob. Two control points adjust reverb time for low frequencies (below 1 kHz) and high frequencies (above 1 kHz) relative to the set reverb time. The left scale indicates this factor, ranging from a maximum increase of 10 x to a decrease of 0.1 x.

These multipliers offer precise control over the reverb tail's frequency response, achieving a natural room reverb effect that can't be replicated with EQ alone.



- *Low and Xover control point and fields:* Drag the control point vertically to adjust the reverb time multiplier for low frequencies and horizontally to set the crossover frequency. You can also change values by dragging up or down in the value fields.
- *High and Xover control point and fields:* Drag the control point vertically to adjust the reverb time multiplier for high frequencies and horizontally to set the crossover frequency. You can also change values by dragging up or down in the value fields.

YardStick primary parameters



- *Primary button:* Access frequently used reverb settings.
- *Room Size slider and field:* Set the room dimensions in cubic meters, from 1 m³ to 1,000,000 m³. Changing this parameter also adjusts the range of the Reverb Time knob.
- *Reverb Density slider and field:* Adjust the reflected energy of the room's natural resonances. Density values above 100% balance a high initial reflection density with a slight risk of a metallic-sounding reverb tail.
- *Reverb Delay slider and field:* Increasing the Reverb Delay value introduces a delay between the source signal and the reverb onset. Use this parameter to add up to 200 ms of delay, affecting spatial perception and timing in the mix.

- *Dry Level slider and field:* Set the level of the dry signal at the plug-in output independently from the first reflection and the reverb tail.
- *1st Reflection Level slider and field:* Set the level of the first reflection at the plug-in output independently from the dry signal and the reverb tail. Raising the level adds intimacy and presence, and lowering it creates a more open, spacious feel, shaping the reverb's depth.
- *Reverb Level slider and field:* Set the level of the reverb tail at the plug-in output independently from the dry signal and the first reflection.

YardStick secondary parameters



- *Secondary button:* Access additional settings that offer more detailed adjustments and fine-tuning options. Note that some options are unavailable when using the Quantec Room Simulator on a mono channel strip.
- *1st Reflection Delay slider and field:* Adjust the time between the direct sound and the first reflection to influence the spatial perception of the room.
- *1st Reflection Spread slider and field:* Adjust the time difference of the first reflection between the left and right stereo channels to affect the stereo width of the reflection.
- *Reverb High Cut slider and field:* Adjust the cutoff frequency of the high-cut filter applied to the output of the reverb tail. This control limits the high-frequency content, reducing brightness and creating a more subdued or warmer effect.
- *Bass Gain slider and field:* Adjust the low-frequency content in the reverb signal. Use this control to increase or decrease bass frequencies. Combined with the Bass Crossover parameter, it shapes the level of bass frequencies.
- *Bass Crossover slider and field:* Set the cutoff frequency to control which low frequencies are affected by the bass gain. This lets you precisely shape the bass content in the reverb.
- *Reverb Correlation slider and field:* Adjust the stereo width of the reverb effect. Changing this parameter alters how the reverb is spread across the stereo field, ranging from a narrow, focused effect to a wide, immersive sound.

YardStick extended parameters



- *Extended button:* Access advanced settings for precise fine-tuning and in-depth customization. Note that some options are unavailable when using the Quantec Room Simulator on a mono channel strip.
- *Dry Source pop-up menu:* Set the channel assignment for the output of the dry signal. Maintain the original order (L R) or swap the left and right channels (R L). This setting doesn't affect how the stereo signal is routed to the reverb effect input and is unavailable when operating the plug-in in mono.
- *1st Reflection Source pop-up menu:* Set the channel assignment for the output of the first reflection. Maintain the original order (L R) or swap the left and right channels (R L).
- *L Correlation Pattern pop-up menu:* Choose predefined virtual microphone positions in the reverb chamber for the left channel. Using the same number for both channels results in a mono output. The number of correlation patterns depends on the chosen mode (Simple, Medium, Complex). Choose Off to mute the Reverb output channel, independent of the dry and first reflection output.
- *R Correlation Pattern pop-up menu:* Choose predefined virtual microphone positions in the reverb chamber for the right channel. Using the same number for both channels results in a mono output. The number of correlation patterns depends on the chosen mode (Simple, Medium, Complex). Choose Off to mute the Reverb output channel, independent of the dry and first reflection output.
- *Subsonic button:* Turn off Subsonic to filter out inaudible low frequencies in the reverb input that can cause rumble and unwanted low-end buildup. Turn on Subsonic to process the unfiltered input signal.

SilverVerb in Logic Pro for iPad

SilverVerb provides a low frequency oscillator (LFO) that can modulate the reverberated signal. It also includes a high cut and a low cut filter, allowing you to filter frequencies from the reverb signal. High frequency transients in reverb signals can sound unpleasant, can hamper speech intelligibility, or can mask the overtones of the original signal. Long reverb tails with a lot of bass generally result in an indistinct mix.

To add SilverVerb to your project, choose Reverb > SilverVerb in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



SilverVerb parameters

- *Pre Delay slider and field:* Set the time between the original signal and the reverb signal.
- *Reflectivity knob and field:* Define how reflective the imaginary walls, ceiling, and floor are.
- *Room Size knob and field:* Define the dimensions of the simulated room.
- *Density/Time knob and field:* Determine both the density and the duration of the reverb.
- *Low Cut slider and field:* Filter frequencies below the set value out of the reverb signal. This affects only the tone of the reverb signal, not the original signal.
- *High Cut slider and field:* Filter frequencies above the set value out of the reverb signal. This affects only the tone of the reverb signal, not the original signal.
- *Modulation On/Off button:* Turn on or turn off the LFO. This affects the Rate, Phase, and Intensity parameters.
- *Rate knob and field:* Set the frequency, or speed, of the LFO.
- *Phase knob and field:* Define the phase of the modulation between the left and right channels of the reverb signal.
  - At 0°, the extreme values (minimum or maximum) of the modulation are achieved simultaneously on both the left and right channels.
  - At a value of 180°, the extreme values opposite each other (left channel minimum, right channel maximum, or vice versa) are reached simultaneously.
- *Intensity knob and field:* Set the modulation amount. A value of 0 turns off the delay modulation.
- *Dry/Wet controls and fields:* Set the balance between the effect (wet) and original (dry) signals.

Space Designer convolution reverb

Space Designer in Logic Pro for iPad

Space Designer is a *convolution* reverb effect that you can use to place your audio signals in exceptionally realistic recreations of real-world acoustic environments. Space Designer generates reverb by convolving, or combining, an audio signal with an impulse response reverb sample. An impulse response is a recording of reverb characteristics, or more precisely, a recording of all reflections in a given room following an initial signal spike. The actual impulse response file is a standard audio file.

To understand how this works, imagine a situation where Space Designer is used on a vocal track. An impulse response file recorded in an actual opera house is loaded into Space Designer. This impulse response file is convolved with your vocal track, placing the singer inside the opera house.

Convolution can be used to place your audio signal inside any space, including a speaker cabinet, a plastic toy, a cardboard box, and so on. All you need is an impulse response recording of the space.

In addition to loading impulse responses, Space Designer includes an on-board impulse response synthesis facility. This lets you create completely unique effects, particularly when the synthesized impulse response doesn't represent a real space.

Space Designer also offers features such as volume and density envelopes, filters, an Output EQ, and stereo balance controls, which provide precise control over the dynamics, timbre, and length of the reverberation.

Space Designer can operate as a mono, stereo, or true stereo (meaning each channel is processed discretely) effect.

To add Space Designer to your project, choose Reverb > Space Designer in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Automation and Space Designer

Space Designer cannot be fully automated—unlike most other included plug-ins. This is because Space Designer needs to reload the impulse response and recalculate the convolution before audio can be routed through it.

You can, however, record, edit, and play back any movement of the following Space Designer parameters:

- X-Over, See Space Designer main parameters.
- Direct and Reverb Output level. See Space Designer global parameters.
- Output EQ. See Space Designer Output EQ.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Use impulse responses in Logic Pro for iPad

Space Designer can use either recorded impulse response files or synthesized impulse responses. The Sampled IR and Synthesized IR buttons switch the impulse response mode.

Important: To convolve audio in real time, Space Designer must first calculate any parameter adjustments to the impulse response. This requires a moment or two following parameter edits.



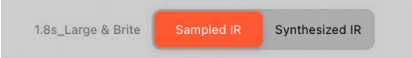
Impulse response parameters

Use to load, save, or manipulate recorded or synthesized impulse response files. The chosen impulse response file determines what Space Designer uses to convolve with your audio signal.

- *Sampled IR button:* Switch to Sampled IR mode. In this mode, an impulse response sample is loaded with the current preset or patch and used to generate reverberation. The name of the loaded IR sample is shown to the left.
- *Synthesized IR button:* Turn on Synthesized IR mode. A new synthesized impulse response is generated, derived from the values of the Length, Envelope, Filter, EQ, and Spread parameters.
- *Input Crossfeed knob and field:* Determine how Space Designer processes the stereo input signal.

Use Sampled IR mode

In Sampled IR mode, Space Designer loads and uses an impulse response recording of an acoustic environment. This is convolved with the incoming audio signal to place it in the acoustic space provided by the impulse response.



1. In Logic Pro, tap the Sampled IR button.

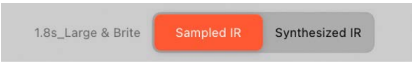
   When you tap the Sampled IR button, the name of the loaded IR sample is shown to the left.

2. Tap a different Space Designer preset in the Browser to change the impulse response.

Use Synthesized IR mode

In Synthesized IR mode, Space Designer generates a synthesized impulse response based on the values of parameters such as Length, Filter, Spread and various envelope values.

Note: You can switch between a loaded impulse response sample and a synthesized impulse response without losing the settings of the other.



- In Logic Pro, tap the Synthesized IR button.

  Repeated taps of the Synthesized IR button randomly generate new impulse responses with slightly different reflection patterns. The current impulse response state is saved with the setting file, including parameter and other values that represent the IR reflection patterns and characteristics.

  Note: Tapping the Synthesized IR button while you're in Sampled IR mode switches to the synthesized impulse response stored with the setting.

Use the Space Designer Input Crossfeed knob

The Input Crossfeed knob works only in stereo channel configurations.



- In Logic Pro, use the Input Crossfeed knob to determine how a stereo signal is processed.
  - At a value of 1.00 the signal is processed on both channels, retaining the stereo balance of the original signal.
  - At a value of 0.50 the signal is processed in mono.
  - At a value of 0.00 the signal is inverted, with processing for the right channel occurring on the left, and vice versa.
  - In-between positions result in a mixture of stereo to mono crossfeed signals.

Space Designer main parameters in Logic Pro for iPad

Space Designer can use either recorded impulse response files or synthesized impulse responses. The Sampled IR and Synthesized IR buttons switch the impulse response mode.

Important: To convolve audio in real time, Space Designer must first calculate any parameter adjustments to the impulse response. This requires a moment or two following parameter edits.



Main parameters

These parameters globally affect the impulse response.

- *Predelay knob and field:* Set the reverb predelay time, or time between the original signal and the first reflections from the reverb.
- *Predelay Sync button:* Turn on to restrict Predelay knob values to divisions synchronized with the project tempo.
- *Length knob and field:* Adjust the length of the impulse response. This control works in conjunction with the Size knob.
- *Size knob and field:* Adjust the sample rate of the loaded impulse response file, thereby changing the perceived size of the reverb by widening or narrowing the room. Size can also be used to preserve the original length of the impulse response when changing the sample rate with the Quality pop-up menu found in the Details section.

  The Size knob value has an impact on the decay because it is multiplied with the Length knob value. To explain, when you rotate the Length knob to its maximum value and use a Size knob value of 100%, this results in a decay that is the full length of the loaded impulse response.
- *X-Over Freq slider and field:* The X-Over Freq slider sets the crossover frequency. Any impulse response frequency that falls below this value is affected by the Lo Spread knob. Frequencies above are affected by the Hi Spread knob.
- *Lo and Hi Spread knobs and fields:* The spread controls set the perceived width of the stereo field.

Use the Space Designer predelay feature

Predelay is the amount of time that elapses between the original signal and the initial early reflections of the reverberation. For a room of any given size and shape, predelay is determined by the distance between the listener and the walls, ceiling, and floor. Space Designer lets you adjust this parameter beyond the range that would be considered natural.

- In Logic Pro, rotate the Predelay knob to set a suitable predelay time.

The ideal predelay setting for different sounds depends on the properties of—or more accurately, the envelope of—the original signal. Percussive signals generally require shorter predelays than signals where the attack fades in gradually, such as strings. A good rule of thumb is to use the longest predelay possible before undesirable side effects, such as an audible echo, begin to materialize.

In practice, an extremely short predelay tends to make it difficult to pinpoint the position of the signal source. It can also color the sound of the original signal. On the other hand, an excessively long predelay can be perceived as an unnatural echo. It can also divorce the original signal from its early reflections, leaving an audible gap between the original and reverb signals.

These guidelines are intended to help you design realistic-sounding spaces that are suitable for various signals. If you want to create unnatural sound stages or otherworldly reverbs and echoes, experiment with the Predelay parameter.

Set impulse response lengths

- In Logic Pro, rotate the Length knob to set the length of the impulse response—sampled or synthesized.

  The Length knob setting changes the decay value, depending on the current Size knob value. To clarify, a maximum Length value and a Size value of 100% result in a decay that is the full length of the loaded impulse response.

  All envelopes are automatically calculated as a percentage of the overall length. Changes to the Length or Size parameter values result in envelope curves stretching or shrinking to fit the new impulse response length.

  Note: When you're using a sampled impulse response file, the combined Length (and Size) parameter values cannot exceed the length of the underlying impulse response sample.

Use the Space Designer Spread parameters

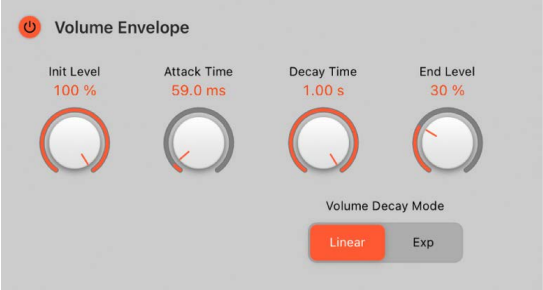
The X-Over Freq slider setting and Lo and Hi Spread knob values enhance the perceived width of the signal. This occurs without losing the directional information of the input signal normally found in the higher frequency range. Low frequencies are spread to the sides, reducing the amount of low frequency content in the center—allowing the reverb to encompass the mix.

- In Logic Pro, rotate the Lo and Hi Spread knobs to extend the stereo base to frequencies below or above the frequency determined by the X-Over Freq parameter.
  - At a spread value of 0.00, no stereo information is added. The inherent stereo information of the source signal and reverb, however, is retained.
  - At a spread value of 1.00, left and right channel divergence is at its maximum.
- Set the X-Over Freq slider frequency (in hertz). Any impulse response frequency below or above the value you set is affected by the Lo and Hi Spread knobs (at values over zero).

Note: These parameters have *no* impact when you use Space Designer as a mono plug-in.

Space Designer volume envelope in Logic Pro for iPad

The volume envelope is used to set the reverb initial level and to control volume changes over time.



Volume envelope parameters

- *Volume Envelope On/Off button:* Turn on or turn off the volume envelope.
- *Init Level knob and field:* Set the initial volume level of the impulse response attack phase. It is expressed as a percentage of the full-scale volume of the impulse response file. The attack phase is generally the loudest point of the impulse response. Set Init Level to 100% to ensure maximum volume for early reflections.
- *Attack Time knob and field:* Determine the time before the decay phase of the volume envelope begins.
- *Decay Time knob and field:* Set the length of the decay phase.

  Note: The overall decay is determined by the global Length and Size parameter values. To explain, a maximum Length value and a Size value of 100% result in a decay that is the full length of the loaded impulse response.

- *End Level knob and field:* Set the end volume level. It is expressed as a percentage of the overall volume envelope.
  - If set to 0%, the reverb tail fades out completely towards the end of the Decay time.
  - If set to a higher value, the reverb tail will not have faded out completely at the end of the Decay time, which stops the reverb abruptly at that point. If the end time falls outside the reverb tail, End Level has no effect.
- *Volume Decay Mode buttons:* Choose a mode that determines how the reverb tail is handled.
  - *Linear button:* The decay curve of the volume envelope is shaped by a linear algorithm, and results in a less natural-sounding reverb tail.
  - *Exp button:* The decay curve of the volume envelope is shaped by an exponential algorithm, in order to generate the most natural-sounding reverb tail.

Space Designer filter and envelope in Logic Pro for iPad

The filter provides control over the timbre of the reverb.

You can choose from several filter types. Changes to filter settings result in a recalculation of the impulse response rather than a direct change to the sound as it plays through Space Designer.

Tap the Filter Envelope On/Off button to use the filter and the filter envelope. You can use the envelope to control the filter cutoff frequency over time.



Filter envelope parameters

- *Filter Envelope On/Off button:* Turn on or turn off the filter and filter envelope.
- *Init Level knob and field:* Set the initial cutoff frequency of the filter envelope.
- *Attack Time knob and field:* Determine the time required to reach the value set with the Filter Max control.
- *Max Level knob and field:* Set the maximum filter cutoff frequency. This value also determines the attack and decay phases of the overall filter envelope. In other words, when the set level is reached after the attack phase, the decay phase begins. You can create interesting filter sweeps by setting the Filter Max value lower than the Filter Init level parameter value.
- *Decay Time knob and field:* Determine the time required after the Filter Max value has been attained until the End Freq value is reached.
- *End Level knob and field:* Set the cutoff frequency at the end of the filter envelope decay phase.

Filter parameters

- *Filter Resonance knob and field:* Emphasize frequencies above, around, or below the cutoff frequency. The impact of the resonance value on the sound is highly dependent on the chosen filter mode, with steeper filter slopes resulting in more pronounced tonal changes.
- *Filter Mode buttons:* Set the filter mode.
  - *LP 6dB:* Bright, general-purpose lowpass filter that retains the top end of most material while still providing some filtering.
  - *LP 12dB:* Warm, lowpass filter without drastic filter effects that is useful for smoothing bright reverbs.
  - *BP:* 6 dB per octave bandpass design that cuts the low and high ends of the signal, leaving the frequencies around the cutoff frequency intact.
  - *HP:* 12 dB per octave (two-pole) highpass design that cuts the level of frequencies that fall below the cutoff frequency.

Space Designer density envelope in Logic Pro for iPad

The density envelope controls the density (the average number of reflections) of the synthesized impulse response over time.

Note: Density envelope parameters are available only in Synthesized IR mode.



Density envelope parameters

- *Density Envelope On/Off button:* Turn on or turn off the density envelope.
- *Init Density knob and field:* Set the initial reverb density (the average number of reflections in a given time period). Low values result in audible reflection patterns and discreet echoes.
- *Ramp Time knob and field:* Adjust the time between the initial and end density levels.
- *End Density knob and field:* Set the density of the reverb tail. An End Density value that's too low can result in a grainy sounding reverb tail. The stereo spectrum may also be affected by lower values.
- *Reflc Shape slider and field:* Determine the steepness (shape) of early reflection clusters as they bounce off the walls, ceiling, and furnishings of the virtual space.

  Low Rflc Shape (Reflection Shape) values result in clusters with a sharp contour. High values result in an exponential slope and a smoother sound. This control is particularly useful when recreating rooms constructed of different materials. When used with suitable envelope, density, and early reflection settings, you can create rooms of almost any shape and material.

Space Designer Output EQ in Logic Pro for iPad

Space Designer has a six-band Output EQ consisting of high and low pass bands, two parametric mid-bands, plus a low shelving filter and a high shelving filter.



Output EQ parameters

- *Output EQ On/Off button:* Turn on or turn off the Output EQ, which adjusts frequencies of the overall combined reverb and source signal.
- *Low Cut button:* Turn on a highpass filter that allows high frequencies to pass and cuts the level of low frequencies below the set frequency.
  - *Low Cut Freq knob and field:* Set the frequency for the Low Cut band.
  - *Low Cut Order pop-up menu:* Choose the filter rolloff amount for the Low Cut band. Higher order filters have a steeper rolloff.
  - *Low Cut Q field:* Set the Q factor—the width—for the Low Cut band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.
- *Low Shelf button:* Turn on the low shelving filter to increase or decrease the frequencies below/above the Frequency value.
  - *Low Shelf Freq knob and field:* Set the frequency for the Low Shelf band.
  - *Low Shelf Gain knob and field:* Cut or boost the Low Shelf band.
  - *Low Shelf Q field:* Set the Q factor—the width—for the Low Shelf band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.
- *Low Mid button:* Turn on a parametric bell filter with three controls.
  - *Low Mid Freq knob and field:* Set the frequency for the Low Mid band.
  - *Low Mid Gain knob and field:* Cut or boost the Low Mid band.
  - *Low Mid Q field:* Set the Q factor—the width—for the Low Mid band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.

- *High Mid button:* Turn on a parametric bell filter with three controls.
  - *High Mid Freq knob and field:* Set the frequency for the High Mid band.
  - *High Mid Gain knob and field:* Cut or boost the High Mid band.
  - *High Mid Q field:* Set the Q factor—the width—for the High Mid band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.
- *High Shelf button:* Turn on a high shelving filter to increase or decrease the frequencies below/above the Frequency value.
  - *High Shelf Freq knob and field:* Set the frequency for the High Shelf band.
  - *High Shelf Gain knob and field:* Cut or boost the High Shelf band.
  - *High Shelf Q field:* Set the Q factor—the width—for the High Shelf band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.
- *High Cut button:* Turn on a lowpass filter that allows low frequencies to pass and cuts the level of high frequencies above the set frequency.
  - *High Cut Freq knob and field:* Set the frequency for the High Cut band.
  - *High Cut Order pop-up menu:* Choose the filter rolloff amount for the High Cut band. Higher order filters have a steeper rolloff.
  - *High Cut Q field:* Set the Q factor—the width—for the High Cut band. Low values result in a narrow frequency band selection. High values encompass a broad frequency band.

Space Designer global parameters in Logic Pro for iPad

The details and output parameters affect the overall input, output, or behavior of the effect.

Note: Some parameters discussed in this section are available only in Sampled IR or Synthesized IR mode. Most parameters are available in both modes. Some parameters are specific to stereo use, and are not available when Space Designer is used in other channel formats.



Details parameters

After your impulse response is loaded or generated, use these parameters to determine how Space Designer operates on the overall signal and impulse response.

- *Quality pop-up menu:* Choose the sample rate. Lo-Fi produces a grainy reverb. Low halves the host application sample rate. Medium matches the host application sample rate. High is smooth and clean sounding.
- *Definition field:* Set a value (as a percentage of the overall length) to reduce the resolution of the synthesized impulse response tail. This emulates reverb diffusion and saves CPU resources.
- *Latency Compensation button:* Turn on or turn off the internal latency compensation feature. When active, the direct signal in the output section is delayed to match the processing delay of the effect signal.

  The complex calculations made by Space Designer take a small amount of time, which results in a processing delay, or *latency*, between the direct input signal and the processed output signal. Space Designer processing latency increases if Low or Lo-Fi is chosen in the Quality pop-up menu. Processing latency does not increase at sample rates above 44.1 kHz (Medium or High settings in the Quality pop-up menu).

  Note: This compensation feature is not related to latency compensation in Logic Pro; it occurs *entirely within* Space Designer.
- *Rev Vol Comp button:* Turn on or turn off the internal impulse response volume matching function.

  The reverb volume compensation feature attempts to match the perceived—not the actual—volume differences between impulse response files. It should generally be left on, although it may not work with all types of impulse responses. If you have an impulse response with a different level, turn off volume compensation, then adjust input and output levels accordingly.
- *Reverse button:* Reverse the impulse response and envelopes. When the impulse response is reversed, you're effectively using the tail rather than the front end of the sample. You may need to adjust the Predelay and other parameter values when reversing.
- *Reset pop-up menu:* Choose a menu command.
  - *EQ:* Reset the Output EQ to default values.
  - *Volume Envelope:* Reset the volume envelope to default values.
  - *Filter Envelope:* Reset the filter envelope to default values.
  - *Density Envelope:* Reset the density envelope to default values.

Output parameters

- *Dry/Wet Output controls:* Set output levels for the dry (source) and wet (effect) signal.

Set the impulse response sample rate and preserve length

Changing the sample rate upward increases—or changing it downward decreases—the frequency response (and length) of the impulse response, and to a degree the overall sound quality of the reverb. Upward sample rate changes are of benefit *only* if the original impulse response sample actually contains higher frequencies. When reducing the sample rate, use your ears to decide if the sonic quality meets your needs.

Note: Room surfaces—except concrete and tiles—tend to have minimal reflections in higher frequency ranges, making half-rate and full-rate impulse responses sound almost identical.

- In Logic Pro, choose one of the following from the Quality pop-up menu to set the sample rate of an impulse response:
  - *Lo-Fi:* This setting divides the sample rate by four. If the project sample rate is 96 kHz, the impulse response sample rate is converted to 24 kHz. If the project sample rate is 44.1 kHz, the impulse response sample rate is converted to 11.025 kHz, and so on.
  - *Low:* This setting effectively halves the sample rate. If the project sample rate is 96 kHz, the impulse response sample rate is converted to 48 kHz. If the project sample rate is 44.1 kHz, the impulse response sample rate is converted to 22.05 kHz, and so on.

    When you select a half sample rate, the impulse response becomes twice as long. The highest frequency that can be reverberated is halved. This results in a behavior that is much like doubling every dimension of a virtual room—multiplying the volume of a room by eight. The Low (and Lo-Fi) setting can also be used for interesting tempo, pitch, and retro digital effects. Another benefit of reducing the sample rate is that processing requirements drop significantly, making the lower quality settings useful for large, open spaces.

    This behavior also applies when you choose Lo-Fi, but the sample rate is divided by four and the impulse response is multiplied in length four times.
  - *Medium:* Space Designer uses the current project sample rate. The sample rate of a loaded impulse response is automatically converted to match the current project sample rate, if necessary. For example, this allows you to load a 44.1 kHz impulse response into a project running at 96 kHz, and vice versa.
  - *High:* Space Designer uses the highest possible sample rate.
- *To retain the original length of the impulse response when the sample rate is changed:* Adjust the Size knob value. Using this parameter with your Quality pop-up menu choice can lead to interesting results.

  If you're running Space Designer in a project that uses a higher sample rate than the impulse response, you may also want to reduce the impulse response sample rate. Adjust the Size knob value to reduce CPU processing time without compromising reverb quality.

Tip: You can make similar adjustments while running in Synthesized IR mode. Most typical reverb sounds don't contain an excessive amount of high frequency content. If your project is running at 96 kHz, for example, you would need to use lowpass filtering to obtain the mellow frequency response characteristics of many reverb sounds. A better approach would be to first reduce the high frequencies by choosing a lower rate from the Quality pop-up menu, followed by using the lowpass filter, thus conserving significant CPU resources. It is also worth noting that longer impulse responses (sampled or synthesized) place a higher strain on the CPU.

Use the Space Designer Definition parameter

The Definition parameter emulates the diffusion of natural reverb patterns when in Synthesized IR mode.

Natural reverbs contain most of their spatial information in the first few milliseconds. Toward the end of the reverb, the pattern of reflections—signals bouncing off walls, and so on—becomes more diffuse. In other words, the reflected signals become quieter and increasingly nondirectional, containing far less spatial information. To emulate this phenomenon, use the full impulse response resolution only at the onset of the reverb, then use a reduced impulse response resolution toward the end of the reverb.

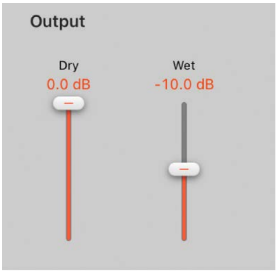
- In Logic Pro, vertically drag the Definition field to set the crossover point—where the switch to the reduced impulse response resolution occurs.

  The Definition field is shown as a percentage, where 100% is equal to the length of the full resolution impulse response.

Set Space Designer output parameters

In Logic Pro, use the output parameters to adjust the balance between the direct (dry) signals and the processed (wet) signals.

Space Designer provides two output sliders—the Dry slider for the direct signal, and the Wet slider for the reverb signal—when you insert it as a mono, mono to stereo, or stereo effect.



- *Set the level of the Dry slider:* Move to set the level of the non-effect, or dry, signal. Move the slider to a value of 0 (mute) if Space Designer is inserted in a bus channel or when you're using modeling impulse responses, such as speaker simulations.
- *Set the level of the Wet slider:* Move to adjust the level of the effect signal.

Specialized effects

Specialized effects in Logic Pro for iPad

Specialized effects are designed to address tasks encountered during production or performance.

Exciter adds life to your recordings by generating artificial high frequency components.

SubBass generates an artificial bass signal that is derived from the incoming signal, making it a great option for adding bottom end.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Exciter in Logic Pro for iPad

Exciter generates high frequency components that are not part of the original signal. It does this by utilizing a nonlinear distortion process that resembles the one used to produce overdrive and distortion effects.

Unlike this process, however, the Exciter distortion process involves passing the input signal through a highpass filter before feeding it into the harmonics (distortion) generator. Artificial harmonics are thus added to the original signal, and these added harmonics contain frequencies at least one octave above the threshold of the highpass filter. The distorted signal is then mixed with the original, dry signal.

You can use Exciter to add life to recordings, particularly audio tracks with a weak treble frequency range. You can also use Exciter to enhance guitar tracks.

To add Exciter to your project, choose Specialized > Exciter in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Exciter parameters

- *Dry Signal button:* Turn on to mix the original (pre-effect) signal with the effect signal. Turn off to hear only the effect signal.
- *Color 1 and 2 buttons:* Turn on Color 1 to generate a less dense harmonic distortion spectrum. Color 2 generates more intense harmonic distortion.

  Note: Color 2 also introduces more intermodulation distortions, which can result in unpleasant artifacts.
- *Frequency knob and field:* Set the cutoff frequency of the highpass filter. The input signal passes through the filter before (harmonic) distortion is introduced.
- *Harmonics knob and field:* Set the ratio between the effect and the original signals. If the Dry Signal button is turned off, this parameter has no effect.

  Note: In most cases, it is preferable to select higher Frequency and Harmonics values, because human ears cannot easily distinguish between the artificial and original high frequencies.

SubBass

SubBass in Logic Pro for iPad

SubBass generates frequencies below those of the original signal, resulting in artificial bass content. The simplest use for SubBass is as an octave divider, similar to octaver effect pedals for electric bass guitars. Whereas such pedals can only process a monophonic input sound source of clearly defined pitch, SubBass can be used with complex summed signals as well.

To add SubBass to your project, choose Specialized > SubBass in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

SubBass creates two bass signals, derived from two separate portions of the incoming signal. These are defined with the High and Low parameters.

WARNING: Using SubBass can produce extremely loud output signals. Choose moderate monitoring levels, and only use loudspeakers that are actually capable of reproducing the very low frequencies produced. Never try to force a loudspeaker to output these frequency bands with an EQ.



SubBass Low and High parameters

- *Ratio Low knob and field:* Adjust the ratio between the generated signal and the lower frequency band of the original signal.
- *Center Low knob and field:* Set the center frequency of the lower frequency band.
- *Bandwidth Low knob and field:* Set the width of the lower frequency band.
- *Ratio High knob and field:* Adjust the ratio between the generated signal and the upper frequency band of the original signal.
- *Center High knob and field:* Set the center frequency of the upper frequency band.
- *Bandwidth High knob and field:* Set the width of the upper frequency band.
- *Freq. Mix slider and field:* Adjust the mix ratio between the low and high frequency bands.

SubBass Output parameters

- *Dry slider and field:* Set the amount of dry (non-effect, original) signal.
- *Wet control and field:* Set the amount of wet (effect) signal.

SubBass use tips in Logic Pro for iPad

Unlike a pitch shifter, SubBass generates a waveform that is not based on the waveform of the input signal; instead it uses a sine wave. Given that pure sine waves rarely work well in complex arrangements, make sure to use the Wet and Dry sliders to control the amount of—and balance between—the generated and original signals.

Use the High parameters and the Low parameters to define the two frequency bands that SubBass uses to generate tones. Center High and Center Low define the center frequency of each band, and Bandwidth High and Bandwidth Low define the width of each frequency band.

The Ratio High and Ratio Low knobs define the transposition amount for the generated signal in each band. This is expressed as a ratio of the original signal. For example, a Ratio value of 2 transposes the signal down one octave.

Important: Within each frequency band, the filtered signal should have a reasonably stable pitch in order to be analyzed correctly.

In general, narrow bandwidths produce the best results, because they minimize frequency intermodulations which can lead to unpleasant artifacts. Set the Center High knob value a fifth higher than Center Low, a factor of 1.5 for the center frequency.

Derive the sub-bass to be synthesized from the existing bass portion of the signal, and transpose by one octave in both bands, using a Ratio of 2. Do not overdrive the process or you will introduce distortion. If you hear frequency gaps, move one or both Center frequency knobs, or widen the Bandwidth of one or both frequency ranges a little.

Tip: Be prudent when using SubBass, and compare the extreme low frequency content of your mixes with other productions. It is very easy to over-enhance the low end of some tracks, resulting in an unbalanced mix.

Utilities and tools

Utility plug-ins in Logic Pro for iPad

The tools found in the Utility category can help with routine tasks and situations you may encounter during production. Included are the Gain plug-in, which you can use to adjust the level or phase of input signals, and I/O utility, which you can use to integrate external audio effects into channel strips.

The suite also includes a Test Oscillator and the Tuner, which is found in the Metering tools submenu.

Learn how you can use plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

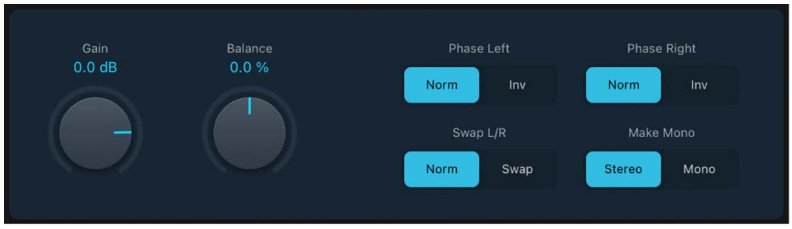
- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Gain plug-in in Logic Pro for iPad

Gain amplifies (or reduces) the signal by a specific decibel amount. It is very useful for quick level adjustments when you work with automated tracks during post-processing—for example, when you have inserted an effect that doesn't have its own gain control, or when you want to change the level of a track for a remix version.

To add the Gain plug-in to your project, choose Utility > Gain in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Gain plug-in parameters

- *Gain knob and field:* Set the amount of gain.
- *Balance knob and field:* Adjust the balance of the incoming signal between the left and right channels.
- *Phase Left/Right switches:* Choose a normal (Norm) phase or choose to invert (Inv) the phase of the left and right channels, respectively.

  Inverting phase is useful for dealing with time alignment problems, particularly those caused by simultaneous recording with multiple microphones. When you invert the phase of a signal heard in isolation, it sounds identical to the original. When the signal is heard in conjunction with other signals, however, phase inversion may have an audible effect. For example, if you place microphones above and below a snare drum, inverting the phase of either microphone can improve (or ruin) the sound. As always, rely on your ears.
- *Swap L/R switch:* Choose normal (Norm) left and right channel output or choose to swap (Swap) the left and right output channels. Swapping occurs after the Balance parameter in the signal path.
- *Make Mono switch:* Choose Stereo for stereo signals. Choose Mono to output a summed mono signal on both the left and right channels.

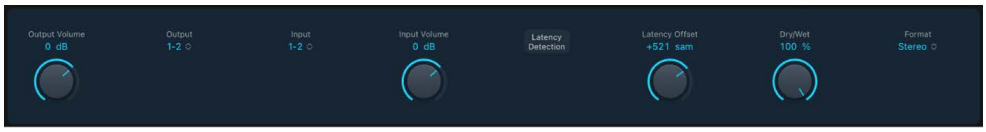
Note: The Gain plug-in is available in mono, mono to stereo, and stereo instances. Only one Phase parameter is available in mono and mono to stereo modes. In mono mode, the Balance, Swap L/R, and Make Mono parameters are not available.

I/O utility in Logic Pro for iPad

I/O utility lets you use external audio effects units in a similar way to the use of internal effects.

Note: I/O utility is not practical unless you're using an audio interface that provides discrete inputs and outputs, either analog or digital, that are used to send signals to and from the external audio effects unit.

To add the I/O utility to your project, choose Utility > I/O utility in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



I/O utility parameters

- *Output Volume knob and field:* Adjust the level of the output signal.
- *Output pop-up menu:* Choose the output, or output pair, of your audio hardware.
- *Input pop-up menu:* Choose the input, or input pair, of your audio hardware.

  Note: The Input pop-up menu is visible only when an audio interface with multiple inputs is active.
- *Input Volume knob and field:* Adjust the level of the input signal.

- *Latency Detection button:* Detect the delay between the selected output and input. Following detection, any delay is automatically compensated for.

  Note: You can obtain the most accurate reading by bypassing any latency-inducing plug-ins on the track.

- *Latency Offset knob and field:* Displays the value for the detected latency between the selected output and input in samples. You can also use this slider to offset the latency manually.

- *Dry/Wet knob and field:* Set the balance between the direct and effected signal, if effects are used.

- *Format pop-up menu:* Choose between Stereo and Mid/Side in stereo instances.

Use an external effects unit with I/O utility

1. In Logic Pro, connect an output of your audio interface with the input on your effects unit, and connect the output of your effects unit with an input on your audio interface.

   Note: These can be either analog or digital connections, depending on the features of your audio interface and effects unit, and each connection can be either an output or an output pair.

2. Tap an Effects slot of an aux channel strip that is being used as a bus send/return, and choose Utility > I/O.

3. In the I/O utility, choose the Outputs and the Inputs of the audio hardware that your effects unit is connected to.

4. Route the signals of any channel strips that you want to process to the bus (aux channel strip) chosen in step 3, and set appropriate Send levels.

5. Adjust the Input Volume and Output Volume knobs as required in the I/O utility.

6. Tap the Latency Detection button if you want to detect and compensate for any delay between the selected output and input.

When you start playback, the signals of any channel strips routed to the aux channel chosen in step 3 are processed by the external effects unit.

Test Oscillator in Logic Pro for iPad

Test Oscillator is useful for tuning studio equipment and instruments. It can be inserted as an instrument or effect plug-in. It operates in two modes, generating either a static frequency or a sine sweep.

- In Test Tone mode, a test signal is generated immediately when the plug-in is inserted. You can switch off the test tone by bypassing the plug-in or by activating Sine Sweep mode.

- In Sine Sweep mode, a user-defined frequency spectrum tone sweep is generated when you tap the Sweep Trigger button.

To use the Test Oscillator, choose Utility > Test Oscillator in a channel strip Audio Effect plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Test Tone mode parameters



- *Frequency knob and field:* Set the frequency of the oscillator (the default is 1 kHz). You can also double-tap this field and enter a value ranging from 1 Hz to 22 kHz, exceeding the possible values that can be set with the knob. If you enter “1,” a 1 Hz test tone is the result.
- *Waveform buttons:* Select the waveform to use for test tone generation. The Square Wave and Needle Pulse (Dirac) waveforms are available as either aliased or anti-aliased versions. The Sine and Square waveforms are bipolar. The Needle Pulse waveform is a unipolar impulse waveform that is always positive, which makes it a useful tool for analyzing polarity or phase issues. The noise waveforms are useful for “tuning” the room and speakers.
- *Anti Aliased button:* Turn on to use anti-aliased versions of the Square or Needle Pulse (Dirac) waves.
- *Level knob and field:* Set the overall output level. This parameter is common to both test tone generator modes.
- *Dim button:* Reduce the output level by 18 dB. This parameter is common to both test tone generator modes.

Sine Sweep mode parameters



- *On/Off button:* Activate sine sweep mode and deactivate test tone mode.
- *Time knob and field:* Set the duration of the sine wave sweep.
- *Mode buttons:* Choose a sweep curve—Linear or Logarithmic.
- *Start/End Freq sliders and fields:* Set the oscillator frequency for the beginning and end of the sine sweep.
- *Trigger button:* Start or stop the sine sweep of the spectrum set with the Start and End Frequency parameters.
- *Repeat buttons:* Choose Single to play the sine sweep once or choose Continuous to play the sine sweep indefinitely when you tap the Sweep trigger button.

Logic Pro Instruments

Instruments overview

Instrument plug-ins in Logic Pro for iPad

Logic Pro for iPad provides an extensive suite of software instruments that can be used in your productions. See Intro to recording and Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Sample-based instruments include Sampler and Quick Sampler. These let you play back recordings of acoustic instruments. Sample Alchemy is a synthesizer that lets you import and warp audio to create new, playable sounds. Also included are the sample-based Studio Bass, Studio Piano, Studio Strings, and Studio Horns plug-ins. The latter two offer a variety of individual and grouped instruments with multiple articulations.

Specialized percussion synthesizers and instruments include Drum Synth, Drum Kit Designer, and Drum Machine Designer. Drum Machine Designer is a track instrument that directly integrates and interacts with the Mixer and Step Sequencer.

Four vintage instruments emulate the classic B3 organ; Rhodes, Wurlitzer, and Hohner electric pianos; the Hohner Clavinet; and the Mellotron. See Vintage B3 Organ, Vintage Electric Piano, Vintage Clav, and Vintage Mellotron.

When it comes to synthesizers, you have a huge range to choose from. These include simple plug-ins such as ES P, ES M, ES E, and EFM1. More advanced options include Retro Synth, ES1, and ES2, up to the extremely sophisticated Sculpture and Alchemy instruments.

Sculpture is a modeling synth that you can use to recreate physical instruments or to create instruments that don't exist. It has a number of unique modulation facilities and can generate a huge array of sound types.

Rounding out the collection are the External Instrument and Klopfgeist utility instruments and the EVOC 20 Polysynth. This instrument tracks incoming MIDI notes and processes audio signals to create classic robotic voices and choirs that follow played note and chord pitches.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
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Throughout the guide, parameters available in Tile view are indicated by  .

Alchemy

Alchemy in Logic Pro for iPad

Alchemy is an easy-to-use, yet powerful sample playback synthesizer. It offers numerous real-time performance controls and an extensive preset library.

Under the hood, Alchemy features additive, spectral, and granular synthesis and resynthesis, sampling, and virtual analog engines. An Alchemy preset can contain up to four sources, each using one or more synthesis engines. You can morph or crossfade between these sources.

Note: Logic Pro for iPad Alchemy provides playback compatibility with Logic Pro for Mac projects. You can load presets for this plug-in, but full parameter editing is available only when using Logic Pro for Mac. In the Logic Pro for Mac version of Alchemy, you can analyze imported samples and can manipulate them using one or more of these synthesis methods. Logic Pro for Mac Alchemy provides extensive sample mapping, looping, and grouping facilities that make it easy to create instruments containing hundreds of samples and layers. If you want to create purely synthetic sounds, the additive, spectral, and virtual analog synthesis engines are full-featured, matching or exceeding the power and facilities of many standalone instruments. Dozens of modeled analog and digital filters are available, in addition to multiple racks of integrated effect units and an extensive modulation section. Logic Pro for Mac Alchemy also features a powerful arpeggiator that can control each source independently and provides flexible pattern modulation options.

If you're new to synthesizers and different synthesis methods, see Intro to synthesizers.

To add Alchemy to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

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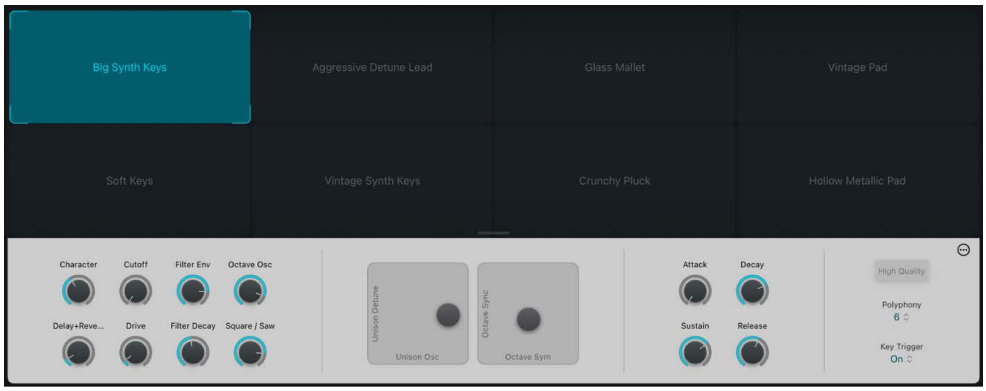
Throughout the guide, parameters available in Tile view are indicated by .

Alchemy controls in Logic Pro for iPad

Alchemy provides eight knobs, two XY pads, and a set of ADSR envelope knobs for a total of sixteen controls. These are automatically assigned to modulate different parameters when you load a preset or patch.

Also available is the Transform pad that morphs between snapshots of performance control settings. All performance controls are available as *automation* targets in Logic Pro.

In addition, each preset or patch will respond in different ways to MIDI modulation wheel data, and note velocity or aftertouch.



Performance controls

Performance controls are a custom set of controls that modify the values of *key* sound parameters.

As you explore the included sound library, you may notice that many presets have a similar performance control layout.

- *Transform pad:* Drag the framing box to different positions to morph between performance snapshots in real time. You can also tap on any snapshot box to choose it.

  The performance control knobs update, modulating the associated parameters.
- *Control knobs:* Provide quick access to a sound's main characteristics.
  - *Knobs 1 and 5:* Often used for Delay (1) and Reverb (5) level. If other effects are used, other effect parameters can be substituted here.
  - *Knobs 2 and 6:* Often used for filter cutoff and resonance.
  - *Knobs 3 and 7:* Often used to control rhythm or movement in a preset with LFO or arpeggiator parameter assignments.
  - *Knobs 4 and 8:* Often used for timbre, pitch, or other sound source parameters.
- *XY pad 1:* Generally used for morphing among (up to four) sources. Drag the gray control point to modulate two parameters simultaneously.
- *XY pad 2:* Can be used for control over additional morphing or effects parameters or for features unique to a particular preset. Drag the gray control point to modulate two parameters simultaneously.
- *Envelope knobs:* Normally control the amplitude in most presets, but may also affect other sound engine parameters.
  - *Attack knob:* Set the attack time for AHDSR1, or adjust the value of assigned parameter or parameters.
  - *Decay knob:* Set the decay time for AHDSR1, or adjust the value of assigned parameter or parameters.
  - *Sustain knob:* Set the sustain level for AHDSR1, or adjust the value of assigned parameter or parameters.
  - *Release knob:* Set the release time for AHDSR1, or adjust the value of assigned parameter or parameters.

Alchemy extended parameters in Logic Pro for iPad

Alchemy provides additional parameters that set the overall output quality and change the way Alchemy responds to incoming MIDI note information.

Extended parameters

Tap the More menu to access Mono Mode parameters outlined in this section.

- *High Quality button:* Choose the processing resolution on output. This setting remains active when loading other presets or when recalling the project.
- *Polyphony menu and field:* Set the number of playback voices, up to the maximum possible polyphony value.

  If you choose Legato and play in a legato style (strike a new key while holding another) the envelope generators are triggered only for the first note you play legato, and continue their curve until you release the last legato played key. If you release each key before pressing a new one, the envelope is not triggered by the new note.

  If you choose Mono, staccato playing retriggers the envelope generators every time a new note is played.

  Note: The maximum possible value is affected by the High Quality parameter state.
- *Arp Key Trigger menu and field:* Choose Off, On, Snap to Rate, Snap to Division, or Customized.

  The arpeggiator is active if the arpeggiator mode in the loaded preset is in any state other than off, or if it is modulated.

  If the arpeggiator is not in All mode in the loaded preset, and more than one of the A/B/C/D arpeggiators is turned on, the Customized option is shown.

  Choose Customized to recall the original key trigger states of the preset. Choose any other option, except Off, to set arpeggiator Key Trigger values for all arpeggiators.
- *MIDI Mono Mode menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16).

  In either mode, each voice receives on a different MIDI channel. Per voice channels support pitchbend, aftertouch, mod wheel, and Performance control assignment messages. Controllers and MIDI messages sent on the base channel affect all voices.
- *Mono Mode Bend Range field:* Tap to open a window and set a value from 0 to 96.

  The chosen pitch bend range affects individual note pitchbend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar to MIDI converters use this range by default.

Drum Kit Designer

Drum Kit Designer in Logic Pro for iPad

Drum Kit Designer lets you customize loaded drum kits by changing the sound characteristics and level of each piece in your kit.

Note: Logic Pro for iPadDrum Kit Designer provides playback compatibility with Logic Pro for Mac projects. You can load presets for this plug-in, but full parameter editing is available only when using Logic Pro for Mac.

To add Drum Kit Designer to your project, choose it from the Instrument > Drums submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

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Drum Kit Designer controls in Logic Pro for iPad

You can change the sound characteristics and level of each piece in your kit.



Kit piece parameters

All kick, snare, hi-hat, tom, and cymbal sounds in the active kit provide the following controls.

Note: Percussion instrument level is controlled separately. See Drum Kit Designer extended parameters.

- *Tune knob and field:* Adjust the pitch of the kit piece.
- *Dampen knob and field:* Adjust the decay of the kit piece.
- *Gain slider and field:* Adjust the volume of the kit piece.
- *Percussion Gain slider:* Drag the slider or field to adjust the level of the following sounds (if available in the kit).
  - Shaker Gain
  - Tambourine Gain
  - Claps Gain
  - Cowbell Gain
  - Sticks Gain

Load a drum kit

- In Logic Pro, tap ••• and choose Show Presets from the menu.

  The Browser opens, and you can tap any drum kit name to load it. See Browser overview.

Preview a drum or percussion piece

- In Logic Pro, tap to open the Play Surfaces.
- At the top left of the Play Surfaces, tap, and choose Drum Pads from the menu.
- Play any drum or percussion piece pad.

Adjust kit piece settings

- To adjust settings, do any of the following:
  - *To adjust the pitch:* Drag the Tune knob, or tap the field and enter a new value.
  - *To adjust the decay:* Drag the Dampen knob, or tap the field and enter a new value.
  - *To adjust the volume:* Drag the Gain slider, or tap the field and enter a new value.

Drum Kit Designer details in Logic Pro for iPad

The Input Mapping pop-up menu lets you choose different mappings that provide enhanced control of HiHats. The maps also change the way Drum Kit Designer sounds are assigned across the MIDI note range. See Drum Kit Designer mappings.

Details parameters

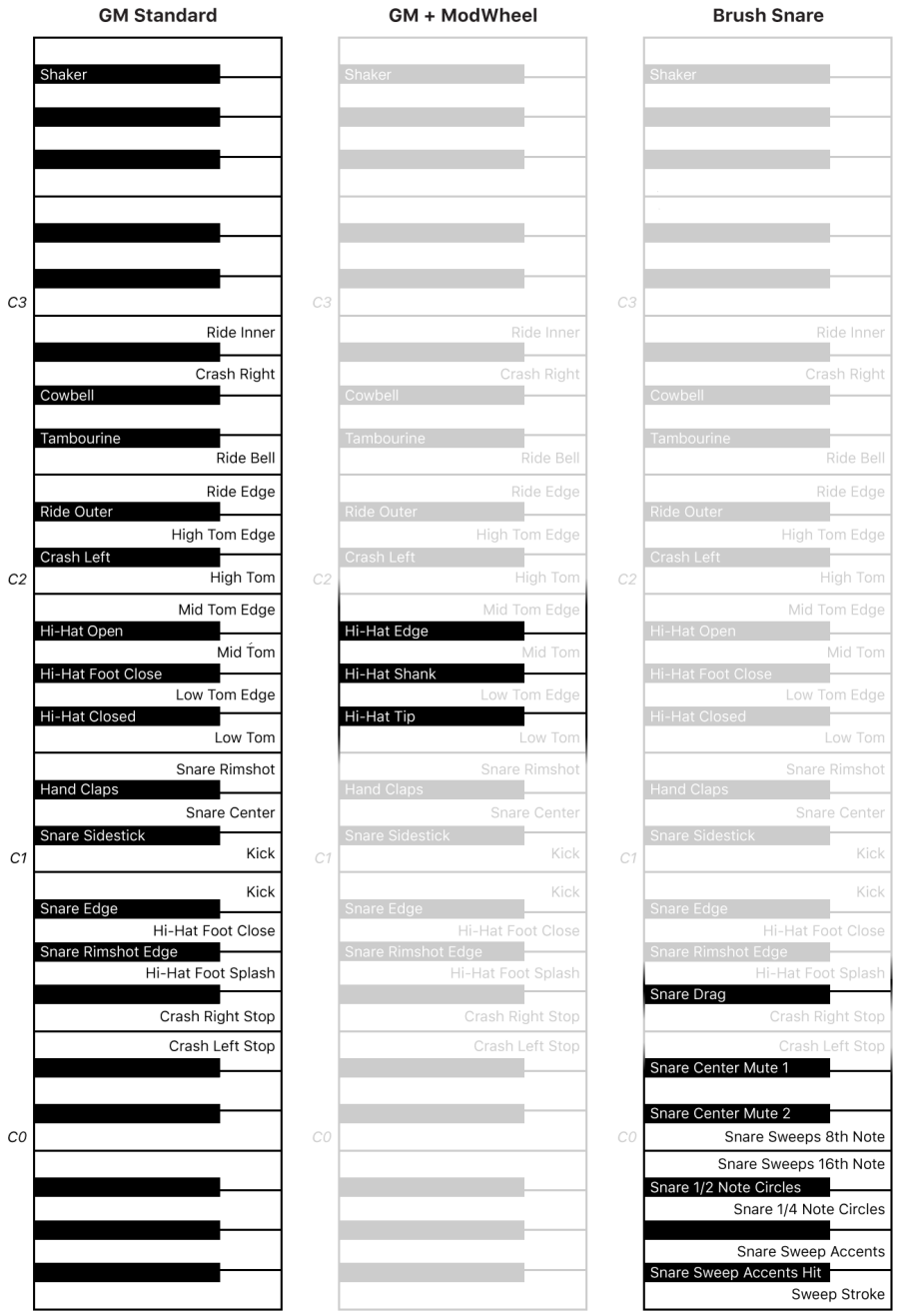
- *Input Mapping pop-up menu:* Choose a keyboard mapping mode. See Drum Kit Designer mappings.
  - *GM:* Drums are mapped to the GM standard.
  - *GM + Mod Wheel Controls HiHat Opening Degree:* The keyboard Mod Wheel is mapped for hi-hat control. Additional sounds are also mapped to keyboard zones above and below the standard GM note mapping range.
  - *V-Drum:* Drums are mapped to work with V-Drum hi-hat, cymbal, and drum triggers.

Drum Kit Designer mappings in Logic Pro for iPad

Drum Kit Designer is compatible with the GM standard. You can also choose GM + Mod Wheel Controls HiHat Opening Degree, which lets you use your keyboard modulation wheel to adjust the amount the hi-hat opens and closes during a drum performance.

Drum Kit Designer is also compatible with the V-Drum standard.

The images show how drum sounds are remapped when different modes are chosen with the Input Mapping pop-up menu, and when using kits that contain brush snares. Kits featuring brush snares provide a number of special features discussed below the images.



Brush snare special features

Kits that contain brush snares have preset behaviors that can enhance your performances and compositions.

Note: The following features apply only to keys that trigger a brush snare drum sound.

- Left and right hand playing is chosen automatically when using MIDI channel 1. This behavior is based on default settings such as the left hand being used for brush circles (if this hand isn't already in use), and playing situation. For example, snare taps will change from a default preference for the right hand to alternating hands if snare hits are played in rapid succession.

  Note: Hand usage can be forced by using MIDI channel 2 for the right hand and MIDI channel 3 for the left hand.

- Brush circles are played continuously while a note is held and loop randomly every bar, synchronized to the project downbeat, tempo, and meter. If a tap on the same hand as a held circle is played, the circle restarts immediately.
- There are two mute states that take brush force into account. These mute states can be active (caused by a brush hit) or passive (caused by the other brush resting on the snare), or can be a combination of both. The current mute state is automatically tracked, which results in a small sound variation each time a snare is played. For example, if a circle is playing, a snare tap will sound slightly different than when played from silence.
- The Snare Center Mute articulations (on keys C#0 and D#0) keep the brush on the snare head after the hit. These keys interrupt a playing circle on the same hand while held. The circle resumes when you release either key.

Drum Machine Designer

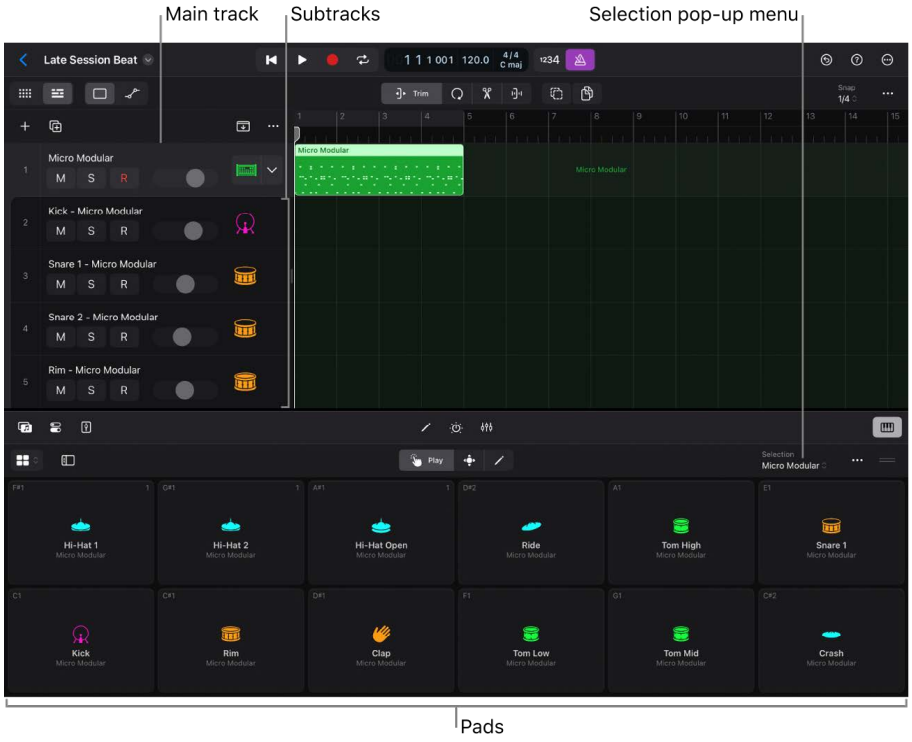
Drum Machine Designer overview in Logic Pro for iPad

Drum Machine Designer is the ideal way to create, organize, and interact with drum kits and kit pieces in Logic Pro for iPad. The Drum Machine Designer Play Surface is available when Drum Machine Designer is inserted on a software instrument track.

When combined with Step Sequencer, it provides an incredibly flexible and inspiring platform for beat production.

Drum Machine Designer structure

Drum Machine Designer is *not* a plug-in, although it can be inserted into software instrument channel strips. It is a track-based meta-instrument using a track stack, which combines a main track and a number of subtracks. Each subtrack has a corresponding channel strip and is assigned a playable pad in a drum grid in the Drum Machine Designer Play Surface. The Play Surface features three different modes you can use to interact with the Play Surface. You can also edit pad settings and surface settings.



- The main track channel strip is represented by the *kit name*, shown at the top of the list in the Selection pop-up menu, located in the top-right corner of the Drum Machine Designer Play Surface.
- Each subtrack channel strip is represented by a corresponding *kit piece pad* shown in the drum grid and by a corresponding *kit piece name* in the Selection pop-up menu.

Settings for the main track (kit) and all subtracks (kit pieces) are stored as a *kit patch*, which can hold multiple channel strips, each with its own instrument and effect plug-ins. Plug-in settings, by comparison, can only hold the plug-in settings of a single plug-in.

A single subtrack with its instrument and effect plug-ins is stored as a *kit piece patch*.

The icon shown on tracks and channel strips always matches the pad icon, and updates when a kit piece's patch changes.

How Drum Machine Designer handles notes

MIDI notes received on the *main track* are converted and distributed to subtracks according to the input and output notes assigned to the pads. This is true for notes played by regions on the main track and for notes played in real time when the main track is the focused track. For example, if the pad assigned to the first subtrack is set to input note C1 and to output note G2, a C1 played on the main track is converted to a G2 in the following way: the note value (C1) is passed to the first subtrack (which has the input note set to C1) and plays a G2 on the instrument inserted in the subtrack channel strip. You focus a main track by tapping the main track header.

In contrast, notes played on a focused *subtrack* are not altered and are passed directly to the instrument inserted in the channel strip, enabling you to play a subtrack instrument chromatically and polyphonically. You focus a subtrack by tapping the subtrack header.

To select a subtrack while keeping the main track focused (to change the sound of a kit piece), you use the Selection pop-up menu in the Drum Machine Designer menu bar or the Plug-ins area.

Separate notes on the main track

You can separate the notes in the main track MIDI region and move them to their corresponding subtracks by doing the following:

- To separate the notes in the main track MIDI region, tap the main track MIDI region, tap Convert, then tap Separate by Note Pitch.

  Individual regions containing these moved note events are created on each subtrack and can be handled and edited in the same way as any other MIDI region.

Drum Machine Designer sounds

You can access Drum Machine Designer kit patches and kit piece patches in the Browser. The Browser features an extensive collection of premapped kit patches and a large number of individual kit piece patches that you can add or use as replacement sounds for pads to create your own custom kits.

You can assign sounds to pads using patches from the Browser, or drop samples, loops, audio files and even MIDI or audio regions directly onto Drum Machine Designer pads. Sounds can also be assigned to subtracks in the Tracks area and Plug-ins area like any other software instrument track.

Note: You can download additional sound packs in the Sound Library to get more kits.

You edit the sound of the entire kit and individual kit pieces in the Plug-ins area. For more information about plug-ins in general, see Intro to plug-ins.

Load a Drum Machine Designer kit from the Browser

1. In Logic Pro, tap the Browser button on the left side of the view control bar, tap Instrument Patches, then do one of the following:
   - Search for kits using the keyword Drum Machine Designer.
   - Tap the All Filters button near the top right of the Browser, then tap the Drum Machine Designer filter in Instrument Plug-Ins.
2. Drag a kit from the Browser to the area below the track headers.

For more information about using the Browser, see Intro to the Browser.

Load an empty Drum Machine Designer kit

1. In Logic Pro, create an empty software instrument track.
2. Tap the Plug-ins button in the center of the view control bar.
3. In Track view, tap the Add Instrument button, tap Drums, then tap Drum Machine Designer (DMD).

   An empty track stack is loaded, and an empty Drum Machine Designer Play Surface is available in the Play Surfaces.

   Note: An empty kit is loaded only if Use Empty Kit as Default is turned on in the surface settings.

Use sounds to create a Drum Machine Designer track

You can easily create Drum Machine Designer tracks using loops and samples from the Browser; MIDI, audio, pattern, and Session Player regions; and your own samples or audio files.

1. In Logic Pro, drag any of the following to the area below the track headers:
   - A loop or sample from the Loops view or Samples view in the Browser.
   - A MIDI, audio, pattern, or Session Player region.
   - Your own sample or audio file from the Samples Folder in the Browser or the Files app in Slide Over.
2. Tap Drum Machine Designer in the “Create new track with” dialog.

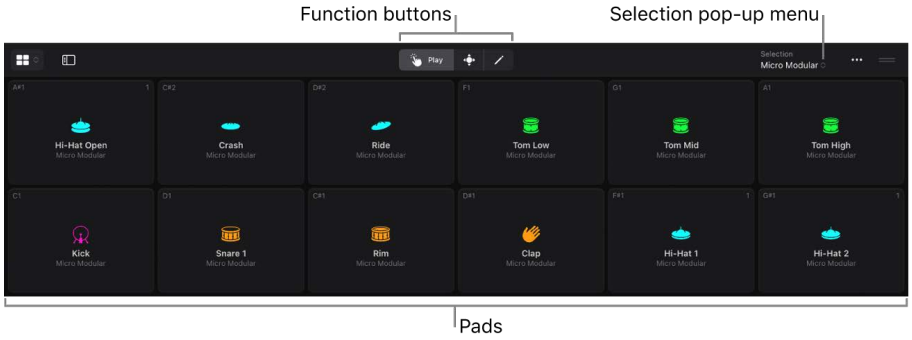
   The process creates a new Drum Machine Designer track with a MIDI region. Logic Pro analyzes the transient positions and slices the loop, placing each slice in a Quick Sampler instance on a subtrack (with an assigned pad in the drum grid).

You can also create Drum Machine Designer tracks using Quick Sampler. For more information, see Use slice markers to create new instruments and regions.

Drum Machine Designer Play Surface in Logic Pro for iPad

The Drum Machine Designer Play Surface in Logic Pro for iPad is an enhanced version of the Drum Pads Play Surface. It is accessible when the Drum Pads Play Surface is selected on a Drum Machine Designer main track. With the Drum Machine Designer Play Surface, you can play back and edit Drum Machine Designer kits.

Note: You can use other Play Surfaces, but the Drum Machine Designer Play Surface gives you access to features specific to Drum Machine Designer. For more information about the Drum Pads, see Intro to Play Surfaces and Use the Drum Pads Play Surface.



The Drum Machine Designer Play Surface features six columns and eight rows of playable pads in a drum grid. Drum and percussion kit pieces assigned to pads can be either synthetically generated or sample based. In fact, you can assign any supported instrument or Audio Unit Extension you have at your disposal to a pad. You can mute, solo, reorder, replace, and change the sound of each kit piece you have assigned to each pad. You can also assign each pad to different input and output notes and to different groups, and you can put kit pieces in exclusive (choke) groups.

Above the drum grid are the different function buttons you can use to switch between Play, Scroll, and Edit modes. In Edit mode, you can access and edit pad settings. You can also edit the surface settings.

Note: The Drum Machine Designer Play Surface shares many functionalities with the Drum Pads Play Surface (and the same icon in the Surface Types menu) but offers more features and flexibility.

Play a drum pad

- In the Drum Machine Designer menu bar in Logic Pro, do one of the following:
  - Tap the Play button or Scroll button, then tap a pad to trigger it.
  - Tap the Edit button, then tap a pad with two fingers to trigger it.

  Note: By default, the velocity is determined by the vertical tap position on the pad. To change this, see surface settings.

Mute or solo a drum pad using the Fader

1. In the Drum Machine Designer menu bar in Logic Pro, do one of the following to select a kit piece:
   - Tap the Edit button, then tap a pad.
   - Tap the Selection pop-up menu, then choose the drum kit or a kit piece.
2. Tap the Fader button on the left side of the view control bar.
3. Tap the Mute button M or the Solo button S in the second Fader to mute the subtrack and pad.

   Note: If you cannot see the Mute button in the Fader, resize or close the Play Surface to create more space.

You can also mute and solo pads in the subtrack header for a pad. See Mute and solo tracks. For more information about the Fader, see Access mixing functions using the Fader.

Adjust the volume of a drum pad

You can set the volume of a pad by dragging the volume slider in the pad's subtrack header. You can also adjust the volume using the second Fader by doing the following:

1. In Logic Pro, with the main track focused, tap the Edit button in the Drum Machine Designer menu bar, then tap a pad to select it.
2. Tap the Fader button on the left side of the view control bar to show the Fader.
3. Drag the handle of the Volume fader up or down in the second Fader to change the volume level.

For more information about the Fader, see Access mixing functions using the Fader.

Scroll the drum grid

You can scroll the Play Surface vertically. You can also scroll horizontally, depending on the screen size and orientation of your iPad.

- In Logic Pro, tap the Scroll button in the Drum Machine Designer menu bar, then scroll the drum grid.

Add kit pieces to unassigned drum pads

In Logic Pro, do one of the following:

- In any mode in the Drum Machine Designer Play Surface drag a kit piece from the Browser to an unassigned pad.
- Tap the Edit button in the Drum Machine Designer menu bar, tap an unassigned pad, then tap Create DMD Subtrack.

Add your own samples or audio files

You can quickly add your own samples or audio files from the Samples Folder in the Browser or the Files app in Split View.

1. In Logic Pro, do one of the following:
   - At the top level of the Browser, tap Sample Folders, then navigate to the folder containing the samples you want to add. To add your own samples to the Browser, see Add your own sample folders to the Browser.
   - Tap the Multitasking button ••• at the top of the screen, tap Split View, the Files app on your Home Screen.
2. Touch and hold the sample you want to add.

   Tip: You can add multiple samples at once using the Files app. To select multiple samples, touch and hold one, drag it slightly, then continue to hold it while you tap additional samples with another finger. A badge indicates the number of selected items.
3. In any mode in Drum Machine Designer in Logic Pro, drag the sample from the Browser or Files app to the Play Surface.

Replace kit pieces using drum pads

- In any mode in the Drum Machine Designer Play Surface in Logic Pro, drag a kit piece from the Browser to an assigned pad.

Replace kit pieces using subtracks

In Logic Pro, with a Drum Machine Designer track stack expanded, do one of the following:

- Drag a kit piece from the Browser to the track header of a subtrack in the Drum Machine Designer track stack.
- In the Browser, activate the Replace Mode button, tap a subtrack in the Drum Machine Designer track stack to select it, then tap a kit piece in the Browser.

Reorder kit pieces

In Logic Pro, you can reorder kit pieces in the following ways:

- Drag a pad to an unassigned pad in the drum grid to swap their positions.
- Drag a pad between two pads in the drum grid. A vertical line is shown to indicate the target location. The pad is placed between the target pads. Adjacent (and other) pads move to accommodate the dropped pad.
- Drag a pad to an assigned pad in the drum grid to swap their positions.

  Note: Dragging behavior is affected by the option you chose in the Reorder Pads menu in surface settings.
  - *Change Sounds:* Changing the pad layout moves the pads and also modifies the MIDI input note of all of the pads moved. The sounds appear in a different order on the grid, and are also triggered by different keys on an external MIDI keyboard or a region on the main track.
  - *Visual Only:* Changing the pad layout moves the pads but does not modify the MIDI routing, so reordering will only have a visual effect. Moved pads appear in a different order, but assigned sounds are still played by the same MIDI notes.

  Neither option modifies the MIDI output notes.

Play a kit piece chromatically and polyphonically

1. In the Logic Pro Tracks area, tap the disclosure arrow in the track header of a track stack, then tap a subtrack.

   The Keyboard Play Surface appears. You can also choose to use a different Play Surface.

2. Tap the keys on the Keyboard Play Surface to play the kit piece chromatically and polyphonically.

3. To show the Drum Machine Designer Play Surface again, tap the main track of the track stack to select it.

Change the sound of a kit or kit piece

1. In Logic Pro, tap the Plug-ins button in the center of the view control bar.

2. Do one of the following:

   - In the Drum Machine Designer menu bar, tap the Selection pop-up menu, then choose the drum kit or a kit piece.
   - In the Drum Machine Designer menu bar, tap the Edit button, then tap a pad in the drum grid.
   - In the Plug-ins area menu bar, tap the Selection pop-up menu, then choose the drum kit or a kit piece.
   - If you have a pattern region on the main track, open Step Sequencer, then select the row for the kit piece you want to edit.

3. In the Plug-ins area, edit the plug-in parameters. For more information about working with plug-ins, see Intro to plug-ins.

Save an edited kit or kit piece as a kit or kit piece patch

1. In the Logic Pro Tracks area, do one of the following:

   - *To save an edited kit:* Tap the icon in the track header of the main track to select it, then tap it again.
   - *To save an edited kit piece:* Tap the icon in the track header of a subtrack to select it, then tap it again.

2. Tap Save Patch, enter a name for the kit, then tap OK.

   Your kit or kit piece is saved in My Instrument Patches in the Browser.

Use MIDI learn with an external MIDI controller

With learn input note, you can assign a pad's input note by playing a note on an external MIDI controller.

1. In Logic Pro, tap the Edit button in the Drum Machine Designer menu bar.

2. Tap a pad in the drum grid to select it, then tap it again to open pad settings.

3. Tap Learn Input Note to activate MIDI learn.

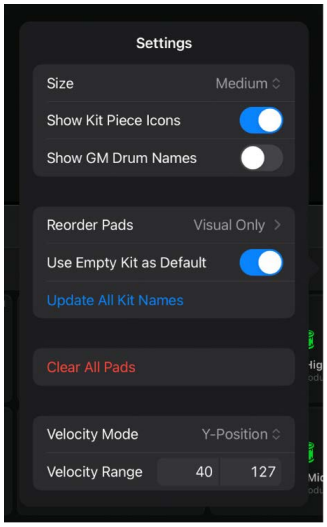
4. Play a note on your external MIDI controller.

   The first note you play is assigned as the pad's input note. Learn input note is deactivated after receiving the first note or, if no note is received, when you close the pad settings.

You can assign multiple pads to the same input note, which allows you to create layered sounds consisting of multiple channel strips with different instruments.

Edit Drum Machine Designer surface settings in Logic Pro for iPad

The surface settings in the Drum Machine Designer Play Surface in Logic Pro for iPad is where you access and edit surface settings that affect the entire Play Surface. You edit the settings of individual pads in pad settings.



Open surface settings

- In Logic Pro, tap the More button ••• in the Drum Machine Designer menu bar, then tap Surface Settings.

Edit surface settings

In surface settings, you can edit any of the following for the Play Surface:

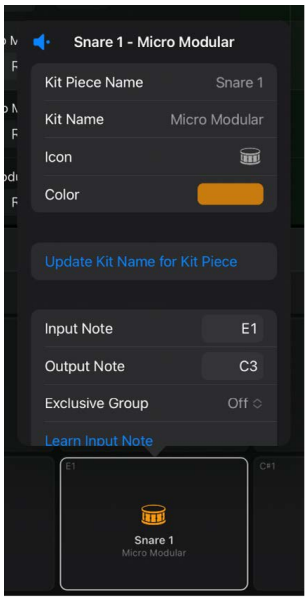
- *Size:* Choose a size for the pads in the drum grid.
- *Show Kit Piece Icons:* Show or hide the icons on each assigned pad.
- *Show GM Drum Names:* Show or hide General MIDI (GM) drum names in the top left corner of each pad. This is useful as a reference when mapping new sounds in a kit that you want to conform with the GM Drum standard.
- *Reorder Pads:* Choose the Change Sounds or Visual Only option to alter how pad layout changes affect assigned pad sounds. The pad layout can be changed by reordering pads. For example, when you insert a pad between other pads or drop one pad onto another to exchange them.
  - *Change Sounds:* Changing the pad layout moves the pads and also modifies the MIDI input note of all of the pads moved. The sounds appear in a different order on the grid, and are also triggered by different keys on an external MIDI keyboard or a region on the main track.
  - *Visual Only:* Changing the pad layout moves the pads but does not modify the MIDI routing, so reordering will only have a visual effect: Moved pads appear in a different order, but assigned sounds are still played by the same MIDI notes.

    - *Reorder by GM Drum Names:* Choose to automatically remap the order of pads to the General MIDI (GM) Drum standard, which is used by Drummer. This changes the visual order of pads, but does not remap sounds.
    - *Reorder Chromatically:* Choose to automatically remap the order of pads chromatically from C1. This changes the visual order of pads, but does not remap sounds.
- *Use Empty Kit as Default:* Choose whether to use an empty kit when you insert Drum Machine Designer on an instrument channel strip.
- *Update all Kit Names:* Choose to apply the current kit name to all kit pieces. This is useful when you add new kit pieces to an existing kit.
- *Clear all Pads:* Remove all assigned kit pieces from all pads. This clears the plug-in settings for each pad but doesn't delete the corresponding subtracks or main track.
- *Velocity Mode:* Determine how the velocity value is created when tapping a pad.
    - *Fixed:* All notes have the same velocity, which is set by the Velocity value.
    - *Dynamic:* The velocity value is determined by how hard or soft you tap on the pads. Minimum and maximum velocity are determined by the Velocity Range values.
    - *Y-Position:* The velocity value is determined by the vertical tap position on the pad. Minimum and maximum velocity are determined by the Velocity Range values.
- *Velocity Range:* Set the velocity range for the pads.

  Note: When the velocity mode is set to fixed, you can choose a single velocity value, not a range of values.

Edit Drum Machine Designer pad settings in Logic Pro for iPad

In Logic Pro for iPad, you access and edit the settings for individual pads in the Drum Machine Designer Play Surface using the pad settings, which are accessible in Edit mode. You can also edit settings that affect the entire Play Surface in surface settings.



Open pad settings

1. In Logic Pro, tap the Edit button in the Drum Machine Designer menu bar.
2. Tap a pad in the drum grid to select it, then tap it again to open pad settings.

Edit pad settings

In pad settings for empty pads, you can edit any of the following for each pad:

- *Input Note:* Choose an input note number for the pad. You can assign multiple pads to the same input note, allowing you to create layered sounds consisting of multiple channel strips with different instruments.
- *Output Note:* Choose an output note number for the pad. For more information, see How Drum Machine Designer handles notes.
- *Learn Input Note:* Activate MIDI learn for the pad's input note. For more information, see Use MIDI learn with an external MIDI controller.
- *Create DMD Subtrack:* Creates a new channel strip and subtrack for the pad with no instrument loaded.

In pad settings for assigned pads, you can also edit any of the following for each pad:

- *Kit Piece Name:* Choose a new name for the kit piece.
- *Kit Name:* Choose a new kit name for the kit piece.

  Note: If the kit name for a kit piece is different to the overall name of the kit, tapping Update Kit Name for Kit Piece undoes changes made here.
- *Icon:* Open a window where you can choose a kit piece icon from several categories. Select a category from the list and tap an icon to assign it to the kit piece.
- *Color:* Chose a color for the pad icon.
- *Update Kit Name for Kit Piece:* Choose to apply the current kit name to the selected kit piece.
- *Exclusive Group:* Choose a choke group for the pad. You can assign multiple pads to the same group. As soon as one drum sound in the group is triggered, all other sounds in that same group are stopped. For example, you could group three pads with open, semi-closed, and closed hi-hat sounds. Only one of these sounds can be played at a time, mirroring the behavior of real hi-hats.
- *Resample Pad:* Choose to initiate a resampling process. This sends the input note of the selected pad to Drum Machine Designer, which plays the assigned instrument(s), inclusive of all channel strip and main track plug-ins. The resulting Drum Machine Designer output is resampled, and loaded into a new Quick Sampler instance on a new channel strip and subtrack, which is automatically assigned to the first available (lowest numbered) unassigned pad.
- *Clear Pad:* Remove the kit piece assigned to the pad. This clears the channel strip of the pad subtrack but doesn't delete the subtrack.

Drum Synth

Drum Synth in Logic Pro for iPad

Drum Synth provides you with easy access to a powerful electronic drum synthesis engine. Depending on the sound type you've chosen, up to eight specially selected controls for pitch, filtering, effect, and envelopes allow you to quickly create the electronic drum sound you need. You can, of course, add further processing plug-ins in the instrument channel strip or busses.

Drum Synth is ideal for adding fills, flourishes, or individual hits to an existing Drummer groove, loops, and live or sequenced parts, and for drum replacement and doubling tasks.

You can use multiple Drum Synth instances, either as individual software instrument tracks or inside Drum Machine Designer, which allows you to build complete electronic drum sets, encompassing everything from vintage drum machine through to modern synthetic percussion sounds.

To add Drum Synth to your project, choose it from the Instrument > Drums submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Drum Synth global controls in Logic Pro for iPad

Drum Synth global Kit Piece controls let you choose the sound type and the global Mode controls set the overall instrument behavior.

Global parameters are always visible in the plug-in.



Kit Piece parameters

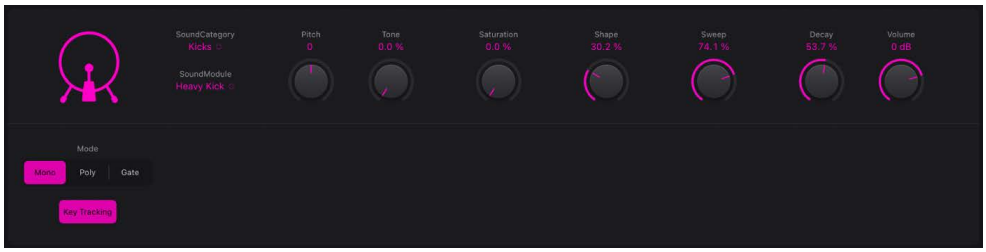
- *Sound Category pop-up menu:* Choose a drum or percussion instrument family: Kicks, Snares and Claps, Percussion, Hats and Cymbals.
- *Sound Module pop-up menu:* Choose a drum or percussion sound type from the active instrument category.

Drum Synth Mode parameters

- *Mode buttons:* Choose a playback mode.
  - *Mono:* One voice can be played. If you play another key, the newly played note cuts off the playing note.
  - *Poly:* You can play multiple notes simultaneously.
  - *Gate:* Like ‘Mono’, but the sound is heard only while you hold the key.
- *Key Tracking button:* Choose a key tracking mode.
  - *Turn Off:* Play the sound at the root pitch when any key is struck.
  - *Turn On:* Play the sound chromatically.

Drum Synth Kicks in Logic Pro for iPad

You can create kick drums that range from soft, classic electronic sounds to more modern and punchy sounds with the Drum Synth Kicks group instruments.



Drum Synth kick sound parameters

You can change the kick drum sound by adjusting its parameters. Parameters interact with each other, changing the behavior and impact of adjustments you make, resulting in a broader range of potential sounds.

Note: Not all of the alphabetically listed parameters are available for each type of kick drum sound. Parameters change when a different kick sound is chosen.

- *Body knob:* Alter the depth of the sound, making it fuller and richer.
- *Decay knob:* Set the length of the decay phase of the sound.
- *Noise knob:* Add a noise signal to the sound.
- *Pitch knob:* Set the tuning of the sound in semitone steps.
- *Punch knob:* Adjust the tone of the attack phase of the sound.
- *Saturation knob:* Set the saturation amount. This adds a warm distortion.
- *Shape knob:* Adjust the shape of the kick drum.
- *Snap knob:* Set the amount of beater noise.
- *Sweep knob:* Adds heft to the attack phase of the sound.
- *Tone knob:* Set the overall tonal color of the sound.
- *Volume knob:* Set the output level of the sound.

Drum Synth Snares and Claps in Logic Pro for iPad

You can create synthetic and electronic snares, rimshots, and handclaps with the Drum Synth Snares and Claps group instruments.



Drum Synth snare and clap sound parameters

You can change the snare or clap sound by adjusting its parameters. Parameters interact with each other, changing the behavior and impact of adjustments you make, resulting in a broader range of potential sounds.

Note: Not all of the alphabetically listed parameters are available for each type of snare or clap sound. Parameters change when a different snare or clap sound type is chosen.

- *Body knob:* Alter the depth of the sound, making it fuller and richer.
- *Crush knob:* Add a lo-fi digital distortion to the sound.
- *Cycles knob:* Smear the sound. Set the rate with the Speed knob.
- *Decay knob:* Set the length of the decay phase of the sound.
- *Dirt knob:* Add grit and fizz to the sound.
- *Noise knob:* Add a noise signal to the sound.
- *Pitch knob:* Set the tuning of the sound in semitone steps.
- *Position knob:* Set the position of the drum strike.
- *Size knob:* Set the size of the drum shell.
- *Speed knob:* Set the rate of cycles. Use the Cycles knob to set intensity of smearing.
- *Tension knob:* Adjust snare tension, making the sound snap more or less.
- *Tone knob:* Set the overall tonal color of the sound.
- *Volume knob:* Set the output level of the sound.

Drum Synth Percussion in Logic Pro for iPad

You can create electronic tom sounds, synthetic percussion and wild metallic tones with the Drum Synth Percussion group instruments.



Drum Synth percussion sound parameters

You can change the percussion sound by adjusting its parameters. Parameters interact with each other, changing the behavior and impact of adjustments you make, resulting in a broader range of potential sounds.

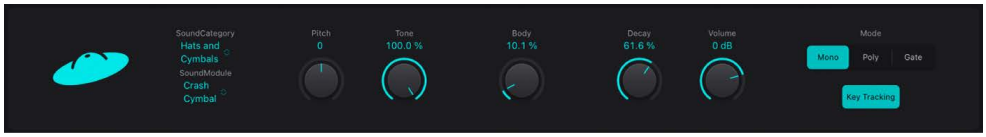
Note: Not all of the alphabetically listed parameters are available for each type of percussion sound. Parameters change when a different percussion sound type is chosen.

- *Attack knob:* Set the length of the attack phase of the sound.
- *Body knob:* Alter the depth of the sound, making it fuller and richer.
- *Color knob:* Set the tonal color of the sound.
- *Crush knob:* Add a lo-fi digital distortion to the sound.
- *Decay knob:* Set the length of the decay phase of the sound.
- *Dirt knob:* Add grit and fizz to the sound.
- *Dissonance knob:* Alter tones by introducing inharmonic content.
- *Harmonic knob:* Alter metallic tones by introducing harmonic content.
- *Material knob:* Make the sound more woody, rubbery or bell-like. The Material knob interacts with the Tension knob.

  Note: The Material knob can also be impacted heavily by the Dissonance knob, if available as a parameter in the chosen sound.
- *Noise knob:* Add a noise signal to the sound.
- *Pitch knob:* Set the tuning of the sound in semitone steps.
- *Saturation knob:* Set the saturation amount. This adds a warm distortion.
- *Snap knob:* Set the tone of the attack phase.
- *Tension knob:* Adjust the rigidity of the core sound you set with the Material knob.
- *Tone knob:* Set the overall tonal color of the sound.
- *Volume knob:* Set the output level of the sound.

Drum Synth Hats and Cymbals in Logic Pro for iPad

You can create electronic crash and ride cymbal sounds, hi-hat sounds, and shaker sounds with the Drum Synth Hats and Cymbals group instruments.



Drum Synth hat and cymbal sound parameters

You can change the hat or cymbal sound by adjusting its parameters. Parameters interact with each other, changing the behavior and impact of adjustments you make, resulting in a broader range of potential sounds.

Note: Not all of the alphabetically listed parameters are available for each type of hat or cymbal sound. Parameters change when a different hat or cymbal sound type is chosen.

- *Attack knob:* Alter the attack phase of the sound.
- *Bell knob:* Introduce bell-like harmonics into the sound.
- *Body knob:* Alter the depth of the sound, making it fuller and richer.
- *Character knob:* Add a metallic edge to the sound with higher values.
- *Crush knob:* Add a lo-fi digital distortion to the sound.
- *Decay knob:* Set the length of the decay phase of the sound.
- *Dirt knob:* Add grit and fizz to the sound.
- *Dissonance knob:* Alter tones by introducing inharmonic content.
- *Metallic knob:* Alter tones by introducing harmonic content.
- *Noise knob:* Add a noise signal to the sound.
- *Pitch knob:* Set the tuning of the sound in semitone steps.
- *Tone knob:* Set the overall tonal color of the sound.
- *Volume knob:* Set the output level of the sound.

EFM1

EFM1 in Logic Pro for iPad

The 16-voice EFM1 is a simple but powerful frequency modulation synthesizer. It can produce the rich bell and digital sounds that frequency modulation (FM) synthesis has become synonymous with.

If you're new to synthesizers, see Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis methods and how they work.

To add EFM1 to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.



EFM1 is divided into several areas.

- *Modulator and Carrier parameters:* The FM engine consists of the modulator and carrier parameters and the Carrier FM Intensity knob. These are the key controls for setting the basic tone of EFM1. See EFM1 Modulator and carrier.
- *Modulation parameters:* The LFO and modulation envelope are used to animate the sound. See EFM1 modulation parameters.
- *Output parameters:* The Output section includes the Volume Envelope, Main Level, and other parameters that you can use to control the EFM1 level. See EFM1 output parameters.
- *Global parameters:* These parameters set the overall tuning of EFM1, set the Glide (portamento) time, limit the number of voices, and thicken the sound with Unison. You can also create random patch variations with a button tap. See EFM1 global parameters.
- *MIDI Controller parameters:* These parameters allow you to assign MIDI controllers for FM intensity and vibrato. See EFM1 MIDI controller assignments.

User Guide conventions

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- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

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Modulator and carrier parameters

EFM1 Modulator and carrier controls in Logic Pro for iPad

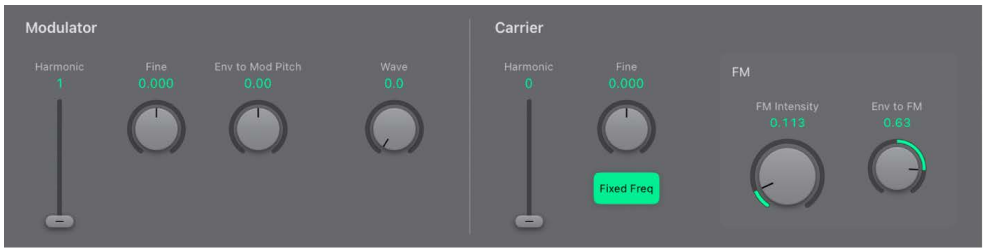
In FM synthesis, the basic sound is generated by setting different tuning ratios between the modulator and carrier oscillators and by altering the FM intensity. The tuning ratio determines the basic overtone structure, and FM intensity controls the level of these overtones.

At the core of the EFM1 synthesis system is a multiwave modulator oscillator and a sine wave carrier oscillator. The basic sine wave of the carrier oscillator is a pure, characterless tone.

To make things more sonically interesting, you use the modulator oscillator to modulate the frequency of the carrier oscillator. This modulation occurs in the audio range—you can hear it—and results in a number of new harmonics becoming audible.

The pure sine wave of the carrier oscillator is combined with the newly generated harmonics, making the sound more interesting.

Changes to the ratio of the two oscillators is achieved by adjusting the Harmonic parameters, found in both the Modulator and Carrier sections. Additional tuning control is provided by the Fine (tune) parameters.



Modulator parameters

- *Harmonic slider and field:* Set the tuning ratio between the modulator and carrier oscillators. See Set the EFM1 tuning ratio.
- *Fine knob and field:* Adjust the tuning between two adjacent harmonics, as determined by the Harmonic controls of both oscillators. The range of this control is ±0.5 harmonic. In the centered position, Fine tune does not have an effect. Double-tap to center the knob. Depending on the amount of detuning, you will hear one of the following:
  - A subtle “beating” of the timbre if lower detuning amounts are used.
  - New harmonic and inharmonic overtones if high detuning amounts are used.

- *Env to Mod Pitch knob and field:* Determine the impact of the modulation envelope on the pitch of the modulator oscillator. See EFM1 modulation parameters.
  - If you turn the knob clockwise, you increase the effect of the modulation envelope. If you turn the knob counterclockwise, you invert the effect of the modulation envelope, as follows: the envelope slopes down during the attack phase and slopes up during the decay and release time phases.
  - If you double-tap to center the knob, the envelope has no effect on the pitch of the modulator oscillator.
- *Wave knob and field:* Choose a different waveform for the modulator oscillator. See Choose an EFM1 modulator waveform.

Carrier parameters

- *Harmonic slider and field:* Set the tuning ratio between the modulator and carrier oscillators. See Set the EFM1 tuning ratio.
- *Fine knob and field:* Adjust the tuning between two adjacent harmonics, as determined by the Harmonic knobs of both oscillators. The range of this control is ±0.5 harmonic. In the center (0) position, Fine (tune) has no effect. Double-tap to center the knob. Depending on the amount of detuning, you will hear one of the following:
  - A subtle "beating" of the timbre if lower detuning amounts are used.
  - New harmonic and inharmonic overtones if high detuning amounts are used.
- *Fixed Freq button:* Disconnect the carrier frequency from keyboard, pitch bend, and LFO modulations, resulting in a carrier tone that is free of these modulation sources.
-  *FM Intensity knob and field:* Set the amount of carrier oscillator frequency modulation by the modulator oscillator. Adjust to increase the intensity and number of overtones, making the sound brighter. Also see EFM1 MIDI controller assignments.

  Note: Although the technology behind it is very different, you could compare the FM Intensity parameter with the Filter Cutoff parameter of an analog synthesizer.
-  *Env to FM knob and field:* Determine the impact of the modulation envelope on FM intensity. See EFM1 modulation parameters.
  - If you turn the knob clockwise, you increase the effect of the modulation envelope. If you turn the knob counterclockwise, you invert the effect of the modulation envelope, as follows: the envelope slopes down during the attack phase and slopes up during the decay and release time phases.
  - If you double-tap to center the Env to FM knob, the envelope has no effect on FM intensity.

Set the EFM1 tuning ratio in Logic Pro for iPad

The carrier frequency is determined by the played key, and the modulator frequency is typically a multiple of the carrier frequency.

You can tune the modulator and carrier to any of the first 32 harmonics. The tuning relationship, or ratio, between the two significantly changes the base sound of EFM1, and is best set by ear.

You use the modulator and carrier Harmonic sliders to set the tuning ratio between the modulator and carrier oscillators.

In general, even tuning ratios between the carrier and modulator tend to sound more harmonic or musical, whereas odd ratios produce more inharmonic overtones—which are great for bell and metallic sounds.

In this respect, you can view the tuning ratio as being somewhat like the waveform selector of an analog synthesizer.

Note: The Harmonic sliders and Fine (tune) knobs in the Modulator and Carrier sections only affect the tuning relationship between the carrier and modulator oscillators. These should not be confused with the global Transpose and Tune parameters, which determine the overall tuning of EFM1 (see EFM1 global parameters).

Experiment with basic tuning ratios

In Logic Pro, do one of the following:

- Adjust the Harmonic sliders in the Modulator and Carrier sections to set the modulator and carrier to the first harmonic—a 1:1 ratio.

  A sawtooth-like sound is produced.

- Adjust the (Modulator) Harmonic slider to set the modulator to the second harmonic and use the (Carrier) Harmonic slider to set the carrier to the first harmonic—a 2:1 ratio.

  A tone that sounds similar to a square wave is produced.

Choose an EFM1 modulator waveform in Logic Pro for iPad

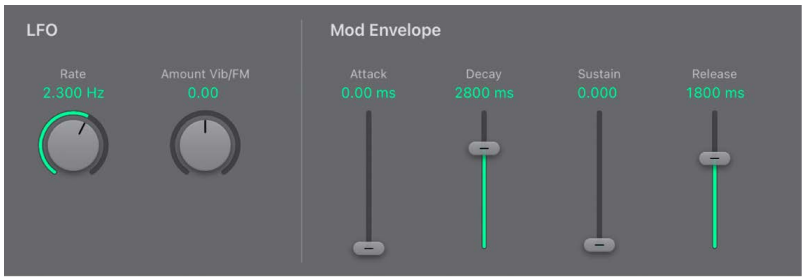
In classic FM synthesis, sine waves are used as modulator and carrier waveforms. The EFM1 modulator oscillator provides a number of additional digital waveforms, which extend its sonic capabilities significantly. These waveforms contain additional harmonics that add a new level of richness to the resulting FM sounds.

Choose a different modulator waveform

- In Logic Pro, turn the Wave knob in the Modulator section.
  - If you turn the knob to the full-left position, the modulator produces a sine wave.
  - If you turn the knob clockwise, you step—or fade—through a series of complex digital waveforms.

EFM1 modulation parameters in Logic Pro for iPad

FM synthesis is, at its core, caused by the intensity and type of modulations that take place in the signal path. The modulators outlined in this section have a different impact and role to play than equivalent LFOs and envelopes found in analog synthesizer designs.



LFO parameters

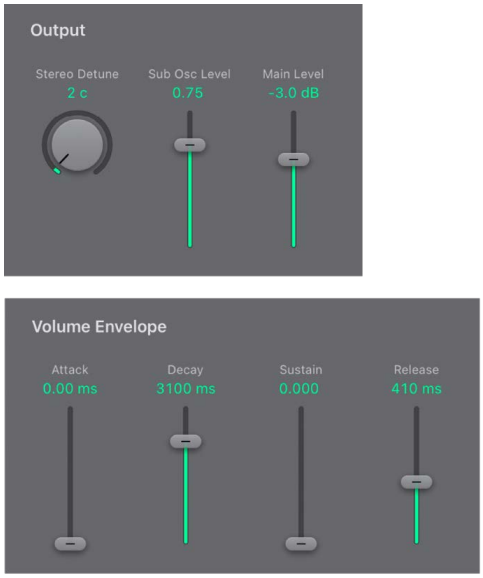
- *Rate knob:* Set the speed of the LFO.
- *Amount Vib/FM knob:* Set the amount of modulation applied to FM intensity or pitch.
  - If you turn the Amount Vib/FM knob clockwise, you increase the effect of the LFO on Carrier FM Intensity. If you turn the knob counterclockwise, you introduce a vibrato.
  - If you double-tap to center the knob, the LFO has no effect on FM intensity or pitch.

Mod Envelope parameters

- *Modulation Envelope sliders:* Control both the (Carrier) FM Intensity and Modulator pitch parameters over time. The envelope is triggered every time a MIDI note is received.
  - *Attack slider:* Set the time it takes to reach the maximum envelope level.
  - *Decay slider:* Set the time it takes to reach the sustain level.
  - *Sustain slider:* Set a level that is held until the MIDI note is released.
  - *Release slider:* Set the time it takes to reach a level of 0, after the MIDI note has been released.

EFM1 output parameters in Logic Pro for iPad

EFM1 provides the following level controls.



Output parameters

- *Stereo Detune knob and field:* Add a chorus-like effect to the sound. This is achieved by doubling the EFM1 voice with a secondary, detuned FM engine. High values result in a wide stereo effect being added to the detuning, thus increasing the perceived space and width of your sound.

  Note: It is possible that mono compatibility could be lost with use of this parameter.

- *Sub Osc Level slider and field:* Introduce a sub-oscillator signal that enhances bass response. EFM1 features a sine wave sub-oscillator. This operates one octave below the FM engine, as determined by the Transpose parameter. Increase the Sub Osc Level control to mix the sub-oscillator sine wave with the FM engine output.
- *Main Level slider and field:* Set the overall output level.

Volume Envelope parameters

The volume Envelope shapes the level of the sound over time. The volume envelope is triggered every time a MIDI note is received. It provides the listed controls.

- *Attack slider:* Set the time it takes to reach the maximum volume level.
- *Decay slider:* Set the time it takes to reach the sustain level.
- *Sustain slider:* Set a level that is held until the MIDI note is released.
- *Release slider:* Set the time required to reach a level of zero, after the MIDI note has been released.

EFM1 global parameters in Logic Pro for iPad

The global parameters are used to set the tuning, number of voices, and other aspects of the overall sound.



Global parameters

- *Tune knob and field:* Fine-tune the pitch in cents. One cent is 1/100th of a semitone.
- *Transpose pop-up menu:* Choose the base pitch. You can transpose by semitones or octaves.
- *Glide knob and field:* Introduce a continuous pitch bend between two consecutively played notes. Adjust the value to set the time required for the pitch to travel from the last played note to the next.

  Note: Glide can be used in both of the monophonic modes—Mono and Legato—or in any of the polyphonic settings—where Voices is set from 2 to 16.
- *Voices pop-up menu:* Choose the number of simultaneously playable voices. Choose from: legato (one voice), mono (one voice), or any number from 2 to 16 voices.
  - In Mono mode, staccato playing retriggers the envelope generators every time a new note is played. If you play in a legato style (play a new key while holding another), the envelope generators are triggered only for the first note you play legato, then they continue their curve until you release the last legato played key.
  - Legato mode is also monophonic, but with one difference: the envelope generators are retriggered only if you play staccato—releasing each key before playing a new key. If you play in a legato style, envelopes are not retriggered.

  Note: On several monophonic synthesizers, the behavior in Legato mode is referred to as *single trigger*, while Mono mode is referred to as *multi trigger*.
- *Unison button:* Layer two complete voices, thus making the sound richer. EFM1 can be played with up to eight-voice polyphony when in unison mode.
- *PB Range slider:* Set a pitch bend range from 0 to 24 semitones.
- *Velo Sens slider and field:* Determine the sensitivity to incoming MIDI velocity messages. EFM1 dynamically reacts to MIDI velocity—harder playing results in a brighter and louder sound. Set the VeloSens control all the way to the left—counterclockwise—if you don't want EFM1 to respond to velocity.
- *Randomize knob and field:* Determine the amount of randomization—variance from the original sound.
- *Randomize Trigger button:* Create a new sound by randomizing multiple parameters.

Create a random sound

The Randomize feature generates new sounds by randomly altering a number of key parameter values.

This feature is ideal for creating subtle variations of a particular sound or for creating totally new sounds. It is useful when getting started with FM synthesis.

- In Logic Pro EFM1, tap the Randomize Trigger button.

  You can tap multiple times. Save your settings as you go if you generate a sound you want to keep.

Limit the amount of randomization

- In Logic Pro EFM1, rotate the Randomize knob to set the amount of randomization—variance from the original sound.

  If you want to only randomly “tweak” the current sound, use values below 10%. Use higher values to radically change the sound with each tap on the Randomize Trigger button.

EFM1 MIDI controller assignments in Logic Pro for iPad

EFM1 allows remote control with your MIDI controller keyboard or other MIDI device.



MIDI Controller parameters

- *Ctrl FM Amount knob and field:* Set the maximum amount of Carrier oscillator FM Intensity modulation with the chosen MIDI controller.
- *Ctrl FM pop-up menu:* Choose a MIDI controller to use for FM intensity modulation.
- *Ctrl Vib Amt knob and field:* Set the maximum amount of Modulator oscillator pitch modulation with the chosen MIDI controller.
- *Ctrl Vibrato pop-up menu:* Choose a MIDI controller to use for pitch modulation.

MIDI Mono Mode (MPE) parameters

- *MIDI Mono Mode pop-up menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16).

  In either mode, each voice receives on a different MIDI channel. Controllers and MIDI messages sent on the base channel affect all voices.

- *Pitch Bend Ran(ge) knob and field:* Set a range from 0 to 96 semitones.

  The chosen range affects individual note pitch bend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar to MIDI converters use this range by default.

Note: EFM1 also responds to standard MIDI pitch bend data. Pitch bend is hard-wired to the overall pitch of EFM1.

ES E

ES E in Logic Pro for iPad

The eight-voice ES E (ES Ensemble) synthesizer is ideal for quickly creating warm, rich pad and ensemble sounds.

ES E produces sounds using subtractive synthesis. It features an oscillator that generates harmonically rich waveforms. You *subtract*—cut, or filter out—portions of these waveforms and reshape them to create new sounds.

If you're new to synthesizers, see Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis methods and how they work.

To add ES E to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.



User Guide conventions

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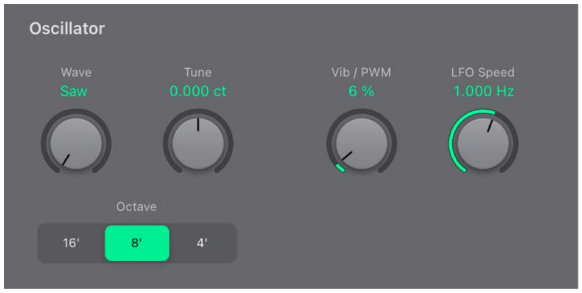
ES E oscillator parameters in Logic Pro for iPad

The ES E oscillator generates a waveform, which is then sent to other portions of the synthesizer engine for processing or manipulation.

ES E oscillator parameters include an LFO (low frequency oscillator), which generates a cyclic waveform that is used to modulate the ES E waveform.

The behavior and effect of the LFO depend on whether a sawtooth or pulse wave is selected.

- If Wave is set to sawtooth, the LFO modulates the frequency of the waveform, resulting in a vibrato or siren effect—depending on the LFO speed and intensity.
- If Wave is set to a pulse wave, the LFO modulates the waveform pulse width—pulse width modulation (PWM).



Oscillator parameters

- *Wave knob and field:* Select the waveform of the oscillator, which is responsible for the basic color of the tone. The leftmost setting of the Wave parameter causes the oscillators to output sawtooth signals. Across the remaining range, the oscillators output pulse waves, with the average pulse width determined by the Wave parameter position.
- *Tune knob and field:* Tune the instrument sound in cents. A cent is 1/100th of a semitone.
- *Octave buttons:* Tap to switch the pitch in octaves—transpose it up or down. The lowest setting is 16 feet, and the highest is 4 feet. The use of the term *feet* to determine octaves comes from the measurements of organ pipe lengths. The longer and wider the pipe, the deeper the tone.

LFO parameters

- *Vib / PWM knob and field:* Define the intensity of LFO modulation.
- *LFO Speed knob and field:* Set the frequency of LFO modulation.

  Note: When the pulse width becomes very narrow, the signal sounds as if it is being interrupted—"breaking up." Given this potential artifact, set the PWM intensity with care. Set the Wave parameter to the 12 o'clock position (50% rectangular) for pulse width to attain the maximum modulation range.

ES E filter parameters in Logic Pro for iPad

ES E includes a lowpass filter that lets you contour the output from the oscillator.



Filter parameters

- *Cutoff knob and field:* Control the cutoff frequency of the filter.
- *Resonance knob and field:* Boost or cut portions of the signal that surround the frequency defined by the Cutoff parameter.

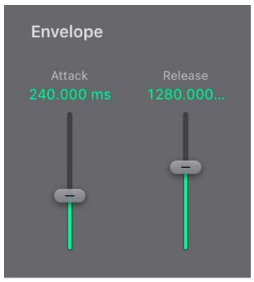
  Note: Increasing the Resonance value results in a rejection of bass—low frequency energy—when using lowpass filters.
- *Filter Env Depth knob and field:* Set the amount (depth) of cutoff frequency modulation applied by the envelope generator.

  Note: ES E provides one envelope generator per voice, offering Attack and Release parameters (see ES E envelope parameters).
- *Filter Vel knob and field:* Set the velocity sensitivity of the cutoff frequency modulation applied by the envelope generator.

  Note: This parameter has no effect if Filter Env Depth is set to 0.

ES E envelope parameters in Logic Pro for iPad

The AR (Attack and Release) envelope affects both the filter cutoff and the level of the sound over time.



Envelope parameters

- *Attack slider and field:* Set the time required for the signal to reach the initial signal level, known as the sustain level.
- *Release slider and field:* Set the time it takes for the signal to fall from the sustain level to a level of zero.

ES E amp and effect parameters in Logic Pro for iPad

The ES E output stage consists of the Amp section and the Effect section Modulation pop-up menu.



Amp parameters

- *Volume knob and field:* Set the overall output level.
- *Volume Vel knob and field:* Set the amount (depth) of velocity sensitivity to incoming MIDI note events. When set to higher values, each note is louder, if struck more firmly. At lower values, the dynamic response is reduced, so that there is little difference when you play a note pianissimo (soft) or forte (loud/hard).

Effect parameter

- *Modulation pop-up menu:* Choose from different effect types or turn off the effect processor.
  - Off turns off the effect processor.
  - Chorus I is a typical chorus effect.
  - Chorus II is characterized by a stronger modulation.
  - Ensemble has a fuller and richer sound, due to a more complex modulation routing.

ES E pitch bend parameters in Logic Pro for iPad

ES E offers two parameters that control the way pitch bend works.

Pitch bend range parameters

- *Bend Up knob and field:* Set the upward pitch bend range in semitone steps. This lets you use the pitch bend controller of your keyboard to bend the ES E pitch.
- *Bend Down knob and field:* The default bend range is a positive pitch bend. In other words, this means that only positive pitch bend is normally available. You can set the Bend Down range in semitone steps by up to 2 octaves (a value of 24), allowing both positive and negative bends. Set to Linked to assign the same value to upward and downward pitch bends with the Bend Up knob.

ES M

ES M in Logic Pro for iPad

The monophonic ES M (ES Mono) synthesizer is a good starting point if you're looking for bass sounds that punch through your mix.

ES M features an automatic fingered portamento mode, making bass slides easy. It also provides an automatic filter compensation circuit that delivers rich, creamy basses, even when you use higher resonance values.

ES M produces sounds using subtractive synthesis. It has an oscillator that generates harmonically rich waveforms. You *subtract*—cut, or filter out—portions of these waveforms and reshape them to create new sounds.

If you're new to synthesizers, see Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis methods and how they work.

To add ES M to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.



ES M is divided into a few parameter areas.

- *Oscillator parameters:* The oscillator generates the basic waveforms that form the basis of your sound. See ES M oscillator parameters.
- *Filter and filter envelope parameters:* The filter is used to contour the waveforms sent from the oscillators. The filter envelope parameters control the filter cutoff over time. See ES M filter and filter envelope.
- *Output parameters:* The level envelope and effect parameters control the level of the sound over time. The integrated Overdrive can be used to color or add bite to the sound. See ES M envelope and effect controls.

User Guide conventions

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ES M oscillator parameters in Logic Pro for iPad

The synthesizer oscillator is used to generate a waveform, which is then sent to other portions of the synthesizer engine for processing or manipulation.



Oscillator parameters

- *Saw/Square Mix knob and field:* Set the waveform of the oscillator, which is responsible for the basic color of the tone.
  - Set all the way to the left to output a sawtooth waveform from the oscillator.
  - Set all the way to the right to output a 50% rectangular wave, which is heard one octave below the sawtooth.
  - For any setting between these extreme positions, the oscillator outputs a crossfaded mix of the two waveforms.
- *Tune knob and field:* Tune the instrument in cents. One cent is 1/100th of a semitone.
- *Octave buttons:* Tap to switch the pitch in octaves—transpose it up or down. The lowest setting is 32 feet, and the highest is 8 feet. The use of the term *feet* to determine octaves comes from the measurements of organ pipe lengths. The longer and wider the pipe, the deeper the tone.
- *Glide knob and field:* Introduce a continuous pitch bend between two consecutively played notes. Adjust the value to set the time required for the pitch to travel from the last played note to the next. At a value of 0, no glide effect occurs.

  Note: ES M always works in a fingered portamento mode, with notes played in a legato style resulting in a glide—portamento—from pitch to pitch.

ES M filter and filter envelope in Logic Pro for iPad

ES M includes a lowpass filter that lets you contour the output from the oscillator. The filter has a dedicated envelope.



Filter and filter envelope parameters

- *Cutoff knob and field:* Set the cutoff frequency of the filter. Its slope is 24 dB/octave.
- *Resonance knob and field:* Boost or cut portions of the signal that surround the frequency defined by the cutoff parameter.

  Note: Increasing the Resonance value results in a rejection of bass—low frequency energy—when using lowpass filters. The ES M compensates for this side-effect internally, resulting in a more bassy sound.
- *Env Depth knob and field:* Define the amount (depth) of cutoff frequency modulation applied by the envelope generator.
- *Decay knob and field:* Set the decay time of the filter envelope.
- *Env Velo knob and field:* Set the velocity sensitivity of the cutoff frequency modulation applied by the envelope generator.

  Note: The Env Decay and Env Velo parameters have no effect if Filter Depth is set to 0.

ES M amp and effect controls in Logic Pro for iPad

The ES M output stage offers the following parameters.



Amp and effect parameters

- *Volume knob and field:* Set the ES M master output level.
- *Decay knob and field:* Set the decay time of the dynamic stage. The attack, release, and sustain times of the synthesizer are internally set to 0.
- *Velo knob and field:* Determine the velocity sensitivity of the dynamic stage.
- *Overdrive knob and field:* Set the level of the integrated overdrive effect.

  Important: To avoid hurting your ears or damaging your speakers, consider turning down the Volume level before setting Overdrive to a high value; then turn it up gradually.

ES M pitch bend parameters in Logic Pro for iPad

ES M offers two parameters that control the way pitch bend works.

Pitch bend range parameters

- *Up knob and field:* Set the upward pitch bend range in semitone steps. This lets you use the pitch bend controller of your keyboard to bend the ES M pitch.
- *Down knob and field:* The default bend range is a positive pitch bend. In other words, this means that only positive pitch bend is normally available. You can set the Bend Down range in semitone steps by up to 2 octaves (a value of 24), allowing both positive and negative bends. Set to Linked to assign the same value to upward and downward pitch bends with the Bend Up knob.

ES P

ES P in Logic Pro for iPad

The eight-voice ES P (ES Poly) emulates classic polyphonic synthesizers of the 1980s.

It is a versatile instrument that is capable of producing a huge variety of useful musical sounds. The creation of classic analog synthesizer brass sounds is just one of its many strengths.

ES P produces sounds using subtractive synthesis. It features an oscillator that generates harmonically rich waveforms. You *subtract*—cut, or filter out—portions of these waveforms and reshape them to create new sounds.

If you're new to synthesizers, see Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis methods and how they work.

To add ES P to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.



User Guide conventions

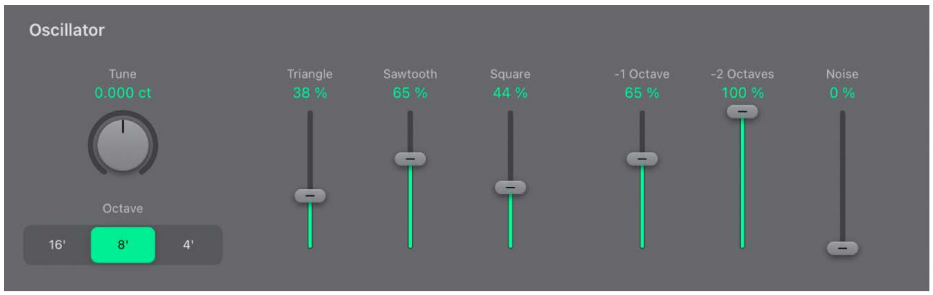
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ES P oscillator parameters in Logic Pro for iPad

ES P features several oscillators that output different waveforms. These signals can be mixed together—at different levels—providing countless variations of the raw material used for your sounds.



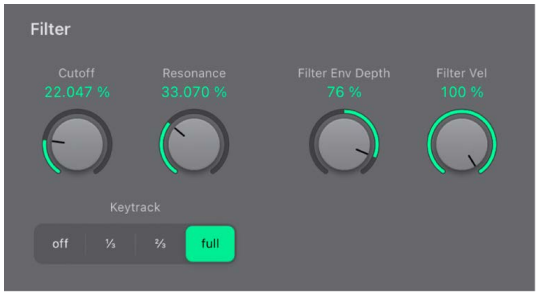
In addition to triangular, sawtooth, and square wave oscillators, two sub-oscillators and a noise generator are also available. The sub-oscillator sliders generate square/rectangular waves that are one or two octaves lower than the main oscillators. Use these to fatten up the sound.

Oscillator parameters

- *Tune knob and field:* Tune the instrument in cents. One cent is 1/100th of a semitone.
- *Octave buttons:* Set the pitch in octaves—transpose it up or down. The lowest setting is 16 feet, and the highest is 4 feet. The use of the term *feet* to determine octaves comes from the measurements of organ pipe lengths. The longer and wider the pipe, the deeper the tone.
- *Triangle slider and field:* Set the level of the triangle waveform output by the oscillators.
- *Sawtooth slider and field:* Set the level of the sawtooth waveform output by the oscillators.
- *Square slider and field:* Set the level of the rectangle waveform output by the oscillators. The pulse width is fixed at 50%.
- *-1 Octave slider and field:* Set the level of the (rectangular) sub-oscillator waveform, which is one octave lower than the main oscillators. Use this to thicken the sound. The pulse width is fixed at 50%.
- *-2 Octaves slider and field:* Set the level of the (rectangular) sub-oscillator waveform, which is two octaves lower than the main oscillators. Use this to thicken the sound. The pulse width is fixed at 50%.
- *Noise slider and field:* Set the level of white noise. This is the raw material for classic synthesizer sound effects, such as waves, wind, and helicopters.

ES P filter parameters in Logic Pro for iPad

ES P provides a lowpass filter that lets you contour the output signals from the oscillator.



Filter parameters

- *Cutoff knob and field:* Set the cutoff frequency of the lowpass filter.
- *Resonance knob and field:* Boost or cut portions of the signal that surround the frequency defined by the cutoff knob.

  Note: Increasing the Resonance value results in a rejection of bass—low frequency energy—when using lowpass filters. The ES P compensates for this side effect internally, resulting in a more bassy sound.
- *Keytrack buttons:* The cutoff frequency can be modulated by MIDI note number (keyboard position); you may know this parameter as *keyboard follow* on other synthesizers. Choose Off, 1/3, 2/3, or Full keyboard follow. If the Off button is active, no keystrike will affect the cutoff frequency. Choosing a value other than Off makes the lower notes sound relatively brighter than the higher ones. If you choose Full, the filter follows the pitch, resulting in a constant relationship between cutoff frequency and pitch. This is typical of many acoustic instruments where higher notes sound both brighter in tone and higher in pitch.
- *Filter Env Depth knob and field:* Define the amount (depth) of cutoff frequency modulation applied by the envelope generator. See ES P envelope and level controls.
- *Filter Vel knob and field:* Set the velocity sensitivity of the cutoff frequency modulation applied by the envelope generator. The main envelope generator (ADSR) modulates the cutoff frequency over the duration of a note. The intensity of this modulation can respond to velocity information. If you play pianissimo (velocity = 1), the modulation is minimal. If you strike with the hardest fortissimo (velocity = 127), the modulation is more intense.

ES P LFO parameters in Logic Pro for iPad

ES P features an LFO (low frequency oscillator) which can do either of the following:

- Modulate the frequency of the oscillators, resulting in a vibrato
- Modulate the cutoff frequency of the dynamic lowpass filter, resulting in a wah wah effect

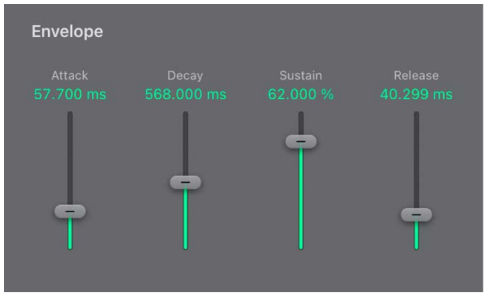


LFO parameters

- *LFO Speed knob and field:* Set the rate of the vibrato or cutoff frequency modulation.
- *Vibrato/Wah knob and field:* Turn to the left to set a vibrato; turn to the right to cyclically modulate the filter.

ES P envelope and level controls in Logic Pro for iPad

ES P features an ADSR envelope that affects both the filter cutoff and the level of the sound over time. This section also covers the master level control parameters in the Amp section.



Envelope parameters

- *Attack slider and field:* Set the time required for the signal to reach the initial signal level (the sustain level).
- *Decay slider and field:* Set the time it takes for the signal to fall from the attack level to the sustain level.
- *Sustain slider and field:* Set the signal level (the sustain level).
- *Release slider and field:* Set the time it takes for the signal to fall from the sustain level to a level of zero.

Amp parameters

- *Volume knob and field:* Set the overall output level.
- *Volume Vel knob and field:* Set the amount (depth) of velocity sensitivity to incoming MIDI note events. At higher values, each note is louder if struck harder. At lower values, the dynamic response is reduced, so that there is little difference when you play a note pianissimo (soft) or forte (loud/hard).
- *VCA Mode buttons:* Tap Gate to output a constant organ-like tone when a key is played. Tap ADSR to control the amplifier with the ADSR envelope generator.

Integrated ES P effect processor in Logic Pro for iPad

ES P offers integrated stereo chorus and overdrive effects. These are based on similar effects processors found in the synthesizers of the 1980s that ES P emulates.



ES P effect parameters

- *Overdrive knob and field:* Set the overdrive/distortion level of the synthesizer output.

  Important: To avoid hurting your ears or damaging your speakers, consider turning down the Volume level before setting Overdrive to a high value; then turn it up gradually.
- *Chorus knob and field:* Set the intensity (depth) of the integrated chorus effect.

ES P pitch bend parameters in Logic Pro for iPad

ES P offers two parameters that control the way pitch bend works.

Pitch bend parameters

- *Bend Up knob and field:* Set the upward pitch bend range in semitone steps. This lets you use the pitch bend controller of your keyboard to bend the ES P pitch.
- *Bend Down knob and field:* The default bend range is a positive pitch bend. In other words, this means that only positive pitch bend is normally available. You can set the Bend Down range in semitone steps by up to 2 octaves (a value of 24), allowing both positive and negative bends. Set to Linked to assign the same value to upward and downward pitch bends with the Bend Up knob.

ES1

ES1 in Logic Pro for iPad

ES1 emulates the circuits of analog synthesizers in a simple, streamlined interface.

ES1 produces sounds using subtractive synthesis. It provides an oscillator and sub-oscillator that generate harmonically rich waveforms. You *subtract* (cut, or filter out) portions of these waveforms and reshape them to create new sounds. The ES1 tone-generation system also provides flexible modulation options that make it easy to create punchy basses, atmospheric pads, biting leads, and sharp percussion.

If you're new to synthesizers, see Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis systems and how they work.

To add ES1 to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.



ES1 is divided into several main areas.

- *Oscillator parameters:* The oscillators generate the basic waveforms that form the basis of your sound. See ES1 oscillator parameters.
- *Filter parameters:* The filter is used to contour the waveforms sent from the oscillators. See ES1 filter parameters.
- *Amplifier and output parameters:* The amplifier and output parameters allow you to fine-tune sound level behavior and to activate the in-built chorus. See ES1 amp and output controls.
- *Modulation parameters:* The LFO, modulation envelope, and ADSR envelope are used to modulate the sound in a number of ways. See ES1 modulation parameters.
- *Global parameters:* Global parameters are used to set glide, polyphony, bend, and keyboard response. See ES1 global parameters.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Oscillator parameters

ES1 oscillator parameters in Logic Pro for iPad

ES1 includes a primary oscillator and a sub-oscillator. The primary oscillator generates a waveform that is sent to other parts of the synthesizer for processing or manipulation. The sub-oscillator generates a secondary waveform one or two octaves below that of the primary oscillator, making your sound richer.



Oscillator parameters

- *Waveform knob:* Select the waveform of the primary oscillator, which is responsible for the basic color of the tone. See ES1 oscillator waveforms.
- *Tune knob and field:* Tune the instrument in cents. One cent is 1/100th of a semitone.
- *32′, 16′, 8′, 4′, and 2′ buttons:* Transpose the pitch of the oscillators up or down by octaves. The lowest setting is 32 feet and the highest is 2 feet. The use of the term *feet* to determine octaves comes from the measurements of organ pipe lengths. The longer and wider the pipe, the deeper the tone.
- *Sub Osc Wave knob:* Generate square, pulse, and white-noise waveforms with the sub-oscillator. The sub-oscillator pitch matches the frequency of the main oscillator. You can choose from the following sub-oscillator waveform options:
  - A square wave that plays one or two octaves below the frequency of the primary oscillator
  - A pulse wave that plays two octaves below the frequency of the primary oscillator
  - Variations of these waveforms, with different mixes and phase relationships, resulting in various sounds

- Off, which allows you to turn off the sub-oscillator
- Noise, which is useful for creating percussion sounds as well as wind, surf, and rain sounds
- External, which allows you to run an external channel strip signal through the ES1 synthesizer engine, by using a side chain

- *Osc Mix slider and field:* Set the level relationship between the primary and sub-oscillator signals. When the sub-oscillator is switched off, its output is completely removed from the signal path.

Change ES1 pulse width

- In Logic Pro, rotate the Waveform knob. The pulse width of the waveform is displayed as a percentage.

  The pulse width can also be automatically controlled with modulators (see ES1 modulation parameters). Modulating the pulse width with a slowly cycling LFO, for example, allows periodically mutating, fat bass sounds.

Process a channel strip signal through the ES1 synthesizer engine

1. In Logic Pro, set the Sub Osc Wave knob to External.
2. Choose the side chain source channel strip from the Side Chain pop-up menu in the upper-right corner of ES1.

ES1 oscillator waveforms in Logic Pro for iPad

The table outlines the basic tones of the oscillator and sub-oscillator waveforms—how they affect your synthesizer sound.

Waveform	Basic tone	Comments
Sawtooth	Warm and even	Useful for strings, pads, bass, and brass sounds
Triangle	Sweet sounding, softer than sawtooth	Useful for flutes, and pads
Square	Hollow and “woody” sounding	Useful for basses, clarinets, and oboes
Pulse	“Nasal” sounding	Great for reed instruments, synth blips, and basses
Noise	Chaotic, hissing sound	Used for wind, surf, and breath sounds. Also useful for synthetic percussion.

ES1 filter parameters in Logic Pro for iPad

This section outlines the ES1 filter parameters.



Filter parameters

- *Cutoff knob and field:* Set the cutoff frequency of the lowpass filter.
- *Resonance knob and field:* Cut or boost the portions of the signal that surround the frequency defined by the Cutoff parameter. Boost can be set so intensively that the filter begins to oscillate by itself.
- *Filter Mode buttons:* The lowpass filter offers four different slopes of band rejection above the cutoff frequency. Tap one of the buttons to choose a slope (amount of rejection, expressed in decibels (dB) per octave):
  - *12 dB:* Provides a soft, smooth sound that is reminiscent of the early Oberheim SEM synthesizer.
  - *18 dB:* Resembles the filter sound of the Roland TB-303.
  - *24 Fat:* Compensates for the reduction of low frequency content caused by high Resonance values. This resembles the behavior of an Oberheim filter.
  - *24 dB:* Mimics the behavior of a Moog filter. Increase the Resonance parameter value to reduce the low end of the signal.
- *Drive knob and field:* Change the behavior of the Resonance parameter, which eventually distorts the sound of the waveform. Drive is actually an input level control, which allows you to overdrive the filter.
- *Filter Boost button:* Increase the output of the filter by approximately 10 decibels. The filter input has a corresponding decrease of approximately 10 decibels, maintaining the overall level. This parameter is particularly useful when applying high Resonance values.

- *Key Follow slider and field:* Set the effect that keyboard pitch (the note number) has on filter cutoff frequency modulation.
  - If Key Follow is set to zero, the cutoff frequency does not change, no matter which key you strike. This makes the lower notes sound comparatively brighter than higher notes.
  - If Key Follow is set to maximum, the filter follows the pitch, resulting in a constant relationship between cutoff frequency and pitch. This mirrors the properties of many acoustic instruments, where higher notes sound both brighter in tone and higher in pitch.
- *ADSR Vel Min/Max sliders and fields:* Determine how note velocity affects modulation of the filter cutoff frequency with the envelope generator. Use the sliders to set minimum and maximum velocity range values. The greater the distance between the sliders, the more filter cutoff is affected by incoming velocity messages. See ES1 envelope parameters.

Output a sine wave from the filter

If you increase the filter Resonance parameter to higher values, the filter begins to internally feed back and, as a consequence, begins to self-oscillate. This results in a sine oscillation—a sine wave—that is actually audible.

You can make the ES1 filter output a sine wave by following the steps below. This lets you play the filter-generated sine wave with the keyboard.

1. In Logic Pro, switch the Sub Osc Wave knob to Off.
2. Drag the Osc Mix slider to the very bottom (Sub).
3. Set the Resonance knob to the maximum position.
4. If you wish, tap the Filter Boost button.

   Filter Boost increases the output of the filter by approximately 10 decibels, making the self-oscillation signal much louder.
5. Play notes on your MIDI keyboard or the onscreen keyboard.

Control filter cutoff with velocity

The envelope generator modulates the filter cutoff frequency over the course of a note duration. The modulation intensity and response to velocity information is set with the ADSR Vel Min/Max sliders. The envelope generator also controls the level of the sound over time.

1. In the Logic Pro ES1 Filter section, set the minimum and maximum amount of modulation with the ADSR Vel Min/Max sliders and fields.

   The difference between the ADSR Vel Min/Max sliders indicates the dynamic range of this modulation.
2. Set the ADSR sliders to the values you want to use, and adjust the ADSR Vel Min/Max sliders as needed.

   Tip: If you're unfamiliar with these parameters, set the Cutoff parameter to a low value, Resonance to a high value, and move both ADSR Vel Min/Max sliders upward. Constantly strike a note on the keyboard while changing the sliders to learn how these parameters work.

ES1 amp and output controls in Logic Pro for iPad

The parameters in the ES1 Amplifier section allow you to fine-tune sound level behavior. These are separate from the Out Level parameter, which acts as the ES1 master volume control.



Amp parameters

- *Mode pop-up menu:* Determine how the ADSR envelope generator is used for control of the amplifier envelope. The ES1 amplifier envelope modes affect played notes in different ways.
  - *AR:* In this mode, move the Attack and Release sliders of the ADSR envelope to set these portions, or stages, of the sound. Between these stages, a gate control signal maintains a constant level while a note is held. When you release the key, the release stage begins immediately. The Decay and Sustain sliders of the ADSR Envelope have no impact on the sound level.
  - *ADSR:* Set this mode to control the level of the sound over time with all ADSR envelope sliders.
  - *R:* In this mode, the gate control signal maintains a constant level while a note is held. As soon as you release the key, the release stage begins. The Attack, Decay, and Sustain sliders of the ADSR envelope have no impact on the sound level.

    The letters *A, D, S,* and *R* refer to the attack, decay, sustain, and release stages of the envelope (see envelope parameters).

    Gate refers to a control signal used in analog synthesizers that is sent to an envelope generator when a key is pressed. As long as an analog synthesizer key is pressed, the gate signal maintains a constant voltage. When a gate signal is used as a modulation source in the voltage-controlled amplifier (instead of the envelope), it creates an organ-type envelope without any attack, decay, or release stage—in other words, an even, sustained sound.
- *Vel Min/Max sliders and fields:* Determine how note velocity affects the synthesizer level. Use the sliders to set minimum and maximum velocity range values. The greater the distance between the sliders, the more the volume is affected by incoming velocity messages.

Output parameters

- *Out Level knob and field:* Set the ES1 master volume.
- *Chorus buttons:* Choose a classic stereo chorus effect, an ensemble effect, or turn off the effects processor.
  - Off turns off the built-in chorus circuit.
  - C1 is a typical chorus effect.
  - C2 is a variation of C1 and is characterized by a stronger modulation.
  - Ens(emble) uses a more complex modulation routing, creating a fuller and richer sound.

Control your sound level over time

The envelope generator controls the sound level over the course of a note duration. The modulation intensity and response to velocity information is set with the VCA Vel Min/Max sliders in the Amp section.

1. In the Logic Pro ES1 Amp section, set the minimum and maximum amount of modulation with the Vel Min/Max sliders and fields.

   The difference between the Vel Min/Max sliders indicates the dynamic range of this modulation.

2. Set the ADSR sliders to the values you want to use, and adjust the Vel Min/Max sliders as needed.

Modulation

ES1 modulation parameters in Logic Pro for iPad

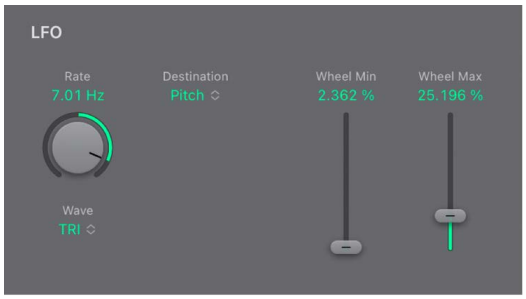
ES1 offers a number of simple yet flexible modulation control and routing options. You use modulation to control and add animation to your sound over time, making it more interesting, lively, or realistic. A good example of this type of sonic animation is the vibrato used by orchestral string players.

Modulation parameters

- *LFO parameters:* Used to modulate other ES1 parameters. See Use the ES1 LFO.
- *Modulation Envelope:* A dedicated modulation control source that can be used to control various ES1 parameters, or it can be used to control the LFO level. See Use the ES1 modulation envelope.
- *Envelope parameters:* ES1 provides an attack, decay, sustain, and release (ADSR) envelope that can shape filter cutoff and the level of the sound over time. See ES1 envelope parameters.

Use the ES1 LFO in Logic Pro for iPad

The LFO (low frequency oscillator) generates an adjustable, cyclic waveform that you can use to modulate other ES1 parameters.



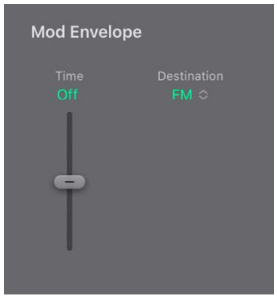
LFO parameters

- *Rate knob and field:* Set the speed, or frequency, of the LFO waveform cycles.
  - If you set values to the right of 0, the LFO phase runs freely.
  - If you set values to the left of 0, the LFO phase is synchronized with the Logic Pro tempo—with phase lengths adjustable between 1/96 bar and 32 bars.
  - When set to 0, the LFO outputs at a constant, full level, which allows you to manually control the LFO speed with your keyboard modulation wheel. For example, to change the pulse width by moving your keyboard modulation wheel, choose pulse width as the LFO modulation target and set the modulation intensity range using the Int via Whl slider.
- *Wave pop-up menu:* Set the LFO waveform. Each waveform has its own shape, providing different types of modulation.
  - You can choose the following waveforms: triangle; ascending and descending sawtooth; square wave; sample & hold (random); and a lagged, smoothly changing random wave.
  - You can also choose EXT to assign a side chain signal as a modulation source. Choose the side chain source channel strip from the Side Chain pop-up menu in the upper-right corner of ES1.
- Destination pop-up menu: Choose a modulation target for the LFO.
  - *Pitch:* Modulate the pitch—the frequency—of the oscillators.
  - *PW:* Modulate the pulse width of the pulse wave.
  - *Mix:* Modulate the mix between the primary oscillator and the sub-oscillator.
  - *Cutoff:* Modulate the cutoff frequency of the filter.
  - *Res.:* Modulate the resonance of the filter.
  - *VCA:* Modulate the main volume.
- *Wheel Min/Max sliders and fields:* Set the LFO intensity at the minimum and maximum mod wheel position. The distance between the sliders indicates the modulation wheel range.

Use the ES1 modulation envelope in Logic Pro for iPad

The modulation envelope can directly modulate a chosen parameter. It controls the time it takes for the modulation to fade in or fade out. At its center position (Off), modulation intensity is static—no fade-in or fade-out occurs. When set to its full value, modulation intensity is at a constant level.

The modulation envelope allows you to set either a percussive type of decay envelope by choosing low values or an attack type of envelope by choosing high values.



Modulation envelope parameters

- *Time slider and field:* Set a fade-in (attack) or fade-out (decay) time for the modulation. Drag upward to set a fade-in. Drag downward to set a fade-out. When set to the center position (Off), the modulation envelope fade is turned off.
- Destination pop-up menu: Choose a modulation target for the modulation envelope.
  - *Pitch:* Modulate the pitch—the frequency—of the oscillators.
  - *PW:* Modulate the pulse width of the pulse wave.
  - *Mix:* Modulate the mix between the primary oscillator and the sub-oscillator.
  - *Cutoff:* Modulate the cutoff frequency of the filter.
  - *Res.:* Modulate the resonance of the filter.
  - *VCA:* Modulate the main volume.
  - *FM:* Use the triangle waveform to modulate filter cutoff frequency. This modulation can result in a pseudo-distortion of the sound, or it can create metallic, FM-style sounds. The latter occurs when the only signal you can hear is the self-oscillation of the resonating filter.
  - *LFO:* Modulate the overall amount of LFO modulation.
- *Vel Min/Max sliders and fields:* Set the upper modulation envelope limit for the hardest keystrike (velocity=127) with the Max slider. The Min slider sets the lower limit for the softest keystrike (velocity=1). The distance between the sliders indicates the range of velocity values that alter the intensity of the modulation envelope.

Modulate a parameter with velocity

1. In Logic Pro, select a modulation target, such as PW (Pulse Width), from the Destination pop-up menu.
2. Set the Time slider to the center (Off) position, and adjust the Vel Min/Max sliders as needed.

   This results in a velocity-sensitive modulation of the oscillator pulse width.

   More interestingly, you can directly control the LFO level if you choose LFO in the Destination pop-up menu.

Fade the LFO modulation in or out

- In Logic Pro, drag the Time slider upward to fade in the LFO modulation. The higher the value, the longer it takes for you to hear the modulation.
- Drag the Time slider downward to fade out the LFO modulation. The lower the value, the shorter the fade-out time is.

  LFO control with envelopes is most often used for delayed vibrato, a technique many instrumentalists and singers employ to intonate longer notes.

Set up a delayed vibrato

1. In Logic Pro, drag the Time slider upward.
2. Select Pitch as the LFO target in the Destination pop-up menu.
3. In the LFO section, use the Wave knob to select the triangular wave as the LFO waveform.
4. Set the (LFO) Rate knob to a rate of about 5 Hz.
5. Set the (LFO) Wheel Max slider to a low value, and the (LFO) Wheel Min slider to zero.

ES1 envelope parameters in Logic Pro for iPad

ES1 provides an attack, decay, sustain, and release (ADSR) envelope that can shape filter cutoff and the level of the sound over time. See ES1 filter parameters and ES1 amp and output controls.

A second, simpler envelope is also available for control of modulation parameters. See Use the ES1 modulation envelope.



Envelope parameters

- *Attack slider:* Set the time it takes for the envelope to reach the initial desired level.
- *Decay slider:* Set the time it takes for the envelope to fall to the sustain level, following the initial attack time.
- *Sustain slider:* Set the sustain level, which is held until the key is released.
- *Release slider:* Set the time it takes the envelope to fall from the sustain level to zero.

Control your sound level over time

The envelope generator controls the sound level over the course of a note duration. The modulation intensity and response to velocity information is set with the Vel Min/Max sliders in the Amp section.

1. In the Logic Pro ES1 Amp section, set the minimum and maximum amount of modulation with the Vel Min/Max sliders and fields.

   The difference between the Vel Min/Max sliders indicates the dynamic range of this modulation.

2. Set the ADSR sliders to the values you want to use, and adjust the Vel Min/Max sliders as needed.

Modulate filter cutoff with the ADSR envelope

The envelope generator modulates the filter cutoff frequency over the course of a note duration. The modulation intensity and response to velocity information is set with the ADSR Vel Min/Max sliders in the Filter section.

1. In the Logic Pro ES1 Filter section, set the minimum and maximum amount of modulation with the ADSR Vel Min/Max sliders and fields.

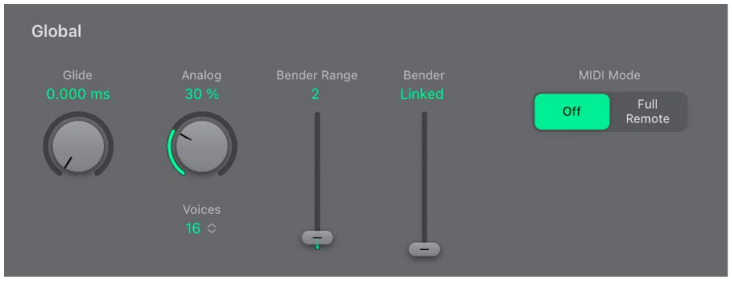
   The difference between the ADSR Vel Min/Max sliders indicates the dynamic range of this modulation.

2. Set the ADSR sliders to the values you want to use, and adjust the ADSR Vel Min/Max sliders as needed.

   Tip: If you're unfamiliar with these parameters, set the Cutoff parameter to a low value, Resonance to a high value, and move both ADSR Vel Min/Max sliders upward. Constantly strike a note on the keyboard while changing the sliders to learn how these parameters work.

ES1 global parameters in Logic Pro for iPad

The global parameters affect the overall sound, or behavior, of ES1.



Global parameters

- *Glide knob and field:* Set the amount of time it takes to slide between the pitches of each triggered note. The Glide trigger behavior depends on the value set in the Voices field (see below).
- *Analog knob and field:* Change the pitch of each note and the cutoff frequency slightly and randomly. This emulates the oscillator detuning and filter fluctuations of polyphonic analog synthesizers, due to heat and age.

  If you set the Analog parameter to 0%, the oscillator cycle start points of all triggered voices are synchronized. This can be useful for percussive sounds, when you want to achieve a sharper attack characteristic.

  If you set the Analog parameter higher than 0%, the oscillators of all triggered voices can cycle freely. Use higher values if you want a warm, analog type of sound—where subtle sonic variations occur for each triggered voice.
- *Voices field:* Set the maximum number of notes that can be played simultaneously.

  When Voices is set to Legato, the ES1 behaves like a monophonic synthesizer—with single trigger and fingered portamento engaged. This means that if you play legato, a portamento—glide from one note to the next—will happen. If you release each key before pressing a new one, the envelope is not triggered by the new note, and there is no portamento. Use this feature to create pitch bend effects, without touching your keyboard pitch bender, by choosing a high Glide parameter value when using the Legato setting.

  When set to *full* (polyphony), each played note has its own synth voice and an automatic release cutoff comes into effect. If you have set a long release time and play a non-legato chord progression, the chords won't smear into each other, which is useful for classic string synthesizer emulations.
- *PB Range Up slider and field:* Set the sensitivity of the pitch bender, in semitone steps.
- *PB Down slider and field:* Set the pitch bend range independently for upward and downward bends.
  - *Linked:* The negative pitch band uses the value set in the global Bender Range field. Positive and negative bend ranges are the same.
  - *0:* No negative bend range at all, but the global value for positive bends is retained.
  - *1-24:* Independent amount of negative bend range to allow for different ranges. For example, +2 and -12.
- *MIDI Mode buttons:* Determine how ES1 responds to MIDI controllers. Choose either Off or Full Remote. See ES1 MIDI controller assignments.

ES1 MIDI controller assignments in Logic Pro for iPad

The table outlines the way ES1 responds to MIDI continuous controller numbers (CC).

Controller number	Parameter name
12	Oscillator pitch buttons
13	Oscillator waveform
14	Mix slider
15	Waveform of sub-oscillator
16	Drive slider
17	Cutoff slider
18	Resonance slider
19	Slope buttons
20	ADSR via Vel (lower slider)
21	ADSR via Vel (upper slider)
22	Attack slider
23	Decay slider
24	Sustain slider
25	Release slider
26	Key slider
27	Amplifier Selector buttons
28	Level via Velocity (lower slider)
29	Level via Velocity (upper slider)
30	Chorus parameter
31	Modulation envelope target
102	Modulation envelope form slider
103	Modulation envelope: Int via Vel parameter (lower slider)
104	Modulation envelope: Int via Vel parameter (upper slider)
105	LFO rate
106	LFO waveform
107	LFO modulation target
108	LFO: Int via Whl (lower slider)
109	LFO: Int via Whl (upper slider)
110	Glide slider
111	Tune parameter

Controller number	Parameter name
112	Analog parameter
113	Bender Range parameter
114	Out Level parameter
115	Voices parameter

ES2

ES2 in Logic Pro for iPad

ES2 combines subtractive synthesis with elements of FM and wavetable synthesis to generate an extraordinary variety of sounds. This makes it the perfect choice for creating powerful pads, evolving textures, rich basses, or synthetic brass.

If you're new to synthesizers, see Intro to synthesizers, which introduces you to the fundamentals and terminology of different synthesis systems.

To add ES2 to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

The three oscillators of the ES2 provide classic analog synthesizer waveforms (including noise) and 100 single-cycle waveforms, known as Digiwaves. This raw material forms the basis for sounds that range from fat analog to harsh digital sounds, or hybrids of the two. You can also cross-modulate oscillators, making it easy to create FM-style sounds. Further options include the ability to synchronize and ring-modulate the oscillators or to mix a sine wave directly into the output stage, to thicken the sound.

ES2 features a flexible modulation scheme that offers up to ten simultaneous (user-defined) modulation routings. Further modulation options include the Mod Pad—which provides control of two parameters on a two-dimensional grid. The Mod Pad itself can be controlled by the sophisticated Vector Envelope. This is a multipoint, loop-capable envelope that makes it easy to create complex, evolving sounds.

Lastly, Distortion, Chorus, Phaser, and Flanger effects are built into ES2.

Note: You can find tasks that cover the use of parameters as modulation targets or sources throughout the ES2 Help. This underlines one of the strengths of ES2—the vast modulation possibilities it offers. Follow the steps in these tasks to create expressive, evolving sounds. See ES2 modulation.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

ES2 interface overview in Logic Pro for iPad

The ES2 graphical interface is divided into the following main areas.



- *Oscillator section:* The oscillator parameters are shown at the top of the ES2 interface. The Oscillator Mix pad is used to set the mix relationships between the three oscillators. See ES2 oscillator parameters.
- *Filter section:* The filter section includes both a multimode filter and a lowpass filter which can be used in series or parallel. See ES2 filters.
- *Output and effect sections:* The output parameters set the overall volume of the ES2, and you can add a sine signal at the output stage to thicken the sound. See Use the ES2 output controls. The output stage also includes built-in distortion and modulation effect processing options. See ES2 integrated effects.
- *Global parameters:* The global parameters control aspects of the ES2 such as master tuning, polyphony, and analog oscillator drift. See ES2 global parameters.
- *Modulation:* The ES2 offers multiple LFOs and envelopes, a sophisticated modulation matrix, and the Vector Envelope. You can freely assign and adjust modulation generator (LFO and envelope) controls. See ES2 modulation.
  - Mod Matrix Slots 1–10 link modulation sources such as envelopes, LFOs, and other parameters to modulation targets, such as the oscillators and filters. See Use ES2 Mod Matrix Slots 1–10.
  - The Vector Envelope is a flexible, powerful envelope generator that provides extensive control over your sound. See Use the ES2 Vector Envelope.
  - The Mod Pad facilitates the simultaneous manipulation of two assignable parameters, and can be controlled with your finger, another controller, or the Vector Envelope. See Use the ES2 Mod Pad.
- *Macro and MIDI controller parameters:* The preassigned macro sound parameters are perfect for quick tweaks to the sound. You can reassign MIDI controller numbers for these parameters. See Use ES2 macro controls.

Oscillators

ES2 oscillator parameters in Logic Pro for iPad

ES2 oscillators are used to generate one or more waveforms. This signal is then sent to other portions of the synthesizer engine for shaping, processing, or manipulation.

- Oscillators 2 and 3 are almost identical to each other, but they differ from oscillator 1.
- Oscillator 1 can be frequency modulated by oscillator 2, for FM synthesis sounds.
- Oscillators 2 and 3 can be synchronized to, or ring modulated with, oscillator 1. These oscillators also have rectangular waves with either user-defined fixed pulse widths or pulse width modulation (PWM) features.
- You can use multiple Mod Matrix slots to simultaneously change the pulse widths of rectangular waves generated by oscillator 1 and the synchronized and ring-modulated rectangular waves of oscillators 2 and 3.



Oscillator parameters

- *Oscillator On/Off buttons:* Tap to independently turn on or turn off oscillator 1, 2, or 3. Deactivating an oscillator saves computer processing power.
- *Semitone knobs and fields:* Set the oscillator pitch, in semitone steps, over a range of ±3 octaves. Because an octave consists of 12 semitones, the ±12, 24, and 36 settings represent octaves.
- *Detune knobs and fields:* Fine-tune the oscillator frequency (pitch) in cents. One cent is 1/100th of a semitone.
- *Waveform knobs and fields:* Choose the waveform that an oscillator generates. The waveform is responsible for the basic tonal color. See ES2 basic oscillator waveforms.

  In addition to basic synthesizer waveforms, all ES2 oscillators provide 100 additional waveforms called *Digiwaves*. These are very short samples of the attack transients of various sounds and instruments.
- *Digiwave sliders and fields:* Drag to choose a Digiwave or tap the Digiwave field, then type a value.

  Important: The Waveform knob of the oscillator *must* be set to the zero position in order to choose a Digiwave. All other Waveform knob positions turn off the Digiwave slider.
- *Oscillator Mix pad:* Move the gray dot in the Oscillator Mix pad to crossfade (set the level relationships) among the three oscillators. See Balance ES2 oscillator levels.

ES2 basic oscillator waveforms in Logic Pro for iPad

All ES2 oscillators output a number of standard waveforms—sine, pulse, rectangular, sawtooth, and triangular waves—or, alternately, any of 100 Digiwaves. The table outlines the basic waveforms.

Waveform	Basic tone	Comments
Pulse/Rectangular	Nasal sounding	Great for reed instruments, synth blips, and basses
Square	Hollow and woody sounding	Useful for basses, clarinets, and oboes. The pulse width of (oscillator 2 and 3) square waveforms can be smoothly scaled between 50% and the thinnest of pulses.
Sawtooth	Warm and even	Useful for strings, pads, bass, and brass sounds
Triangle	Sweet sounding, softer than sawtooth	Useful for flutes and pad sounds
Sine	A pure tone	The sine wave of oscillator 1 can be frequency modulated by oscillator 2. This kind of modulation forms the basis of FM synthesis.

Oscillators 2 and 3 also offer the selection of:

- A rectangular wave, synchronized to oscillator 1.
- A sawtooth wave, synchronized to oscillator 1.
- A ring modulator, which is fed by the output of oscillator 1 and a square wave from oscillator 2.
- Different noise types for oscillator 3. See Use the ES2 noise generator.

Oscillator synchronization and ring modulation allow for the creation of very complex and flexible harmonic spectra. The principles behind oscillator synchronization are described in Synchronize ES2 oscillators. Ring modulation principles are described in Use ES2 ring modulation.

Use the ES2 noise generator in Logic Pro for iPad

The sonic palette of oscillator 3 is bolstered by the inclusion of a noise generator, which can be activated by choosing the noise waveform. By default, the oscillator 3 noise generator generates *white noise*.

White noise is defined as a signal that consists of all frequencies (an infinite number) sounding simultaneously, at the same intensity, in a given frequency band. The width of the frequency band is measured in hertz. Sonically, white noise falls between the sound of the consonant "*F*" and breaking waves (surf). White noise is useful for synthesizing wind and seashore noises, or electronic snare drum sounds.

You can also modulate the tonal color of the noise signal in real time—without using the main filters of the ES2—by modulating the waveform of oscillator 3.

Change the noise color

1. In any Logic Pro ES2 Mod Matrix Slot, set up a modulation routing as follows: modulation target Osc3Wave, source ModWhl. The modulation amount slider behaves somewhat differently with this routing, essentially acting like a filter.
2. Use negative modulation amount values (not –1.000) to set a descending filter slope that roughly equates to 6 dB/octave. The sound becomes darker (red noise) as you adjust the mod wheel downwards.
3. To tune this pseudo filter down to 18 Hz, set the modulation amount to –1.000. When Osc3Wave is modulated positively, the noise becomes brighter (blue noise).
4. If you choose a modulation amount value of +1.000 for the Osc3Wave modulation target, the filter cutoff frequency is set to 18 kHz.

Synchronize ES2 oscillators in Logic Pro for iPad

Typical *oscillator sync* sounds tend toward the aggressive, screaming leads that synthesizer manufacturers like to talk about. The rectangular and sawtooth waveforms of oscillators 2 and 3 feature a Sync option. When this parameter is turned on, the phase of oscillator 2 or 3 is synchronized with oscillator 1.

Every time oscillator 1 starts a new oscillation phase, the synchronized oscillator (oscillator 2 or 3) is also forced to restart its phase from the beginning. Between the waveform cycles of oscillator 1, the waveform cycles of the synchronized oscillators run freely.

You can achieve interesting synchronized oscillator sounds by modulating the frequency of the synchronized oscillator with an envelope generator. This constantly changes the number of phases within a section of the synchronization cycle, resulting in corresponding changes to the frequency spectrum.

Modulate the synchronized oscillator frequency with an envelope

1. In Logic Pro, set the oscillator 2 Waveform knob to Synced Sawtooth or Synced Pulse.
2. In any Mod Matrix Slot, set up a modulation routing as follows: modulation target Pitch 2, source Env 2.
3. Adjust the settings of Envelope 2.

Use ES2 pulse width modulation in Logic Pro for iPad

You can alter the tonal color of rectangular waveforms by scaling the width of waveform pulses to any value. This is known as pulse width modulation.

ES2 pulse width modulation features are extensive. For example, if rectangular waves are chosen for all oscillators, you can simultaneously modulate the pulse width of oscillator 1 and the synchronized pulse waves of oscillator 2 (or the square wave of the oscillator 2 ring modulator) and oscillator 3.

Set a basic pulse width in oscillator 2 or 3

- In Logic Pro ES2, drag the Waveform knob to the Pulse position.

  Only oscillators 2 and 3 allow you to define a base (default) pulse width, prior to any pulse width modulation.

Set up a pulse width modulation (of oscillator 1) in Mod Matrix Slot 1—10

1. In Logic Pro ES2, choose a rectangle wave for oscillator 1.
2. In any Mod Matrix Slot, choose Osc1Wave as the target, and LFO 1 as the source.
3. Adjust the modulation amount slider (try a value of 0.12).
4. Choose a sine wave for LFO 1.
5. Adjust the LFO 1 Rate (around 0.160 Hz for a slow sweep).

Use ES2 frequency modulation in Logic Pro for iPad

The principle of frequency modulation (FM) synthesis was developed in the late 1960s and early 1970s by John Chowning. It was popularized by the Yamaha DX synthesizers in the 1980s. Although the ES2 can't be compared with the DX series in the discipline of pure FM synthesis, it can achieve some of the signature sounds of these instruments.

In pure FM synthesis, the frequency of one signal generator, or oscillator, is altered (modulated) by another signal generator. Positive values from the second generator increase the frequency of the first generator. Negative values decrease the frequency. In a synthesizer, this type of modulation takes place in the audible range. Depending on the design of the instrument, you can hear the signals of either the first oscillator alone (being modulated by the other oscillator), or both oscillators. The interaction between the two generators alters the waveform signal of the first oscillator and introduces a number of new harmonics. This harmonic spectrum can then be used as the source signal for further sound processing, such as filtering, envelope control, and so on. See Frequency modulation (FM) synthesis for further information.

In ES2, the frequency of oscillator 1 (with a sine wave chosen—zero position for *both* the Waveform knob and Digiwave slider) can be modulated by the output signal of oscillator 2.

- When oscillator 2 outputs a positive signal, the frequency of oscillator 1 increases.
- When oscillator 2 outputs a negative signal, the frequency of oscillator 1 decreases.

The net effect of speeding up or slowing down the frequency of oscillator 1 in each waveform cycle is a distortion of the basic wave shape. This waveform distortion also has the side benefit of introducing a number of new, audible harmonics.

Important: The impact of any frequency modulations you perform depends on *both* the frequency ratio *and* the modulation intensity of the two oscillators.

The "pure" FM synthesis method uses a sine wave for both the first and second signal generator (both oscillator 1 and 2 would be limited to generating a sine wave in ES2 if you stuck with this approach). ES2, however, provides 100 Digiwaves and countless combinations of modulation intensities and frequency ratios that can be used for either oscillator. This provides a vast pool of harmonic spectra and tonal colors for you to experiment with.

Tip: The type of modulation that occurs can vary significantly when different waveforms are chosen for oscillator 2—the modulating oscillator—in particular.

Set the frequency ratio and adjust the modulation intensity

1. In Logic Pro ES2, adjust the frequency (Semitone and Detune) parameter values of one, or both, oscillators 1 and 2.
2. Set the FM amount (shown as a percentage) with the oscillator 1 Waveform knob.

   This determines the intensity of frequency modulation.

Use ES2 ring modulation in Logic Pro for iPad

Ring modulation is a powerful tool for the creation of inharmonic, metallic, bell-like sounds. The spectra resulting from its use are inharmonic at almost every frequency ratio. The ring modulator is a device that dates back to the early days of the synthesizer.

A ring modulator has two inputs. At the output you hear both the sum and difference frequencies of the input signals. If you ring modulate a sine oscillation of 200 Hz with a sine oscillation of 500 Hz, the output signal of the ring modulator consists of a 700 Hz (sum) and a 300 Hz (difference) signal. Negative frequencies result in a change to the phase polarity of output signals.

Tip: Use sawtooth and rectangular (pulse width modulated) input signals from oscillators 1 and 2, respectively, to create a much more complex output signal. The use of these harmonically rich waveforms results in a number of extra sidebands becoming audible.

Create a ring-modulated sound

1. In Logic Pro ES2, set the oscillator 2 Waveform knob to the Ring setting.
2. Experiment with different frequency (Semitone and Detune) values for one, or both, oscillators.

   The oscillator 2 ring modulator is fed with the output signal of oscillator 1 and a square wave, generated by oscillator 2 itself. The pulse width of this square wave can be modulated (see Use ES2 pulse width modulation).

Balance ES2 oscillator levels in Logic Pro for iPad

The position of the control point (gray dot) in the Oscillator Mix pad is described by two parameters—x and y coordinates—which are used when automating the oscillator mix. These parameters can be assigned to the Osc1Levl, Osc2Levl and Osc3Levl targets in Mod Matrix Slot 1—10.

Drag the gray dot in the Oscillator Mix pad to crossfade—set the level relationships—between the three oscillators. The Osc 1/2/3 Level fields update to reflect respective oscillator levels as you move the gray dot.



The position of the gray dot (x and y coordinates) in the Oscillator Mix pad can also be controlled with the Vector Envelope. Because the Vector Envelope features a loop function, it can be used as a pseudo-LFO with a programmable waveform. For more information about this feature, see Use the ES2 Vector Envelope.

Modulate Oscillator Mix pad coordinates with the modulation wheel

1. In Logic ProES2, set up a modulation routing as follows: modulation target Osc1Levl, source ModWhl. Adjust the intensity.
2. Set up a second modulation routing as follows: modulation target Osc2Levl, source ModWhl. Adjust the intensity. You can choose other sources for these targets.

Filter parameters

ES2 filters in Logic Pro for iPad

ES2 features two discrete, and different, filters.

- Filter 1 is a multimode filter (MMF) that can operate as a lowpass, highpass, bandpass, band reject, or peak filter.
- Filter 2 is a lowpass filter (LPF) that offers variable slopes (measured in dB/octave).



Dual Filter Global parameters

- *On/Off button:* Turn the entire filter section on or off. Deactivating the filter section makes it easier to hear adjustments to other sound parameters, because the filters always heavily affect the sound. Disabling the filters also reduces processor load.
- *Drive knob and field:* Rotate to overdrive the filter, which affects each voice independently. See Overdrive ES2 filters.
- *Filter Blend knob and field:* Set the balance between Filter 1 and Filter 2. See Crossfade between ES2 filters.
- *Filter Reset button:* Turn on Filter Reset to provide a trigger signal that can be used to drive the filter to self-oscillate. See Filter cutoff and resonance.
- *Filter Routing buttons:* Switch between a parallel or series filter configuration.
  - *Series:* This means that the signal of all oscillators (combined at the Oscillator Mix pad) passes through the first filter, then this filtered signal passes through Filter 2, if Filter Blend is set to 0, the middle position. The output signal of Filter 2 is then sent to the input of the dynamic stage (Amplifier section).
  - *Parallel:* If Filter Blend is set to 0, you'll hear a 50/50 mix of the source signal, routed via Filter 1 and Filter 2. The output signals of the two filters are then sent to the input of the dynamic stage. See Crossfade between ES2 filters.

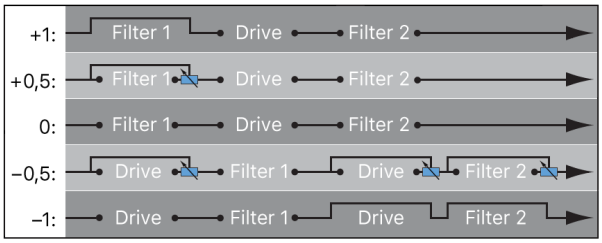
Filter 1 and Filter 2 parameters

- *Filter 1 Cutoff knob and field:* Set the cutoff frequency of the multimode filter (Filter 1). See Filter cutoff and resonance.
- *Reso 1 knob and field:* Determine the resonance behavior of the multimode filter (Filter 1).
- *Filter 1 Mode buttons:* Switch Filter 1 between lowpass (LP), highpass (HP), bandpass (BP), band reject (Notch), or peak filter types.
  - *LP:* Allow frequencies that fall below the cutoff frequency to pass. The slope of Filter 1 is fixed at 12 dB/octave.
  - *HP:* Allow frequencies above the cutoff frequency to pass. The slope of Filter 1 is fixed at 12 dB/octave.
  - *Peak:* Filter 1 works as a peak filter. This allows the level in a frequency band to be increased. The center of the frequency band is determined by the Cutoff parameter. The width of the band is controlled by the Resonance parameter.
  - *Notch:* The frequency band directly surrounding the cutoff frequency is rejected, but frequencies outside this band can pass. The Resonance parameter controls the width of the rejected frequency band.
  - *BP:* The frequency band directly surrounding the cutoff frequency is allowed to pass. All other frequencies are cut. The Resonance parameter controls the width of the frequency band. The bandpass filter is a two-pole filter with a slope of 6 dB/octave on each side of the center frequency.
- *Filter 2 Cutoff knob and field:* Set the cutoff frequency of the low pass filter (Filter 2). See Filter cutoff and resonance.
- *Reso 2 knob and field:* Determine the resonance behavior of the low pass filter (Filter 2).
- *Filter 2 FM knob and field:* Set the amount of Filter 2 cutoff frequency modulation with the oscillator 1 frequency. See Modulate ES2 Filter 2 frequency.
- *Filter 2 Fatness button:* Adds 24 dB per octave of rejection. Fat mode has a built-in compensation circuit that retains the sound bottom end. By comparison, the standard 24 dB mode tends to make lower end sounds less rich.
- *Filter 2 Mode buttons:* Choose a Filter 2 slope: 12 dB, 18 dB, and 24 dB. The steeper the slope, the more severe the effect on signal levels below the cutoff frequency. Most filters do not completely suppress the portion of the signal that falls outside the frequency range defined by the Cutoff parameter. The slope, or curve, chosen for Filter 2 expresses the amount of rejection below the cutoff frequency in decibels per octave.

Crossfade between ES2 filters in Logic Pro for iPad

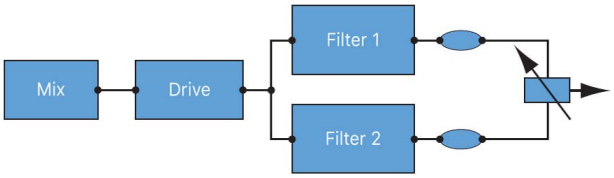
Filter Blend can have a significant effect on the ES2 signal flow. Regardless of whether a parallel or series filter configuration is chosen, a Filter Blend setting of –1.00 results in only Filter 1 being audible. A Filter Blend setting of 1.00 limits audibility to Filter 2. The figures illustrate the signal flow between the oscillator mix stage (the Oscillator Mix pad) and the dynamic stage (the Amplifier). The signal flow through the filters and the filter overdrive circuit (the Drive parameter) are dependent on the Filter Blend setting.

- *Filter Blend:* Series filter configuration information:
  - Use *positive* values for Filter Blend to partially bypass Filter 1.
  - Use *negative* values for Filter Blend to partially bypass Filter 2.
  - When *zero* or *positive* Filter Blend values are used, there is only one overdrive circuit for *both* filters.
  - Use of *negative* Filter Blend values introduces another overdrive circuit, which distorts the output signal of the oscillator mix stage before it is fed into the first filter.
  - If Drive is set to 0, no distortion occurs.



- *Filter Blend:* Parallel filter configuration information:

  In a parallel configuration, the overdrive/distortion circuit—the Drive parameter—is always wired *after* the oscillator mix stage—the Oscillator Mix pad—and *before* the filters. The filters receive a mono input signal from the output of the overdrive circuit. The outputs of both filters are mixed to mono via Filter Blend.



The Filter Blend parameter is available as a modulation target in Mod Matrix Slot 1—10. You can use manual control sources, such as the modulation wheel, to change the filter blend; but the Filter Blend target can also be used creatively, to rapidly switch or smoothly fade between the two filters. You can also use velocity, or a combination of the Vector Envelope and Mod Pad as sources. The latter allows for interesting filter control possibilities that evolve independently, or alongside oscillator parameters that are also being controlled with the Vector Envelope.

Crossfade between ES2 filters

- In Logic Pro, set the Filter Blend knob to crossfade between the two filters when cabled in parallel.
  - If Filter Blend is set to the -1.00 position, you only hear the effect of Filter 1.
  - If Filter Blend is set to the 1.00 position, you only hear the effect of Filter 2.
  - In between these positions, the filters are crossfaded. You hear the effect of both filters.

  You can also crossfade the filters when they are cabled in series. In this situation, the distortion—controlled by the Drive parameter—also needs to be considered, as this can be positioned either before or in between the filters, depending on the Filter Blend setting you choose.

Modulate Filter Blend with an LFO in ES2

1. In Logic Pro, set up a modulation routing as follows: modulation target FltBlend, source LFO 2.
2. Adjust the settings of LFO 2.

Filter cutoff and resonance

In every lowpass filter (ES2: LP mode for Filter 1; Filter 2 is a lowpass filter), all frequency portions above the cutoff frequency are suppressed, or cut off, hence the name. If you're new to synthesizers and the concepts behind filters, see Filters.



Cutoff and resonance parameters

- *Cutoff Frequency knob:* Control the brilliance of the signal.
  - In a lowpass filter (LP), the higher the cutoff frequency is set, the higher the frequencies of signals that are allowed to pass.
  - In a highpass filter (HP), the cutoff frequency determines the point where lower frequencies are suppressed and only upper frequencies are allowed to pass.
  - In a bandpass (BP) or band rejection (notch) filter, the cutoff frequency determines the center frequency for the bandpass or band rejection filter.

- *Resonance knob:* Emphasize or suppress portions of the signal above or below the defined cutoff frequency.
  - In a lowpass (LP) filter, Resonance emphasizes or suppresses signals below the cutoff frequency.
  - In a highpass (HP) filter, Resonance emphasizes or suppresses signals above the cutoff frequency.
  - In bandpass (BP) or band rejection (notch) filters, resonance emphasizes or suppresses the portions of the signal—the frequency band—that surround the defined frequency, set with the Cutoff Frequency parameter.

Use Filter Reset to drive the ES2 filters to self-oscillate

If you increase the filter Resonance parameter to higher values, the filter begins to internally feed back and, as a consequence, begins to self-oscillate. This results in a sine oscillation—a sine wave—that is audible.

To start this type of oscillation, the filter requires a trigger. In an analog synthesizer, this trigger can be the noise floor or the oscillator output. In the digital domain of the ES2, noise is all but eliminated. Therefore, when the oscillators are muted there is no input signal routed to the filter. Turn on Filter Reset to provide a trigger signal that can be used to drive the filter to self-oscillate.

- In Logic Pro, tap the Filter Reset button in the Dual Filter Global section to turn on.

  When this button is active, each note starts with a trigger that makes the filter resonate/self-oscillate immediately.

Compensate for high resonance values with the ES2 Filter Fatness parameter

- In Logic Pro, tap the Filter 2 Fatness button.

  An increase of the resonance value results in a rejection of bass—low frequency energy—when using lowpass filters. Use the Filter 2 Fatness button to compensate for this side effect and to obtain a richer sound.

Overdrive ES2 filters in Logic Pro for iPad

The filters are equipped with discrete overdrive modules. You can set the overdrive intensity by rotating the Drive parameter in the Dual Filter Global section.

Drive affects each voice independently. When every voice is overdriven individually—like having six fuzz boxes for a guitar, one for each string—you can play extremely complex harmonies over the entire keyboard range. Each voice sounds clean, without unwanted intermodulation effects spoiling the overall sound.

Certain Drive settings can lead to a different tonal character. This is because analog filters can behave uniquely when overdriven, forming an essential part of the sonic character of a synthesizer. ES2 is very flexible in this area, allowing tonal colors that range from the most subtle fuzz to the hardest of distortions.

- If the filters are connected in parallel, the overdrive circuit is placed *before* the filters.
- If the filters are connected in series, the position of the overdrive circuits is dependent on the Filter Blend parameter. See Crossfade between ES2 filters.

Tip: Because Filter 2 can cut away the overtones introduced by the distortion, Drive can be used as another tool for deforming oscillator waveforms.

Polyphonic distortions in the real world

ES2 provides a dedicated distortion effect in the ES2 integrated effects processor. Given this inclusion, you may wonder what benefit the filter Drive function offers.

The Distortion circuit in the Effects section affects the entire polyphonic output of ES2. Every rock guitarist knows that more complex chords—other than major chords, parallel fifths, and octaves—sound “rough” when using distortion. Therefore, distorted guitar playing generally involves few voices or parallel fifths and octaves. Because the filter Drive parameter affects each voice individually, you can play complex chords without introducing the unpleasant intermodulations that the Distortion effect can add to your sound.

Modulate ES2 Filter 2 frequency in Logic Pro for iPad

Filter 2 cutoff frequency can be modulated by the sine wave of oscillator 1, which is always generated, even when the oscillator is switched off. The level of this sine signal can be mixed in at the output stage with the Sine Level parameter. See Enhance ES2 sounds with Sine Level).

The effect of such filter modulations in the audio spectrum is unpredictable, but the results tend to remain harmonic if you avoid high modulation intensity values. The Filter 2 FM knob is used to define the intensity of this filter frequency modulation.

Note: Don’t confuse this filter frequency modulation with the oscillator FM feature (where oscillator 1 is modulated by oscillator 2). If oscillator 1 is frequency-modulated by oscillator 2, it does not influence the sine wave signal used to modulate the filter 2 cutoff frequency. See Use ES2 frequency modulation.

Filter 2 can also be driven to self-oscillation. If you set a very high Resonance parameter value, it produces a sine wave. This self-oscillating sine wave distorts at the maximum resonance value. If you mute all oscillators, you’ll only hear this sine oscillation. By modulating the cutoff frequency, you can produce effects similar to those produced by modulating the frequency of oscillator 1 with oscillator 2.

Modulate filter FM in ES2

1. In Logic Pro, set up a modulation routing in a Mod Matrix slot as follows: modulation target LPF FM.

   A sine wave, at the frequency of oscillator 1, is *always* used as the modulation source. Given this default assignment and the direct relationship between the filter FM intensity and oscillator 1 frequency, you can set up a second routing to modulate Oscillator 1 pitch.

2. Set up a second modulation routing as follows: modulation target Pitch 1, source LFO 1.
3. Adjust LFO settings.

Modulation

ES2 modulation in Logic Pro for iPad

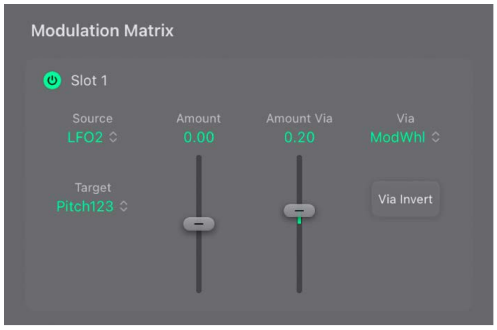
ES2 is equipped with a huge number of modulation sources and targets, making it a synthesizer that can generate extraordinary sounds that constantly evolve, sound like audio loops, or are just plain expressive to play.

- *Mod Matrix Slot 1—10:* Each slot links modulation sources, such as LFOs and envelopes, to modulation targets, such as the oscillators and filters. See Use ES2 Mod Matrix slots.
- *Modulation sources:* The modulation sources include the LFOs and envelopes. See ES2 LFOs and ES2 envelopes.
- *Vector Envelope:* The Vector Envelope is an extremely sophisticated, loop-capable, multipoint envelope that can control the Mod Pad and Oscillator Mix pad. See Use the ES2 Vector Envelope.
- *Mod Pad:* The Mod Pad is a two-dimensional controller that facilitates the simultaneous manipulation of two, freely assignable, parameters. It can be controlled with your finger, or with the Vector Envelope. See Use the ES2 Mod Pad.

Mod Matrix Slot 1–10

Use ES2 Mod Matrix Slots 1–10 in Logic Pro for iPad

Mod Matrix Slots 1–10 provide extensive modulation routing and control options. If you're new to synthesizer modulation routings, see Modulation overview.



Any modulation source can be connected to any modulation target, much like an old-fashioned telephone exchange or a studio patch bay.

The modulation intensity—how strongly the target is influenced by the source—is set with the vertical sliders to the right of the modulation routing.

The intensity of the modulation can itself be modulated: the Via parameter defines a further modulation source, which is used to control the modulation intensity. When a via source is active, you can specify upper and lower limits for the modulation intensity.

Ten such modulation routings of source, via, and target can take place simultaneously. It doesn't matter which of the ten modulation routings you use. You can even select the same target in several parallel modulation routings. You can also use the same sources and the same via controllers in multiple modulation routings.

Create a basic modulation routing in ES2

1. In a Logic Pro ES2 Mod Matrix slot, choose the Target parameter you want to modulate.
2. Choose the Source parameter you want to use for modulation of the target.
3. Drag the Amount slider to set a fixed modulation value.

   When Via is active, this slider sets the minimum modulation intensity.

   The Via Amount slider sets the maximum modulation intensity.

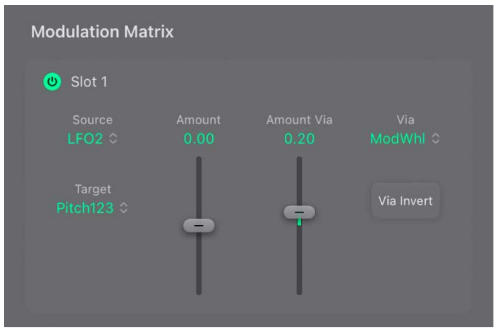
Bypass a modulation routing in ES2

- In Logic Pro ES2, tap the On/Off button at the top left of each Mod Matrix slot.

  This lets you bypass individual modulation routings, without losing settings.

Control ES2 modulation intensity in Logic Pro for iPad

In a basic modulation routing comprised of a target and source, you can set a fixed modulation intensity by vertically dragging the Amount slider. The slider value always defines a constant modulation intensity.



You can control modulation intensity by choosing an additional modulation source from the Via pop-up menu.

Choosing a value other than *Off* from the Via pop-up menu activates the Amount Via slider.

- Move the Amount Via slider to set the maximum modulation intensity when the assigned via controller is at its maximum value.
- The Amount slider defines the minimum modulation intensity when the via controller—the modulation wheel, for example—is set to its minimum value.
- The gap between the two slider handle positions defines the modulation range of the via controller.

Create a modulation routing that includes a via source in ES2

1. In a Logic Pro ES2 Mod Matrix slot, choose a modulation target from the Target pop-up menu.
2. Choose a modulation source from the Source pop-up menu.
3. Choose the modulation source that you want to use for control of modulation intensity from the Via pop-up menu.
4. Drag the Amount Via slider to set the maximum modulation intensity.
5. Drag the Amount slider to set the minimum modulation intensity.

Set the modulation intensity to zero in ES2

- In Logic Pro, double-tap the Amount or Amount Via slider.

Invert the effect of the via modulation source in ES2

- In Logic Pro, tap the Via Invert button.

LFOs

ES2 LFOs in Logic Pro for iPad

ES2 features two multi-waveform LFOs. Both are available as sources in Mod Matrix Slot 1—10.



LFO 1 is polyphonic, which means that if used for any modulation of multiple voices, they are *not* phase-locked. LFO 1 is also key-synced: each time you play a key, LFO 1 modulation of this voice is started from zero.

To understand the non phase-locked characteristic more fully, imagine a scenario where a chord is played on the keyboard. If LFO 1 is used to modulate pitch, for example, the pitch of one voice may rise, the pitch of another voice might fall, and the pitch of a third voice may reach its minimum value. As you can see, the modulation is independent for each voice, or note.

The key-sync feature ensures that the LFO waveform cycle always starts from zero, which results in consistent modulation of each voice. If the LFO waveform cycles were not synchronized in this way, individual note modulations would be uneven.

- LFO 1 is preconfigured to control the pitch of all three oscillators. It can be simultaneously used for modulation of other parameters.
- LFO 1 can also be faded in or out automatically, courtesy of a built-in envelope generator.
- LFO 2 is monophonic, which means that the modulation is identical for all voices. For example, imagine a chord is played on the keyboard. If LFO 2 is used to modulate pitch, the pitch of all voices in the played chord rises and falls synchronously. LFO 2 is ideally suited for creating rhythmic modulation effects that retain perfect synchronicity, even during project tempo changes.

LFO parameters

- *LFO 1 EG slider and field:* Set the time it takes for the LFO modulation to fade in or fade out. The value is displayed in milliseconds beneath the slider.
- *LFO 1 Rate knob and field:* Set the frequency (speed) of LFO 1 modulation. The value is displayed in hertz (Hz).
- *LFO 1 Waveform pop-up menu:* Choose the waveform used by LFO 1. See ES2 LFO waveforms.
- *LFO 2 Rate knob and field:* Set the frequency of LFO 2 modulation. LFO 2 can be synchronized with the Logic Pro tempo by choosing a value to the left of the center (DC) position.
- *LFO 2 Waveform pop-up menu:* Choose the waveform used by LFO 2.

ES2 LFO waveforms in Logic Pro for iPad

Choose a waveform for LFO 1 or LFO 2 from the respective Waveform pop-up menu. The table outlines how these waveforms can affect your sounds.

Tip: Try using different waveforms while a modulation routing of Pitch123 (the pitch of all three oscillators) is engaged and running

Waveform	Comments
Triangle	Suitable for vibrato effects.
Sawtooth	Suitable for helicopter and space gun sounds. Intense modulations of oscillator frequencies with a negative (inverse) sawtooth wave lead to “bubbling” sounds. Intense sawtooth modulations of lowpass filter cutoff and resonance creates rhythmic effects. The inverted sawtooth waveform provides a different start point for the modulation cycle.
Rectangle	Rectangular waves periodically switch the LFO between two values. The Unipolar rectangular wave switches between a positive value and zero. The Bipolar wave switches between a positive and a negative value set to the same amount above/below zero. An interesting effect can be achieved by modulating Pitch123 with a suitable modulation intensity that leads to an interval of a fifth. Choose the upper rectangular wave to do so.
Sample & Hold	The bottom two LFO waveforms output random values. A random value is selected at regular intervals, defined by the LFO rate. Sample & Hold steps between randomized values—rapid switches between values. Smoothed Sample & Hold results in fluid changes to values. The term Sample & Hold (S & H) refers to the procedure of taking samples from a noise signal at regular intervals. The values of these samples are then held until the next sample is taken. *Tip:* A random modulation of Pitch123 leads to an effect commonly referred to as a random pitch pattern generator or sample and hold. Try using very high notes, at very high rates and high intensities—you’ll recognize this well-known effect from hundreds of science fiction movies.

Use ES2 LFOs in Logic Pro for iPad

ES2 LFOs can be used to create delayed modulations, free modulations, and modulations that are synchronized with the Logic Pro tempo.



Set the LFO 1 modulation fade time in ES2

- In Logic Pro, set a positive LFO 1 EG value to fade in the modulation.

  The higher the value, the longer the delay time.

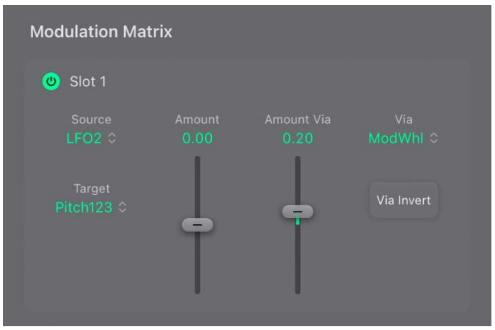
- Set a negative LFO 1 EG value to fade out the modulation.

  The lower the slider is positioned onscreen, the shorter the fade out time.

Set up a delayed vibrato in ES2

LFO envelopes are most often used for delayed vibrato—many instrumentalists and singers intonate longer notes this way.

1. In Logic Pro, set the LFO 1 EG slider to a position in the upper half (Delay) and modulate the Pitch123 target with the LFO 1 source in Mod Matrix Slot 1—10.



2. Set a slight modulation intensity with the Amount slider.
3. Set an LFO 1 Rate of about 5 Hz.
4. Choose the triangular wave as the LFO 1 waveform.

Set a free rate for LFO 2 in ES2

- In Logic Pro, choose a value in the upper half of the LFO 2 Rate range to run LFO 2 freely.

  The rate is displayed in hertz.

Synchronize the ES2 LFO 2 rate with the song tempo

- In Logic Pro, choose a value to the left of the LFO 2 Rate center position to synchronize LFO 2 with the project tempo.

  The rate is displayed in rhythmic values (when project tempo synchronization is active).

  Synchronized rates range from speeds of 1/64-notes to a periodic duration of 32 bars. Triplet and punctuated values are also available.

Envelopes

ES2 envelopes in Logic Pro for iPad

ES2 features three envelope generators per voice. They are abbreviated as Env1, Env2, and Env3 in Mod Matrix slots. In addition, ES2 features the sophisticated Vector Envelope. See Use the ES2 Vector Envelope.

To learn more about the roots of the term “envelope generator” and its basic function, see Amplifier envelope.

The parameters of Envelope 2 and Envelope 3 are identical. Envelope 3 defines the changes in level over time for each note played. You can think of Envelope 3 as being hardwired to the Amp modulation target in Mod Matrix Slots 1–10. Envelope 2 controls the cutoff frequency of both ES2 filters.

Note: All envelopes can be used to control multiple parameters simultaneously.

ES2 Envelope 1 in Logic Pro for iPad

Although Envelope 1 appears to be simplistic, it is useful for a range of synthesizer functions.



ES2 Envelope 1 parameters

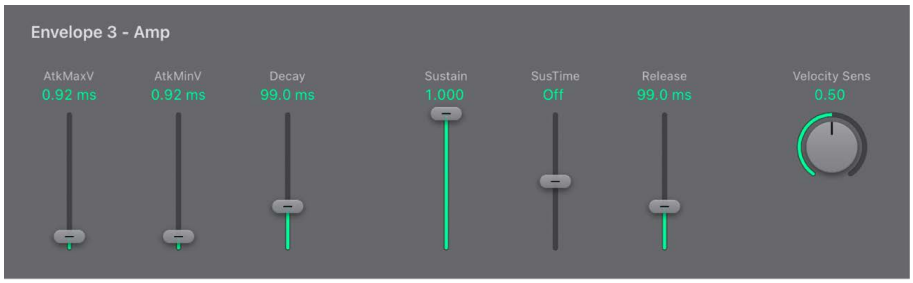
- *Mode buttons:* Tap to switch Envelope 1 between an Attack/Decay or an Attack/Release envelope.
  - *Decay mode:* The level falls to zero after the attack phase has completed, whether or not the note is sustained. It decays at the same speed, even if you release the key. Set the decay time with the Dec/Rel slider.
  - *Release mode:* The envelope level remains at its maximum after the attack phase is over, while the key remains depressed. Use the Dec/Rel slider to set the time required for the level to fall to zero, once the key is released.

- *Trigger buttons:* Choose a mode to define the trigger behavior of Envelope 1.
  - *Poly:* The envelope generator behaves as you would expect on any polyphonic synthesizer: every voice has its own envelope.
  - *Mono:* A single envelope generator modulates all voices in the same way. All notes must be released before the envelope can be retriggered. If you play legato, or any key remains depressed, the envelope does not restart its attack phase.
  - *Retrig:* A single envelope generator modulates all voices in the same way. The envelope is triggered by any key you strike, even when other notes are sustained. All sustained notes are identically affected by the retriggered envelope.
- *AtkMax/MinV sliders and fields:* Move the left slider (AtkMaxV) to set the attack time when keys are struck at maximum velocity. The right slider (AtkMinV) sets the attack time at minimum velocity.
- *Dec/Rel slider and field:* Set the decay time when the Decay button is active. Set the time required for the level to decrease to zero once the key is released, when the Release button is active.

ES2 Envelope 2 and 3 in Logic Pro for iPad

The feature sets of Envelope 2 and Envelope 3 are identical, but it is *always* the task of Envelope 3 to define the level of each note—to modulate the dynamic stage, in other words. Envelope 2 is preconfigured to control the Cutoff frequency of both filters.

Both Envelope 2 and Envelope 3 can also be used simultaneously as *sources* in Mod Matrix Slots 1–10. The envelope time parameters can be used as modulation *targets* in Mod Matrix Slots 1–10.



ES2 Envelope 2 and 3 parameters

- *AtkMax/MinV sliders and fields:* Move the left slider (AtkMaxV) to set the attack time when keys are struck at maximum velocity. The right slider (AtkMinV) sets the attack time at minimum velocity.
- *Decay slider and field:* Set the time it takes for the level of a held note to fall to the sustain level, after the attack phase has completed.
  - If the Sustain level parameter is set to its maximum value, the Decay parameter has no effect.
  - When the Sustain level is set to its minimum value, the Decay parameter defines the duration or fade-out time of the note.
- *Sustain/SusTime sliders and fields:* Set the sustain level and the sustain time. See Use ES2 Envelope 2 and 3 sustain.

- *Release slider and field:* Define the time required for the sustain level to fall to zero, after the key is released.
- *Velocity Sens knob and field:* Determine the velocity sensitivity of the entire envelope. If set to maximum, the envelope outputs its maximum level only when the keys are struck at maximum velocity. Softer velocities result in a corresponding change to the envelope levels, with a 50% velocity resulting in half-levels for each envelope level parameter.

Use ES2 Envelope 2 and 3 sustain in Logic Pro for iPad

When the SusTime slider is set to its center value, the Sustain (level) slider behaves like the sustain parameter of a standard synthesizer ADSR envelope.

In this position, the Sustain slider defines the level that is sustained while the key remains depressed, following completion of the Attack time and Decay time phases.

The SusTime slider defines the time it takes for the level to rise from the Sustain level back to its maximum level—or to fall to zero:

- Settings in the lower half of the SusTime slider range (fall) determine the time required for the level to decay from the sustain level to zero. The lower the slider position, the faster the sound level decays.
- Settings in the upper half of the SusTime slider range (rise) determine the time required for the level to rise from the sustain level to the maximum value. The higher the slider position, the faster the sound level rises.

Emulate instrument behaviors with envelope decay modulation in ES2

1. In Logic Pro, set up a modulation routing as follows: modulation target Env3Dec, source Kybd.
2. Make sure the Amount slider is set to a negative value.
3. Adjust Envelope 3 settings.

   This routing simulates the behavior of pianos and plucked instruments, where high notes decay faster than low notes.

Use the ES2 Mod Pad in Logic Pro for iPad

The Mod Pad has two axes—X (horizontal) and Y (vertical). Two user-defined parameters can be modulated with the X and Y values, allowing you to use your finger like a joystick.

The X and Y axes have positive and negative value ranges. When you drag the control point (gray dot), the values of both axes are continuously transmitted.



The Vector X and Vector Y Target pop-up menus in the Vector Envelope section determine which parameter is modulated by control point (gray dot) movements in the Mod Pad.

These modulation targets are identical to those available in Mod Matrix Slots 1–10. See ES2 oscillator modulation targets, ES2 filter modulation targets, and Other ES2 modulation targets.

The position (coordinates) of the Mod Pad gray dot are also available in Mod Matrix Slots 1–10, as the Pad-X and Pad-Y source and via options. See ES2 modulation source reference and Control ES2 modulation intensity.

The maximum intensity, sensitivity, and polarity of the modulation is set with the Vector X and Vector Y Amount knobs in the Vector Envelope section.

Set the ES2 Mod Pad modulation intensity

- In Logic Pro, rotate the Vector X and Vector Y Amount knobs.

  Use a negative value to invert the modulation polarity.

Use the Vector Envelope

ES2 Vector Envelope in Logic Pro for iPad

The Vector Envelope is a multipoint, loop-capable modulation source. It provides real-time control of gray dot movements in the Oscillator Mix pad and the Mod Pad.

Each played voice has an independent Vector Envelope, which is triggered from its start point with every new keystrike (MIDI note-on message).

Conceptually, the Vector Envelope—and Mod Pad and Oscillator Mix pad—may be difficult to grasp, but some experimentation reveals how easy these features are to use. Combine these facilities with other synthesis options to create truly unique sounds that are—quite literally—moving.



Turn the Vector Envelope on or off

- In Logic Pro, turn *off* the Point Solo button to make the Vector Envelope active.
- Turn *on* the Point Solo button to deactivate the Vector Envelope.

  When Point Solo is turned on, the Oscillator Mix pad and Mod Pad positions for the currently selected point (the solo point) are active.

Choose the Vector Envelope mode

In Logic Pro, the Vector Mode buttons determine the Vector Envelope target.

- Choose the Vector Envelope target—the Mod Pad, Oscillator Mix pad, or both.
  - *Off:* The Vector Envelope does not control the Oscillator Mix pad or the Mod Pad.
  - *Mix:* The Vector Envelope controls the Oscillator Mix pad but not the Mod Pad.
  - *XY:* The Vector Envelope controls the Mod Pad but not the Oscillator Mix pad.
  - *Mix+XY:* The Vector Envelope controls both the Mod Pad and the Oscillator Mix pad.

Use ES2 Vector Envelope points in Logic Pro for iPad

The Vector Envelope time axis runs from left to right.



Up to 16 points can be used on the time axis. Each point can control the gray dot positions of the Oscillator Mix pad and the Mod Pad.

The points are numbered sequentially, from left to right, along the time axis.

There are always at least three points: point 0 is the Start point, point 1 is defined as the Sustain point, and point 2 is the End point.

Any point can be declared the Sustain point. If a played note is held for a sufficient length of time and no loop is engaged, any envelope movement stops when the Sustain point is reached. The Sustain point value is maintained until the key is released—until the MIDI note-off command. See ES2 Vector Envelope solo and sustain.

Any point can be declared the Loop point. The looped area spans the time between the Sustain point and Loop point. In between these points you can create additional points that describe the movements of the control points (gray dots) in the Mod Pad and Oscillator Mix pad. See Use ES2 Vector Envelope loop controls.

The more Vector Envelope points you set, the more complex the movements that can be performed.

Select a Vector Envelope point

In Logic Pro ES2, do one of the following:

- Rotate the Select Point knob to choose a point.
- Tap the Select Point field and use the arrows or knob to choose a point. Tap Done to complete entry.
- Tap the Select Point field and type a value from 0 to 15 in the numeric keypad. Tap Done to complete entry.

  Once selected, you can edit the point.

Create a new Vector Envelope point

1. In Logic Pro ES2, use the Select Point knob to choose the point that precedes the point you wish to create.
2. Tap the Vec Env Actions pop-up menu and choose the Insert Point to the Right of Selected Point command.

   A new point is created, and is automatically selected.

   In cases where you create a new point between two existing points, the segment that previously existed is divided into two equal-sized segments. The sum of the two new segment times is equal to the time of the original undivided segment. This ensures that any points that follow retain their absolute time positions. Existing control point (gray dot) positions in the Oscillator Mix pad and Mod Pad are fixed, thus ensuring that newly created points don't affect any previously defined movements.

Quickly create multiple Vector Envelope points

- In Logic Pro ES2, tap the Vec Env Actions pop-up menu and choose either the *Init to 8/8 Loop* or *Init to 16/16 Loop* command.

  Either 8 or 16 new points are created. The entire timeline is divided into segments of equal length.

  WARNING: In cases where you have previously created several points, use of either command will overwrite your existing segments.

Delete a Vector Envelope point

- In Logic Pro ES2, use the Select Point knob to choose the point that you wish to remove.
- Tap the Vec Env Actions pop-up menu and choose the Delete Selected Point command.

  In cases where you delete a point between two existing points, the segments that previously existed are combined. The sum of the two previous segment times is equal to the time of the new undivided segment.

Define a Vector Envelope point as the Sustain, Loop, or End point

In Logic Pro ES2, do any of the following:

- Drag the Sustain Seg slider to the point value that you want to use as the sustain point.
- Drag the Loop Seg slider to the point value that you want to use as the loop point.
- Drag the End Segment slider to the point value that you want to use as the end point.

ES2 Vector Envelope solo and sustain in Logic Pro for iPad

The Point Solo button turns the Vector Envelope on or off. If turned on, no dynamic modulations are generated by the Vector Envelope. In this scenario, the current control point (gray dot) positions of the Oscillator Mix pad and Mod Pad are permanently in effect. These gray dot positions match the currently selected Vector Envelope point.

If you select another Vector Envelope point, the gray dot positions in the Oscillator Mix pad and Mod Pad update to reflect your selection. If the Point Solo button is on, the newly selected point becomes the solo point.

Note: You can independently turn off Vector Envelope modulation of the Mod Pad by setting Vector Mode to Off. See Use the ES2 Vector Envelope.

Any point can be declared the Sustain point. Assuming that the played note is held long enough and no loop is engaged, any envelope movement stops when this Sustain point is reached. The Sustain point value is maintained until the key is released—until the MIDI note-off command.

Define a Vector Envelope point as the Sustain point

- In Logic Pro, drag the Sustain Seg slider to the point value that you want to use as the sustain point.

Set ES2 Vector Envelope times in Logic Pro for iPad

With the exception of the first point (point zero), which is tied to the beginning of each played note, every point has a Time parameter. This parameter defines the period of time required for the playhead to travel from the point that preceded it. The times are normally displayed in milliseconds (ms).



Set a Vector Envelope time value

1. In Logic Pro, choose a point with the Select Point knob.
2. Use the Time knob to set a value for the segment associated with the selected point.

   Note: Changing a time value alters the absolute time positions of all subsequent points.

Use ES2 Vector Envelope XY pad controls in Logic Pro for iPad

In a typical workflow, you would create several vector envelope points and choose one for editing.

Simply drag the gray dot in one or both Vector Envelope XY pads to set X and Y values for the selected vector envelope point.

Note: The XY pads in the Vector Envelope section are used *only* for programming the X and Y values for each vector envelope point. When the Vector Envelope is active, the XY values assigned for each vector envelope point (and associated time segment) are sent to the Oscillator Mix pad and the Mod Pad.



Vector Envelope XY pad controls

- *OscLevel XY pad:* Drag to program movements for the Oscillator Mix pad. X and Y positions can be unique for each vector envelope point.
- *Mod Pad XY pad:* Drag to program movements for the Mod Pad. X and Y positions can be unique for each vector envelope point.
- *Vector X Amount knob and field:* Set the intensity of Mod Pad modulation on the X axis.
- *Vector Y Amount knob and field:* Set the intensity of Mod Pad modulation on the Y axis.
- *Vector X Target pop-up menu:* Choose the Mod Pad modulation target for the X axis.
- *Vector Y Target pop-up menu:* Choose the Mod Pad modulation target for the Y axis.

ES2 Vector Envelope actions menu in Logic Pro for iPad

The Vec Env Actions pop-up menu provides a number of commands that can accelerate your use of the Vector Envelope.

Vector Envelope Actions menu commands

Tap the Vec Env Actions pop-up menu to choose any of the following commands.

- *Delete Selected Point:* Tap to delete the currently selected point.
- *Insert Point to the Right of Selected Point:* Tap to create a point to the right of the currently selected point. A new point is created, and is automatically selected.

In cases where you create a new point between two existing points, the segment that previously existed is divided into two equal-sized segments. The sum of the two new segment times is equal to the time of the original undivided segment. This ensures that any points that follow retain their absolute time positions. Existing control point (gray dot) positions in the Oscillator Mix pad and Mod Pad are fixed, thus ensuring that newly created points don't affect any previously defined movements.

- *Copy Point:* Tap to copy the currently selected point to the Clipboard.
- *Paste Point:* Tap to paste the copied point from the Clipboard to the currently selected point.
- *Paste to All Points:* Tap to paste the copied point from the Clipboard to all points.

  This command is useful for duplicating segment times and XY positions.
- *Set Segments to Average Time:* Tap to change the segment time values of all points to a value that is averaged over the entire vector envelope length.
- *Init to 8/8 Loop:* Tap to create 8 new points. The entire timeline is divided into segments of equal length.

  WARNING: In cases where you have previously created several points, use of this command will overwrite your existing segments.
- *Init to 16/16 Loop:* Tap to create 16 new points. The entire timeline is divided into segments of equal length.

  WARNING: In cases where you have previously created several points, use of this command will overwrite your existing segments.
- *Clear Envelope:* Tap to reset the vector envelope.

  Note: Only three points will remain when this command is used: Start, Sustain, End.
- *Copy Envelope:* Tap to copy the entire vector envelope to the Clipboard.
- *Paste Envelope:* Tap to paste the copied vector envelope from the Clipboard.

Use ES2 Vector Envelope loop controls in Logic Pro for iPad

The Vector Envelope can run in one-shot mode, as long as the note is sustained; it can be set to repeat a specific number of times or it can repeat indefinitely, much like an LFO modulation. You can create repetitions with the loop functions.

Although the loop parameters seem similar to the loop parameters available for samples, there are significant differences between them. The Vector Envelope only supplies control signals that are used to move the gray dot positions of the Oscillator Mix pad and Mod Pad. The audio output of the ES2 is *not* looped in any way.

Any point can be declared the Loop point. Provided that the note is held for a suitable length of time, portions of the envelope can be repeated, or looped.

The looped area spans the time between the Sustain point and the Loop point. In between these points you can define several points that describe control point (gray dot) movements in the Oscillator Mix pad and the Mod Pad.

Define a Vector Envelope point as the Loop point

- In Logic Pro, drag the Loop Seg slider to the point value that you want to use as the loop point.

Set a Vector Envelope Loop mode

- In Logic Pro, tap a Loop Mode button.
  - *Off:* When Loop mode is set to Off, the Vector Envelope runs in one-shot mode from beginning to end, if the note is held long enough to complete all envelope stages. The other loop parameters are unavailable.
  - *Fwd:* When Loop mode is set to Forward, the Vector Envelope runs from the beginning to the Sustain point, and then begins to periodically repeat the section between the Sustain point and the Loop point in a forward direction.
  - *Bwd:* When Loop mode is set to Backward, the Vector Envelope runs from the beginning to the Sustain point, and then begins to periodically repeat the section between the Sustain point and the Loop point in a backward direction.
  - *Altern:* When Loop mode is set to Alternate, the Vector Envelope runs from the beginning to the Sustain point and then periodically switches to the Loop point, then back to the Sustain point, alternating between backward and forward directions.

Set the Vector Envelope Loop Rate

You can set a defined speed for the Vector Envelope loop cycle. You can also synchronize the loop speed with the project tempo.

- In Logic Pro, rotate the Loop Rate knob to choose one of the following:
  - *As set:* The loop cycle length equals the sum of the times between the sustain and Loop points.
  - *Rhythmic:* Rotate Loop Rate to the left to choose a rhythmic value. The loop rate follows the project tempo. You can choose from 32 bars up to a 64th triplet note value.
  - *Free:* Rotate Loop Rate to the right to set a value (shown in Hz). This indicates the number of cycles per second.

    Note: If Loop Rate is not switched to “as set,” and Loop mode (Forward, Backward, or Alternate) is active, the times of points between the Loop and Sustain points (and the Loop Smooth value) are shown as a percentage of the loop duration, rather than in milliseconds.

Make smooth Vector Envelope loop transitions

- In Logic Pro, use the Loop Smooth knob to even out the transition from the Sustain point to the Loop point in Forward or Backward loop mode.
  - If the Loop Rate parameter is set to a synchronized value or Free, the loop-smoothing time is displayed as a percentage of the loop cycle duration.
  - If the Loop Rate parameter is “as set,” the loop-smoothing time is displayed in milliseconds (ms).

Specify a Vector Envelope loop count

- In Logic Pro, use the Loop Count slider to determine a specified number of times the Vector Envelope loop cycle will repeat.

  Following the defined number of repetitions, the Vector Envelope runs from the Sustain point onward. Possible values are 1 to 10 and “Infinite.”

ES2 Vector Envelope curve shapes in Logic Pro for iPad

Tap the Curve pop-up menu to choose the shape of transitions from point to point. There are nine convex and nine concave shapes.

You can also choose “hold+step” and “step+hold,” which allow stepped modulations.

- *step+hold:* This curve jumps at the beginning of the transition.
- *hold+step:* This curve jumps at the end of the transition.

Note: You can use “hold+step” to create stepped vector grooves—with up to 15 steps.

ES2 Vector Envelope stop mode in Logic Pro for iPad

You can set one of two release phase options in the Stop Mode pop-up menu: Normal or Finish.

When the Stop Mode pop-up menu is set to Normal, the release phase—the phase after the Sustain point—begins as soon as you release the key (note off). In other words, the release phase starts from the Vector Envelope point where you released the key. The following behaviors apply:

- If looping is turned off and the Vector Envelope reaches the Sustain point, the Sustain point value is retained for as long as you hold a key.
- If looping is turned on and the Loop point is positioned before the Sustain point, the loop cycles for as long as you hold a key.
- If looping is turned on and the Loop point is positioned after the Sustain point, the Vector Envelope loop continues to cycle until the overall release phase of the sound, as determined by the Envelope 3 Release parameter, has completed.

When the Stop Mode pop-up menu is set to Finish, the Vector Envelope does not immediately begin the release phase when you release the key. Rather, it plays all points for their full duration until the end point is reached, regardless of whether you hold the key or release it. The following behaviors apply:

- If looping is turned off, the Sustain point is ignored. The Vector Envelope completes all points up to the end point, regardless of whether you hold the key or release it.
- If looping is turned on, the Vector Envelope plays all points until it reaches the Loop point, and then plays loop until the end point is reached. It does not matter if the Loop point is positioned before or after the Sustain point.
- If looping is turned on, and Loop Count is set to a value other than “Infinite,” the Vector Envelope continues on to the subsequent points—following completion of the specified number of loop repetitions. If Loop Count is set to “Infinite,” the points after the loop are irrelevant.

Use ES2 Vector Envelope time scaling in Logic Pro for iPad

You can stretch and compress the entire Vector Envelope, which is faster than modifying each point.

To double the Vector Envelope speed, set the Time Scale knob to 50%. Set it to 200% to halve the speed.

- The Time Scale parameter ranges from 10% to 1000%. It is scaled logarithmically.
- If the Loop Rate knob is “as set,” scaling also affects the loop.
- If the Loop Rate knob is set to a free or synced value, the setting is not affected by the Time Scale parameter.

Normalize the Vector Envelope time scale and loop rate with Fix Timing

- In Logic Pro, tap the Fix Timing button to multiply the Time Scale value by all time parameters. The Time Scale parameter is reset to 100%.

  There is no audible difference. This is simply a normalizing procedure.

  In cases where the Loop Rate knob is set to a synced value, tapping the Fix Timing button switches Loop Rate to “as set,” thus preserving the absolute rate.

Modulation target reference

ES2 oscillator modulation targets in Logic Pro for iPad

The table outlines all oscillator-related modulation targets.

Target	Comments
Pitch123	Modulates the frequencies (pitch) of all three oscillators. If you select an LFO as the source, this target leads to siren or vibrato sounds. Select one of the envelope generators with zero attack, short decay, zero sustain, and short release as the source for tom and kick drum sounds.
Pitch 1	Modulates the frequency (pitch) of oscillator 1. Slight envelope modulations can make the amount of detuning change over time, when oscillator 1 is sounding in unison with another (unmodulated) oscillator. This also applies to the other Pitch targets and is particularly useful for synthesizer brass sounds.
Pitch 2	Modulates the frequency (pitch) of oscillator 2.
Pitch 3	Modulates the frequency (pitch) of oscillator 3.
Detune	Controls the amount of detuning between all three oscillators. The sensitivity of all pitch modulation targets is determined by the modulation intensity. This is scaled as per the lists below, allowing you to create very delicate vibrati in the cent range (1/100 semitone), and huge pitch jumps by octaves. • Modulation intensity from 0 to 8: steps are 1.25 cents. • Modulation intensity from 8 to 20: steps are 3.33 cents. • Modulation intensity from 20 to 28: steps are 6.25 cents. • Modulation intensity from 28 to 36: steps are 12.5 cents. • Modulation intensity from 36 to 76: steps are 25 cents. • Modulation intensity from 76 to 100: steps are 100 cents. This leads to the following rules of thumb for modulation intensity values. • Intensity of 8 equals a pitch shift of 10 cents. • Intensity of 20 equals a pitch shift of 50 cents (one quarter tone). • Intensity of 28 equals a pitch shift of 100 cents (one semitone). • Intensity of 36 equals a pitch shift of 200 cents (two semitones). • Intensity of 76 equals a pitch shift of 1,200 cents (one octave). • Intensity of 100 equals a pitch shift of 3,600 cents (three octaves).

Target	Comments
OscWaves	Depending on the waveforms set in the three oscillators, this target can be used to modulate: • The pulse width of rectangular and pulse waves • The amount of frequency modulation (oscillator 1 only) • Noise color (oscillator 3 only) • The position of the Digiwaves OscWaves affects all oscillators simultaneously. For further information about the effects of these modulations, see Use ES2 pulse width modulation, Use ES2 frequency modulation, and Use the ES2 noise generator.
Osc1Wave	Depending on the waveform selected for oscillator 1, you can control the pulse width of rectangular and pulse waves, the amount of frequency modulation, or the position of the Digiwave. In classic FM synthesizers the amount of FM is controlled in real time by velocity-sensitive envelope generators. Select one of the ENVs as the source for such sounds.
Osc2Wave	The same as Osc1Wave, except that oscillator 2 does not feature FM. Note that pulse width modulation also works with both the synchronized rectangular and ring-modulated rectangular waves.
Osc3Wave	Oscillator 3 is the same as Osc1Wave and Osc2Wave except that it does not feature FM or ring modulation. Oscillator 3 features noise, the color of which can be modulated with this parameter.
OscWaveB	The transitions between Digiwaves during a wavetable modulation (where you switch between different Digiwaves) are always smooth. You can use the OscWaveB target to continuously modulate the shape of the transitions from smooth to hard. This target applies to all oscillators.
Osc1WaveB	If wavetable modulation is active for a Digiwave (using the Osc1Wav target), you can use this target to modulate the shape of the transition. When you're frequency-modulating oscillator 1, the Osc1WaveB target offers much higher FM intensities than either the Osc1 FM or the Osc1Wave targets.
Osc2WaveB	The same as above for a Digiwave using the Osc2Wav target.
Osc3WaveB	The same as above for a Digiwave using the Osc3Wav target.
SineLev1	SineLevl (Sine Level) allows the *sine wave* level of oscillator 1 to be modulated. The parameter defines the level of the first partial tone of oscillator 1. See Enhance ES2 sounds with Sine Level.
OscLScle	OscLScle (Osc Level Scale) modulates the levels of *all three* oscillators simultaneously. A modulation value of *0* mutes all oscillators, whereas a value of *1* raises the gain of the entire mix by 12 dB. The modulation is applied *before* the overdrive stage, allowing for dynamic distortions.
Osc1Levl	(Osc 1 Level) allows modulation of oscillator 1 level.
Osc2Levl	(Osc 2 Level) allows modulation of oscillator 2 level.
Osc3Levl	(Osc 3 Level) allows modulation of oscillator 3 level.

ES2 filter modulation targets in Logic Pro for iPad

The table outlines all filter-related modulation targets.

Target	Comments
Cutoff 1	Modulates the Cutoff Frequency parameter of Filter 1. See Filter cutoff and resonance.
Resonance 1	(Reso 1) Modulates the Resonance parameter of Filter 1.
Cutoff 2	Modulates the Cutoff Frequency parameter of Filter 2.
Resonance 2	(Reso 2) Modulates the Resonance parameter of Filter 2.
LPF FM	Determines the intensity of the lowpass filter frequency modulation (LPF FM) of Filter 2—with a sine wave (at the same frequency as oscillator 1). This parameter is described in Modulate ES2 Filter 2 frequency.
Cut 1+2	Modulates the cutoff frequency of both filters in parallel. This is like applying the same modulation to Cutoff 1 and Cutoff 2 in two *modulation routings*.
Cut1inv2	Cut1inv2 (Cutoff 1 normal and Cutoff 2 inverse) simultaneously modulates the cutoff frequencies of the first and second filters inversely (in opposite directions). Put another way, when Filter 1 cutoff frequency is rising, the cutoff of Filter 2 falls, and vice versa. In cases where you have combined Filter 1, defined as a highpass filter, and Filter 2 in *serial* mode, both act as a bandpass filter. Modulating the Cut1 inv 2 target results in a modulation of the bandpass filter bandwidth.
Filter Blend	(FltBlend) modulates the Filter Blend parameter. See Crossfade between ES2 filters.

Other ES2 modulation targets in Logic Pro for iPad

The table outlines all other modulation targets.

Target	Comments
Amp	This target modulates the dynamic stage, or level of voices. If you select Amp as the target and modulate it with an LFO as the source, the level changes periodically, and you hear a tremolo.
Pan	This target modulates the panorama position of the sound in the stereo spectrum. Modulating Pan with an LFO results in a stereo tremolo (auto panning). In unison mode, the panorama positions of all voices are spread across the stereo spectrum. Nevertheless, Pan can still be modulated, with positions being moved in parallel.
LFO1Asym	(LFO1 Asymmetry) can modulate the selected waveform of LFO 1. If a square wave, it changes pulse width. If a triangle wave, it sweeps between triangle and sawtooth. If a sawtooth wave, it shifts its zero crossing.
LFO1Curve	This target modulates the waveform smoothing of the square and random wave. If the LFO is using a triangle or sawtooth wave, it changes between convex, linear, and concave curves.

Scaled ES2 modulation targets in Logic Pro for iPad

All modulation targets outlined in this table result in a scaled modulation, which means that the target parameter value is multiplied by the modulation value. This works as follows: a modulation value of 0.0 results in no change, a modulation value of +1.0 equals a 10x multiplication, and a modulation value of –1.0 equals a multiplication by 0.04.

Target	Comments
LFO1Rate	This target modulates the frequency (rate) of LFO 1. You can automatically accelerate or slow down LFO 1 rate by modulating the LFO1Rate target with one of the envelope generators (ENV) or with LFO2.
Env2Atck	(Envelope 2 Attack) modulates the attack time of the second envelope generator.
Env2Dec	(Envelope 2 Decay) modulates the decay time of the second envelope generator. In cases where you've selected Env2Dec as the target and Velocity as the source, the duration of the decaying note is dependent on how hard you strike the key. Selecting Keyboard as the source results in higher notes decaying more quickly (or slowly).
Env2Rel	Env2Rel (Envelope 2 Release) modulates the release time of the second envelope generator.
Env2Time	Env2Time (Envelope 2 All Times) modulates *all* ENV2 time parameters: Attack, Decay, Sustain, and Release times.
Env3Atck	Env3Atck (Envelope 3 Attack) modulates the Attack time of ENV3.
Env3Dec	Env3Dec (Envelope 3 Decay) modulates the Decay time of ENV3.
Env3Rel	Env3Rel (Envelope 3 Release) modulates the Release time of ENV3.
Env3Time	Env3Time (Envelope 3 All Times) modulates all ENV3 time parameters: Attack, Decay, Sustain, and Release times.
Glide	This target modulates the duration of the Glide (portamento) effect. If you modulate Glide, with Velocity selected as the source, the speed of the keystrike determines the time it takes for the played notes to reach the target pitch.

ES2 modulation source reference in Logic Pro for iPad

The table outlines all modulation sources.

Source	Comment
LFO1	LFO 1 is used as a source.
LFO2	LFO 2 is used as a source.
ENV1	Envelope Generator 1 is used as a source.
ENV2	Envelope Generator 2 is used as a source.
ENV3	Envelope Generator 3 is used as a source. Envelope Generator 3 always controls the level of the overall sound.

Source	Comment
Pad-X, Pad-Y	Define the axes of the Mod Pad as modulation sources for the selected modulation target. See Use the ES2 Mod Pad and Use the ES2 Vector Envelope.
Max	Max sets the value of this source to +1. This offers interesting options for controlling the modulation intensity with all possible via values.
Kybd	Kybd (Keyboard) outputs the keyboard position (the MIDI note number). The center point is C3 (an output value of 0). Five octaves below and above, an output value of –1 or +1, respectively, is sent. Modulate the Cut 1+2 target with the Kybd source to control the cutoff frequencies of the filters with the keyboard position—as you play up and down the keyboard, the cutoff frequencies change. A modulation intensity of 0.5 proportionately scales cutoff frequencies with keyboard note pitches.
Velo	Velocity sensitivity serves as a modulation source.
Bender	The pitch bend wheel serves as a bipolar modulation source. This is also true when the Bend Range parameter of the oscillators is set to 0.
ModWhl	The modulation wheel serves as a modulation source. For most standard applications, you'll probably use the wheel as the via controller. Traditionally, it is used to control the intensity of periodic LFO modulations. Used here, it can be employed for direct, static modulations, such as controlling both filter cutoff frequencies (Target = Cut 1+2).
Touch	Aftertouch serves as a modulation source. ES2 reacts to polyphonic aftertouch. If you set the Target to Cut 1+2, the cutoff frequencies rise and fall, depending on how firmly you press a key on your touch-sensitive MIDI keyboard—after the initial keystrike.
Whl+To	Both the modulation wheel *and* aftertouch serve as modulation sources.
MIDI Controllers A-F	MIDI controllers available in Mod Matrix Slot 1—10 are named Ctrl A–F and can be assigned to arbitrary controller numbers. See Use ES2 macro controls.
RndN01	RndNO1 (Note On Random1) outputs a random modulation value between –1.0 and 1.0, that changes when a note is triggered or retriggered. The (random) note-on modulation remains constant throughout the note duration, until the next note-on trigger. There is no value change when playing legato while in legato mode.
RndN02	RndNO2 (Note On Random 2) behaves like Note On Random1, but it glides, rather than steps, to the new random value, using the Glide time (inclusive of modulation). It also differs from Note On Random 1 in that the random modulation value changes when playing legato while in legato mode.
SideCh	SideCh (Side Chain modulation) uses a side chain signal as a modulation (trigger) signal. The side chain source can be chosen from the Side Chain pop-up menu in the plug-in menu bar. It is fed to the internal envelope follower, which creates a modulation value based on the current side chain input signal level.

ES2 via modulation source reference in Logic Pro for iPad

The outlined sources can be used to control the modulation intensity.

Via source	Comment
LFO1	The modulation undulates at the speed and waveform of LFO 1, which controls the modulation intensity.
LFO2	The modulation undulates at the speed and waveform of LFO 2, which controls the modulation intensity.
ENV1	ENV1 controls the modulation intensity.
ENV2	ENV2 controls the modulation intensity.
ENV3	ENV3 controls the modulation intensity.
Pad-X, Pad-Y	Both axes of the Mod Pad are also available as via sources, allowing you to control modulation intensities with them.
Kybd	Kybd (Keyboard) outputs the keyboard position (the MIDI note number). The center point is C3 (an output value of 0). Five octaves below and above, an output value of –1 or +1, respectively, is sent. If you select Pitch123 as the target, modulate it with the LFO1 source, and select Keyboard as the via value, the vibrato depth changes, depending on the key position. Put another way, the vibrato depth is different for notes higher or lower than the defined Keyboard position.
Velo	If you select Velo (Velocity) as the via value, the modulation intensity is velocity sensitive—modulation is more or less intense depending on how quickly (how hard) you strike the key.
Bender	The pitch bend wheel controls the modulation intensity.
ModWhl	If you select ModWhl (Modulation Wheel) as the via value, the modulation intensity is controlled by your MIDI keyboard mod wheel.
Touch	If you select Touch (Aftertouch) as the via value, the modulation intensity is touch sensitive—modulation is more or less intense depending on how firmly you press the key of your touch-sensitive MIDI keyboard after the initial keystrike (aftertouch is also known as *pressure sensitivity*).
Whl+To	Both the modulation wheel and aftertouch control the modulation intensity.
MIDI Controllers A-F	MIDI controllers available in Mod Matrix Slot 1—10 are named Ctrl A–F, rather than Expression, Breath, and General Purpose 1–4 (MIDI Control Change Messages 16 to 19 are also known as General Purpose Slider 1/2/3/4). These can be assigned to arbitrary controller numbers with the Controller Assignments pop-up menus.
RndN01	RndNO1 (Note On Random1) outputs a random modulation intensity value between –1.0 and 1.0, which changes when a note is triggered or retriggered. The random note-on modulation remains constant throughout the note duration, until the next note-on trigger. *Note:* There is no value change when playing legato while in legato mode.
RndN02	RndNO2 (Note On Random 2) behaves like Note On Random1, but it glides, rather than steps, to the new random intensity value, using the Glide time (inclusive of modulation). It also differs from Note On Random 1 in that the random modulation value changes when playing legato while in legato mode.

Via source	Comment
SideCh	SideCh (Side Chain modulation) uses a side chain signal as a modulation intensity (trigger) signal. The side chain source can be chosen from the Side Chain pop-up menu in the plug-in menu bar. It is fed to the internal envelope follower, which creates a modulation value based on the current side chain input signal level.

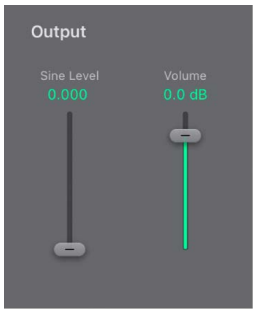
Output and effects

Use the ES2 output controls in Logic Pro for iPad

The dynamic stage of a synthesizer defines the level, or perceived volume, of a played note. The change in level over time is controlled by an *envelope generator*. For more information about envelope generators, see Amplifier envelope.

Envelope 3 is hard wired to the dynamic stage of the ES2—it is *always* used to control the level of each note. See ES2 envelopes.

The dynamic stage can be modulated by any modulation source in a Mod Matrix slot.



Output parameters

- *Sine Level slider and field:* Set the level of a sine wave signal (at the frequency of oscillator 1) that is mixed directly into the dynamic stage, independent of the filters. See Enhance ES2 sounds with Sine Level.
- *Volume slider and field:* Set the overall instrument output level.

Modulate the ES2 dynamic stage (Amp)

1. In Logic Pro, set up a modulation routing as follows: modulation target AMP, source LFO1.
2. Make sure that Via is set to Off.
3. Adjust LFO settings.

   A tremolo effect is created, with the level changing periodically, based on the current LFO 1 Rate value.

Enhance ES2 sounds with Sine Level in Logic Pro for iPad

The Sine Level slider mixes a sine wave (at the frequency of oscillator 1) directly into the dynamic stage, independent of the filters. Even if you have filtered away the basic partial tone of oscillator 1 with a highpass filter, you can reconstitute it with this parameter.

- In cases where oscillator 1 is frequency-modulated by oscillator 2 (if you have set an FM amount with the Waveform selector), *only* the pure sine wave is mixed into the dynamic section, not the distorted FM waveform.
- Any modulation of oscillator 1 pitch set in Mod Matrix Slot 1—10 affects the frequency of the sine wave mixed in at this stage.

Note: The Sine Level control is useful for adding warmth and a fat bass quality to the sound. Extra body can be added to thin sounds with this parameter, given that oscillator 1 actually plays the basic pitch.

ES2 integrated effects processor in Logic Pro for iPad

ES2 is equipped with an integrated effects processor. Any changes to the parameters of these effects are saved with each sound setting.



You can activate only two effects at the same time.

- The Distortion circuit.
- Your choice of a Chorus, Flanger, or Phaser effect. These effects share the same control knobs—Intensity and Speed.

  A chorus effect is based on a delay line, the output of which is mixed with the original, dry signal. The short delay time is modulated periodically, resulting in pitch deviations. The modulated deviations, in conjunction with the original signal pitch, produce the chorus effect.

  A flanger works in a similar fashion to a chorus, but with even shorter delay times. The output signal is fed back into the input of the delay line. This feedback results in the creation of harmonic resonances that wander cyclically through the spectrum, giving the signal a “metallic” sound.

  A phaser mixes a delayed and an original signal. The delayed element is derived from an allpass filter, which applies a frequency-dependent delay to the signal. This is expressed as a phase angle. The effect is based on a comb filter, which is basically an array of inharmonic notches—rather than resonances, as with the flanger—that also wanders through the frequency spectrum. This delivers a “sweeping” sound.

Distortion effect parameters

- *Gain knob and field:* Set the amount of distortion. Rotate this knob to zero to turn off the effect.
- *Tone knob and field:* Control the treble portion of the distortion signal.
- *Type buttons:* Choose the distortion type.
  - *Soft button:* Activate the Distortion effect Soft mode. The distortion circuit sounds somewhat like a tube overdrive.
  - *Hard button:* Activate the Distortion effect Hard mode. The distortion effect sounds like a fully transistorized fuzz box.

Modulation FX parameters

- *Intensity knob and field:* Set the depth of the effect. Turn this knob to zero to turn off the effect.
  - *When the Chorus type is active:* Set how rich the modulation is.
  - *When the Flanger type is active:* Set how "cutting" the modulation is.
  - *When the Phaser type is active:* Set the depth of the "sweeping" effect—the width of the modulation.
- *Rate knob and field:* Set the modulation rate.
- *Type buttons:* Choose the effects processor.

Global parameters

ES2 global parameters in Logic Pro for iPad

The global parameters affect the overall ES2 sound and behavior.



Global parameters

- *Tune knob and field:* Set the overall instrument pitch in cents. 100 cents equals a semitone step. At a value of 0 c (zero cents), the central A key is tuned to 440 Hz, or concert pitch.
- *Glide knob and field:* Set the time it takes for the pitch of a played note to slide to the pitch of the following played note. See Set the ES2 glide time.
- *Osc Start buttons:* The oscillators can run freely or can begin at the same phase position of their respective waveform cycles each time a note is struck. Tap a button to change the waveform phase start position behavior.

- *Free:* The initial oscillator phase start point is random for each played note. This adds life to the sound. The downside is that the output level may differ each time a note is played, making the attack phase sound less punchy—even if the performance is identical each time—such as when the note is triggered by a MIDI region. This setting is useful when emulating sounds typical of hardware analog synthesizers.
- *Soft:* The initial oscillator phase starts at a zero crossing for each played note. This mimics the sonic character (and precision) typical of digital synthesizers.
- *Hard:* The initial oscillator phase starts at the highest level in the waveform cycle for each played note. The extra *punch* that this setting can provide is audible only if the Envelope 3 Attack Time parameter is set to a low value—a very fast attack, in other words. This setting is highly recommended for electronic percussion and hard basses.

- *Voices knob and field:* Set the maximum number of notes that can be played simultaneously.
- *Unison button:* Turn unison mode on or off. See Use unison and voices.
- *Analog knob and field:* Rotate to randomly alter the pitch of each note and the filter cutoff frequency. See Detune analog oscillators in ES2.
- *CBD knob and field:* Detuned oscillators periodically beat against each other at a certain frequency. Use CBD to set the beating frequency between low and high notes or to retain a constant beating.
- *Keyboard Mode buttons:* Switch ES2 between polyphonic, monophonic, and legato behaviors. See Set the ES2 keyboard mode.
- *Bend Up/Dn sliders and fields:* Define the upward and downward pitch bend range. See Set the ES2 pitch bend range.

Set the ES2 keyboard mode in Logic Pro for iPad

A *polyphonic* instrument, such as an organ or a piano, allows several notes to be played simultaneously. Many older analog synthesizers are *monophonic*, which means that only one note can be played at a time, much like a brass or reed instrument. This shouldn't be viewed as a disadvantage; instead, it allows playing styles that are not possible with polyphonic instruments.

Change the keyboard mode

- In Logic Pro, tap the Poly, Mono, or Legato button.



- In Mono mode, staccato playing retriggers the envelope generators every time a new note is played. If you play in a legato style (play a new key while holding another), the envelope generators are triggered only for the first note you play legato, then they continue their curve until you release the last legato played key.

- Legato mode is also monophonic, but with one difference: the envelope generators are retriggered only if you play staccato—releasing each key before playing a new key. If you play in a legato style, envelopes are not retriggered.

Note: On several monophonic synthesizers, the behavior in Legato mode is referred to as *single trigger*, while Mono mode is referred to as *multi trigger*.

Use unison and voices in ES2 in Logic Pro for iPad

One of the great strengths of polyphonic analog synthesizers is unison—or stacked voices—mode. Unison mode in polyphonic analog synthesizers is typically monophonic, with all voices playing simultaneously when a single note is struck. Because the voices of an analog synthesizer are never perfectly in tune, the result is an extremely fat chorus effect with great sonic depth.



Use monophonic unison mode

1. In Logic Pro, tap the Mono or Legato button, depending on the keyboard mode you want to use. See Set the ES2 keyboard mode.
2. Tap the Unison button.
   - The intensity of the unison effect depends on the number chosen with the Voices parameter. Increase the Voices value for a fatter sound. See ES2 global parameters.
   - The intensity of detuning (voice deviation) is set with the Analog parameter. See Detune analog oscillators in ES2.

Use polyphonic unison mode

- In Logic Pro, tap the Poly *and* Unison buttons.

  In poly/unison mode, each played note is effectively doubled—or, more correctly, the polyphony value chosen with the Voices parameter is halved. These two voices are heard when you trigger the note. Poly/unison has the same effect as setting the ES2 to mono/unison (Voices = 2), but you can play polyphonically.

Set the ES2 glide time in Logic Pro for iPad

The Glide parameter (also known as *portamento*) sets the time it takes for the pitch of one played note to travel to the pitch of another played note.



Make portamento active

- In Logic Pro, rotate the Glide knob.

  Glide behavior is dependent on the chosen keyboard mode. See Set the ES2 keyboard mode.

  - If the keyboard mode is set to Poly or Mono, and Glide is set to a value other than 0, portamento is active.
  - If Legato is chosen, and Glide is set to a value other than 0, you need to play legato (press a new key while holding the old one) to activate portamento. If you don't play in a legato style, portamento won't work. This behavior is also known as *fingered portamento*.

Detune analog oscillators in ES2 in Logic Pro for iPad

The Analog parameter randomly alters the pitch of each note and the filter cutoff frequency.

- Low Analog values can add a subtle richness to the sound.
- Medium Analog values simulate the tuning instabilities of analog synthesizer circuitry, which can be useful in achieving that much sought-after "warmth" of analog hardware synthesizers.
- High Analog values result in significant pitch instability, which can sound truly out of tune—but this may be perfect for your needs.



Much like polyphonic analog synthesizers, all three oscillators maintain their specific frequency deviation from each other, but the pitches of all three oscillators are randomly detuned by the same Analog amount. For example, if the Analog detuning is set to around 20%, all three oscillators (if used) randomly drift by 20%.

Note: If ES2 is set to Mono or Legato keyboard mode, the Analog parameter is effective only when Unison is turned on. In this situation, Analog sets the amount of detuning between the stacked (unison) voices. If the Voices parameter is set to 1 and/or Unison is not active, the Analog parameter has no effect. For more information about these parameters, see Set the ES2 keyboard mode.

Stretch tuning in ES2 in Logic Pro for iPad

The Semitone knob of each oscillator lets you tune oscillators 1, 2, and 3 in semitones or octaves. The Detune parameter lets you fine-tune each oscillator in cents (1/100th of a semitone). Precise detuning between oscillators can result in beats, or phasing, between the oscillator frequencies. The higher the played frequency/pitch, the faster the phasing beats. High notes, therefore, may seem to be somewhat out of tune in comparison with lower notes.

CBD (Constant Beat Detuning) can be used as a corrective tool to even out the beating between oscillators, or it can be used as a creative tool to emulate stretch tuning. The latter can be particularly important when you use an ES2 sound alongside an acoustic piano recording. This is because acoustic pianos are intentionally tuned “out-of-tune” (from equal temperament). This is known as *stretch tuning*, and results in the upper and lower keyboard ranges being slightly out of tune with the center octaves but harmonically “in-tune” with each other.



Detuned oscillators periodically beat against each other at a certain frequency. CBD sets the beating frequency between low and high notes or retains a constant beating frequency across the keyboard range. Choose a CBD value to detune the harmonics/beating of low note frequencies in a ratio proportionate to the fundamental tone of the upper note frequencies.

CBD offers five values: off, 25%, 50%, 75%, and 100%. If you choose 100%, the phasing beats are almost constant across the entire keyboard range. This value may, however, be too high, because the lower notes might be overly detuned at the point where the phasing of the higher notes feels right. Try lower CBD values in cases where the bass notes are a little too far out of tune with the upper keyboard range.

The reference pitch for CBD is C3 (middle C): its (de)tuning is constant, regardless of the chosen CBD value.

Set the ES2 pitch bend range in Logic Pro for iPad

The Bend Up/Dn sliders determine the range for pitch bend modulation, typically performed with your keyboard pitch bend wheel.



Set independent upward and downward bend ranges

- In Logic Pro, drag either slider to set an upward or downward bend range.

Set an identical upward and downward bend range

1. In Logic Pro, set the Bend Dn slider to the lowest position. This turns on link mode and link is shown in the field.

   This locks the upward and downward bend ranges, making them identical.

2. Set a Bend Up slider range value.

   This is mirrored for both upward and downward pitch bend.

   Note: A bend range of 4 semitones results in a combined bend range of 8 semitones—9 if you include the standard pitch, or “no bend” position.

Create random sound variations

Use ES2 randomization parameters in Logic Pro for iPad

ES2 offers a powerful feature that lets you randomly vary sound parameters. You can define the amount of random variation and can restrict variations to specific sonic elements. The random sound variation feature can inspire and aid you when creating new sounds.



Set the amount of random parameter alteration with the RND Intensity knob.

The random sound variation feature always alters parameters as they are currently set, not based on the original setting file. Therefore, tapping the RND Trigger button repeatedly results in a sound that increasingly differs from the original setting.

Randomly alter a sound in ES2

- In Logic Pro, tap the RND Trigger button.

  The randomize process is triggered by a single tap and can be repeated as often as you like.

Increase the amount of random variation in ES2

- In Logic Pro, set a higher value with the RND Intensity knob.

Create several slight variations of the current setting in ES2

- In Logic Pro, reload the original setting after each random alteration, saving each with a new name.

Restrict ES2 randomization in Logic Pro for iPad

You can restrict randomization to particular groups of parameters with the RND Group pop-up menu.

Some aspects of your sound may already be ideal for the sound you had in mind. For example, your sound setting has a nice percussiveness, and you'd like to try a few sonic color variations while retaining this percussive feel. To avoid the random variation of any attack times, you can restrict the variation to oscillator or filter parameters. You do this by setting the RND Group to Waves or Filters, thus excluding the envelope parameters from the variation process.

Note: The Master Level, Filter Bypass, and oscillator on/off parameters are never randomized. Also, randomizations of the Vector Envelope turn the Point Solo parameter off.

You can restrict random sound variations to the parameter groups outlined below:

Randomize Group	Comments
All	All parameters, with the exception of those mentioned above, are randomized.
All except Mod Matrix+Pitch	All parameters, with the exception of router parameters and the basic pitch (semitone settings of the oscillators), are altered. Oscillator fine-tuning is, however, randomized.
All except Vector Env	All parameters, with the exception of Vector Envelope parameters, are altered. This maintains the rhythmic feel of a given setting.
Waves	Only the oscillator Wave and Digiwave parameters are altered. Other oscillator parameters (tuning, mix, and modulation routings in the router) are excluded.
Digiwaves	New Digiwaves are selected for all oscillators. Other oscillator parameters (tuning, mix, and modulation routings in the router) are excluded.
Filters	The following filter parameters are varied: Filter Structure (series or parallel), Filter Blend, Filter Mode, Cutoff Frequency, and Resonance for Filters 1 and 2. The Fatness and Filter FM parameters of Filter 2 are also randomized.
Envs	All parameters of all three envelopes (ENV 1, ENV 2, and ENV 3) are randomized. The Vector Envelope is *excluded*.
LFOs	All parameters of both LFOs are varied.

Randomize Group	Comments
Mod Matrix	All parameters—in all modulation routings—are varied (all intensities, target, via, and source parameters are changed).
FX	All effects parameters are randomized.
Vector Envelope	All Vector Envelope parameters are varied, including the X/Y routing of the Planar Pad.
Vector Env Mix Pad	The oscillator mix levels of the Vector Envelope points are altered. The rhythm and tempo of the modulation (the time parameters of the points) are not changed.
Vector Env XY Pad Options	The X and Y values of Vector Envelope points are randomized. The X/Y routing, however, is not changed. The rhythm and tempo of the modulation (the time parameters of the points) are also left unaltered. You can specify a single direction for randomization by choosing either: • Vector Env XY Pad X only • Vector Env XY Pad Y only
Vec Env Times	Only the time parameters of the Vector Envelope points are altered.
Vec Env Structure	The Vector Envelope structure is altered. This includes: All times, the Sustain point, the number of points, and all loop parameters.
Vec Env Shuffle Times	The Vector Envelope shuffle times (within loops) are altered. This includes the Loop Smooth value, if Loop Mode is set to Fwd or Bwd.

Macro controls and controller assignments

Use ES2 macro controls in Logic Pro for iPad

The macro knobs provide quick access to several linked, related parameters.

When you rotate any of the macro controls, one or more parameters in the ES2 interface update. For example, adjusting the Detune macro control simultaneously affects the Analog parameter and the Semitone and Detune oscillator parameters.

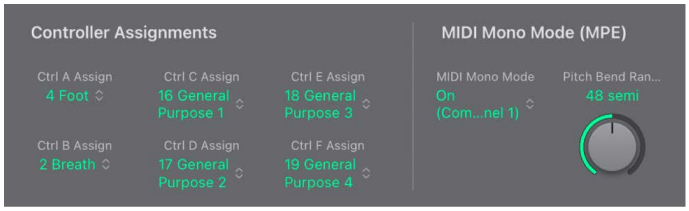


The macro parameters are settings-compatible with ES2-based GarageBand instruments. In other words, you can use the ES2 and some GarageBand synthesizer settings interchangeably.

Important: The impact of each macro control is completely dependent on the parameter values of the current setting. In some patches, a number of macro controls may have no effect.

Set ES2 controller assignments in Logic Pro for iPad

The Controller Assignments area lets you assign MIDI keyboard knobs, sliders, and other controls to act as control sources for ES2 parameters. There are six pop-up menus, for Ctrl A to Ctrl F. You can use any *available* MIDI controller for these control sources.



Ctrl A Assign to Ctrl F Assign parameters are saved with each setting. They are updated only if the default setting that is loaded on instantiating the plug-in is used or if the setting was saved with a project. This approach helps you to adapt all MIDI controller assignments to the keyboard, without having to edit and save each setting separately.

Controllers 0 and 32 are reserved for Bank Select messages, controller 1 is used as modulation source in Mod Matrix Slot 1—10, controllers 33 to 63 work as LSB for controllers 1 to 31, controllers 64 to 69 are reserved for pedal messages, controllers 120 to 127 are reserved for channel mode messages.

In the MIDI specification, all controllers from 0 to 31 are known as Most Significant Byte (MSB) controller definitions. Each of these controllers (0 to 31) also contains a Least Significant Byte (LSB) controller definition (32 to 63). Use of this secondary LSB controller in conjunction with the MSB controller allows for a resolution of 14 bits instead of 7 bits. ES2 recognizes these control change messages—the breath or expression controllers, for example.

To explain:

- 14-bit controllers are pairs of normal Control Change (CC) messages, where the number of the second CC message (the LSB) is 32 higher than the first CC message (the MSB). Examples of valid 14-bit pairs are: CC1/33, CC7/39, and CC10/42.
- 14-bit controllers have a resolution of 16,384 steps, allowing very precise control of plug-in parameters. The first CC message of a 14-bit pair (the MSB) has a coarse resolution of 128 steps. Each of these steps can be divided into a further 128 substeps using the second CC message (the LSB). This results in 128 x 128 = 16,384 steps.
- You don’t need to create new, or special, data types to use 14-bit controllers. The finer resolution is achieved by complementing the assigned CC message (the MSB) with its LSB. The CC message assigned in ES2 can always be used alone if your MIDI controller isn’t capable of sending 14-bit messages, thus limiting the resolution to 7-bit = 128 steps.

The 14-bit capability is the reason why CC numbers 33–63 can’t be assigned in the Ctrl A–F Assign pop-up menus. Using these (LSB) CC numbers would result in changing 1/128th of the parameter range—or put another way, 128 continuous steps out of 16,384.

Assign a MIDI controller in ES2

1. In Logic Pro, choose the controller name or number that you want to use from any Ctrl A to Ctrl F Assign pop-up menu.

Learn a MIDI controller assignment in ES2

1. In Logic Pro, choose the -Learn MIDI- item from a Ctrl A to Ctrl F Assign pop-up menu.
2. Move the selected controller on your MIDI keyboard or controller.

   Note: If no suitable MIDI message is received within 20 seconds, the selected control reverts to the previous value/assignment.

ES2 MIDI Mono Mode (MPE) in Logic Pro for iPad

ES2 provides additional parameters that determine the way it responds to incoming MIDI Polyphonic Expression (MPE) data.



MIDI Mono Mode (MPE) parameters

- *MIDI Mono Mode pop-up menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16).

  In either mode, each voice receives on a different MIDI channel. Per-voice channels support pitchbend, aftertouch, mod wheel, and Ctrl A-F assignment messages. See Set ES2 controller assignments. Controllers and MIDI messages sent on the base channel affect all voices.

- *Pitch Bend Ran(ge) knob:* Set a value from 0 to 96.

  The chosen pitch bend range affects individual note pitchbend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar to MIDI converters use this range by default.

EVOC 20 Polysynth

EVOC 20 Polysynth in Logic Pro for iPad

EVOC 20 PS combines a vocoder with a polyphonic synthesizer and can be played in real time.

It can create classic vocoder sounds, made famous by groups such as Kraftwerk during the 1970s and 1980s. Vocoding remains popular in current electronic, hip-hop, R & B, and other music styles.

EVOC 20 PS "listens" to an incoming audio signal—typically of a spoken or sung performance—and imposes the sonic characteristics and level changes of this signal onto the integrated synthesizer.

When you play notes and chords with your MIDI keyboard, the internal synthesizer "sings" at the pitches of incoming MIDI notes, but with the articulations—level changes, vowel and consonant sounds—of the incoming audio signal. This results in the classic "singing robot" or "synthetic voice" sounds that vocoders are mainly known for.

EVOC 20 PS can also be used as a synthesizer, or it can be used for more subtle effects processing—such as the creation of relatively natural-sounding vocal harmonies from a solo voice performance. Not limited to vocal processing, you can also achieve interesting results by processing other audio material, such as drum or instrument loops.



The EVOC 20 PS interface is divided into five main parameter sections.

- *Synthesizer parameters:* Control the polyphonic synthesizer of the EVOC 20 PS. See EVOC 20 PS synthesis overview.
- *Sidechain Analyser parameters:* Determine how the input signal is analyzed and used by the EVOC 20 PS. See EVOC 20 PS sidechain analyser.
- *Vocoder Filter Bank parameters:* Configure the analysis and synthesis filter banks. See EVOC 20 PS formant filter.

- *Un/Voiced Detection parameters:* Control how EVOC 20 PS handles voiced and unvoiced signals. See EVOC 20 PS Un/Voiced detection.
- *Output parameters:* Configure the output signal of the EVOC 20 PS. See EVOC 20 PS output parameters.
- *Global parameters:* Set global tuning, bend range, and other controls. See EVOC 20 PS global parameters.

Set up EVOC 20 PS

To add EVOC 20 PS to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins. You also need to provide an audio signal as the analysis audio source, via a side chain.

Also see EVOC 20 PS performance tips.

1. In Logic Pro, insert EVOC 20 PS into the Instrument slot of an instrument channel strip.
2. Choose an input source from the Side Chain pop-up menu in the plug-in toolbar. This can be an audio track, live input, or bus.

   EVOC 20 PS is now ready to accept incoming MIDI data and has been assigned to an input, audio track, or bus—via a side chain.
3. Start playback, and play your MIDI keyboard.

   If applicable, mute the audio track serving as the side chain input.
4. Adjust the volume levels of EVOC 20 PS and the side chain source—if not muted—to meet your needs.
5. To further enhance the sound, adjust the knobs, sliders, and other controls, and insert other effect plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Vocoder basics

The word *vocoder* is an abbreviation for *voice encoder*. A vocoder analyzes and transfers the sonic character of the audio signal arriving at its analysis input to synthesizer sound generators. The result of this process is heard at the output of the vocoder.

The classic vocoder sound uses speech as the analysis signal and a synthesizer sound as the synthesis signal. This sound was popularized in the late 1970s and early 1980s. You may be familiar with tracks such as “O Superman” by Laurie Anderson, “Funkytown” by Lipps Inc., and numerous Kraftwerk pieces—such as “Autobahn,” “Europe Endless,” “The Robots,” and “Computer World.”

In addition to these “singing robot” sounds, vocoding has also been used in many films—such as with the Cylons in *Battlestar Galactica*, and most famously, with the voice of Darth Vader from the *Star Wars* saga. See Vocoder history.

Vocoding, as a process, is not strictly limited to vocal performances. You could use a drum loop as the analysis signal to shape a string ensemble sound arriving at the synthesis input.

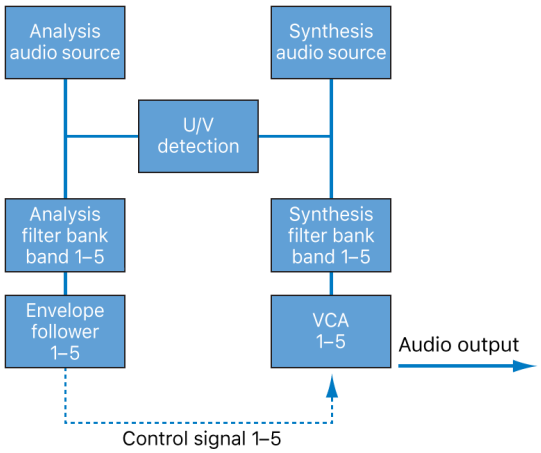
The speech *analyzer* and *synthesizer* features of a vocoder are two bandpass *filter banks*. Bandpass filters allow a frequency band—a slice in the overall frequency spectrum—to pass through unchanged. Frequencies that fall outside the band are cut.

In the EVOC 20 plug-ins, these filter banks are named the *analysis* and *synthesis* banks. Each filter bank has a matching number of corresponding bands—if the analysis filter bank has five bands (1, 2, 3, 4, and 5), there is a corresponding set of five bands in the synthesis filter bank. Band 1 in the analysis bank is matched to band 1 in the synthesis bank, band 2 to band 2, and so on.

The audio signal arriving at the analysis input passes through the analysis filter bank, where it is divided into bands.

An envelope follower is coupled to each filter band. The envelope follower of each band tracks, or *follows*, volume changes in the audio source—or, more specifically, the portion of the audio that has been allowed to pass by the associated bandpass filter. In this way, the envelope follower of each band generates dynamic control signals.

These control signals are then sent to the synthesis filter bank—where they control the levels of the corresponding synthesis filter bands. This is done with voltage-controlled amplifiers (VCAs) in analog vocoders. Volume changes to the bands in the analysis filter bank are imposed on the matching bands in the synthesis filter bank. These filter level changes are heard as a synthetic reproduction of the original input signal—or a mix of the two filter bank signals.



The more bands a vocoder offers, the more precisely the original sound character is reproduced by the synthesis filter bank. EVOC 20 PS provides up to 20 bands per bank. See EVOC 20 block diagram for a detailed image of the EVOC 20 PS signal path.

Synthesizer parameters

EVOC 20 PS synthesis overview in Logic Pro for iPad

EVOC 20 PS is equipped with a polyphonic synthesizer that accepts MIDI note input. Synthesizer section parameters are outlined below.



The EVOC 20 PS Synthesizer section contains the following grouped parameters:

- *Oscillator parameters:* Determine the basic waveforms and operating mode for the synthesis engine of EVOC 20 PS. See EVOC 20 PS oscillators.
- *Lowpass Filter parameters:* Shape the basic waveforms of the oscillators with a lowpass filter. See EVOC 20 PS lowpass filter.
- *Envelope parameters:* Control the level of the attack and release phases of the synthesizer sound. See EVOC 20 PS envelope.
- *Synthesizer LFO parameters:* Control the pitch of the synthesizer oscillators. See EVOC 20 PS pitch modulation.

EVOC 20 PS oscillators in Logic Pro for iPad

You can switch EVOC 20 PS oscillators between dual mode and FM mode. These operating modes change both the behavior and sound of the synthesis engine. An integrated noise generator can be used to add a further color to your sound.

The EVOC 20 PS Synthesizer section also incorporates a lowpass filter, an envelope, and a dedicated pitch modulation (vibrato) LFO.



Main oscillator parameters

- *Osc 1/2 Wave knobs and fields:* Choose the waveform type for oscillators 1 and 2. There are 50 single-cycle digital waveforms with different sonic characteristics.
- *Osc1 Octave buttons:* Set the octave range for oscillator 1. 16′ (16 feet) is the lowest, and 4′ the highest setting. The use of the term *feet* to determine octaves comes from the measurements of organ pipe lengths. The longer and wider the pipe, the deeper the tone.
- *Synthesis buttons:* Choose the synthesis mode.
  - *Dual mode:* Each oscillator allows you to choose a digital waveform. See EVOC 20 PS oscillator dual mode.
  - *FM mode:* Oscillator 1 generates a sine wave. The frequency, or *pitch*, of oscillator 1 is modulated by oscillator 2. This leads to a number of different tones and harmonics becoming audible. Oscillator 2 can use any available digital waveform. See EVOC 20 PS oscillator FM mode and Frequency modulation (FM) synthesis).

    Each mode changes the parameters shown in the Synthesizer section.

EVOC 20 PS oscillator dual mode in Logic Pro for iPad

In dual mode, each oscillator can use any of 50 digital waveforms.



Dual mode oscillator parameters

- *Osc2 Semitone knob and field:* Adjust the tuning of oscillator 2 in semitone steps.
- *Detune knob and field:* Fine-tune both oscillators in cents. One hundred cents equals one semitone step.
- *Osc Mix slider and field:* Set the level balance between the two oscillator signals.

EVOC 20 PS oscillator FM mode in Logic Pro for iPad

In FM mode, oscillator 1 generates a sine wave. The Osc 1 Wave knob has no effect in this mode.



FM mode oscillator parameters

- *Ratio Coarse knob and field:* Adjust the frequency ratio between oscillator 2 and oscillator 1 in semitone steps.
- *Ratio Fine knob and field:* Adjust the frequency ratio between oscillator 2 and oscillator 1 in cents. One hundred cents equals one semitone step.
- *Osc Mix/FM slider and field:* Set the intensity of frequency modulation (FM). Higher values result in a more complex waveform with more overtones.

EVOC 20 PS noise generator in Logic Pro for iPad

The EVOC 20 PS Synthesizer section noise generator provides a further sound source that can be used alongside the two oscillators.



Important: The noise generator in the Synthesizer section is independent of the noise generator found in the Output parameters. For further information about use of the Output section noise generator for voiced and unvoiced signals, see EVOC 20 PS (U/V) detection.

Noise generator parameters

- *Noise Volume knob and field:* Control the amount of noise added to the signals of the two oscillators.
- *Noise Color slider and field:* Set the timbre of the noise signal. Slide to the full-left position to hear white noise. Slide full-right to hear blue noise (high-passed noise). White noise has traditionally been used to create wind and rain sound effects. It has the same energy in each frequency interval. Blue noise sounds brighter, because its bass portion is suppressed by a highpass filter.

  Tip: Set Noise Color to the full-right position and Noise Volume to a very low value to achieve a lively and fresh synthesis signal.

EVOC 20 PS lowpass filter in Logic Pro for iPad

The EVOC 20 PS Synthesizer section includes a lowpass filter that is used for coarse signal shaping before the signal is more precisely shaped by the individual bands of the formant filter banks.



Synthesizer Filter parameters

- *Cutoff knob and field:* Set the cutoff frequency of the lowpass filter. Turn to the left to remove high-frequency content from the synthesizer signal.
- *Resonance knob and field:* Boost or cut the signal portion that surrounds the frequency defined by the cutoff knob.

  Tip: Set cutoff as high as possible, then adjust resonance to achieve a brighter high-end signal. This is useful for achieving better speech intelligibility.

EVOC 20 PS envelope in Logic Pro for iPad

The EVOC 20 PS Synthesizer section includes an Attack/Release envelope generator that controls the levels of the oscillators over time.



Amp Envelope parameters

- *ENV Attack slider:* Set the time it takes for the oscillators to reach their maximum level.
- *ENV Release slider:* Set the time required for the oscillators to reach their minimum level, after the keys have been released.

EVOC 20 PS pitch modulation in Logic Pro for iPad

EVOC 20 PS includes an LFO (LFO 2) that is dedicated to pitch modulation (vibrato). It can either run freely or can be synchronized with the project tempo.



Synthesizer Pitch Modulation parameters

- *LFO2 Rate knob and field:* Set the speed of modulation. Values to the left (of the centered position) are synchronized with the host application tempo. These include bar values, triplet values, and so on. Values to the right (of the centered position) are nonsynchronized, and are displayed in hertz—cycles per second.
- *LFO2 Waveform pop-up menu:* Set the waveform type used for vibrato (pitch modulation). You can choose from the following waveforms:

- Triangle
- Falling and rising sawtooth
- Square up and down around zero (bipolar, good for trills)
- Square up from zero (unipolar, good for changing between two definable pitches)
- Random stepped waveform (S & H)
- Smoothed random waveform

- *Min/Max. Vibrato sliders and fields:* Set the intensity of LFO pitch modulation. The Max. Vibrato slider determines the intensity when the modulation wheel is set to its maximum value; the Min. Vibrato slider determines the intensity when the modulation wheel is set to its minimum value. This parameter is permanently assigned to the modulation wheel of your MIDI keyboard, or corresponding MIDI data.

EVOC 20 PS sidechain analyser in Logic Pro for iPad

The parameters in the Sidechain Analyser section control how EVOC 20 PS analyzes and uses the input signal. Be precise with these parameters to attain the best possible speech intelligibility and the most accurate tracking.



Sidechain Analyser parameters

- *Attack knob:* Determine how quickly each envelope follower—coupled to each analysis filter band—reacts to rising signal levels. Longer attack times result in a slower tracking response to transients—level spikes—of the analysis input signal. A long attack time on percussive input signals—a spoken word or hi-hat part, for example—will translate into a less articulated vocoder effect. Set the Attack parameter to the lowest possible value to enhance articulation.
- *Release knob:* Determine how quickly each envelope follower—coupled to each analysis filter band—reacts to falling signal levels. Longer release times cause the analysis input signal transients to sustain for a longer period at the vocoder output. A long release time on percussive input signals—a spoken word or hi-hat part, for example—will translate into a less articulated vocoder effect. Use of extremely short release times results in rough, grainy vocoder sounds. Release values of around 8 to 10 milliseconds are useful starting points.
- *Freeze button:* Turn on to hold, or freeze, the current analysis sound spectrum indefinitely. When Freeze is active, the analysis filter bank ignores the input source, and the Attack and Release knobs have no effect.

Freeze the input signal

Freezing the input signal lets you capture a particular characteristic of the signal, which is then imposed as a complex sustained filter shape on the Synthesizer section. Here are some examples of when this could be useful:

If you're using a spoken word pattern as a source, the Freeze button could capture the attack or tail phase of an individual word within the pattern—the vowel *a*, for example.

People cannot sustain sung notes indefinitely. To compensate for this human limitation, use the Freeze button. If the synthesis signal needs to be sustained but the analysis source signal—a vocal part—is not sustained, use the Freeze button to lock the current formant levels of a sung note, even during gaps in the vocal part, between words in a vocal phrase. The Freeze parameter can be automated, which may be useful in this situation.

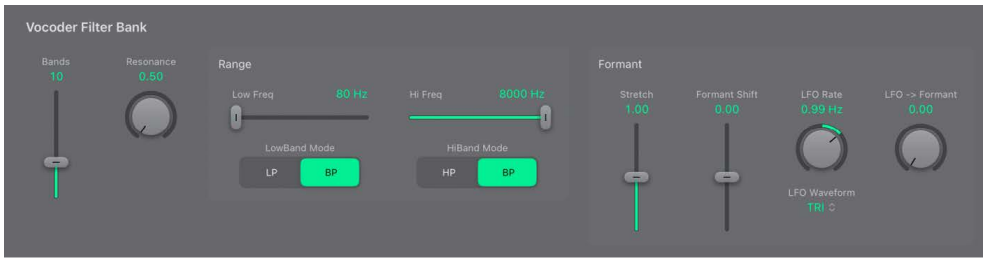
- In Logic Pro, tap the Freeze button to hold, or sustain, the sound spectrum of the analysis input signal.

Vocoder Filter Bank controls

EVOC 20 PS formant filter in Logic Pro for iPad

The EVOC 20 PS Vocoder Filter Bank section features two formant filter banks—one for analysis and one for synthesis. Each bank provides up to 20 individual filters. The entire frequency spectrum of an incoming signal is analyzed and is divided into a specified number of (equally-sized) frequency bands. These analyzed filter bands are mirrored by a corresponding number of bands in the synthesizer filter bank. Each filter bank controls the peak levels—the formants—within these frequency bands.

The EVOC 20 PS Vocoder Filter Bank section provides an LFO that is dedicated to modulation of the Formant Shift parameter. This offsets the analysis and synthesis filter banks, enabling you to create rhythmic filter sweeps and phaser-like effects.



Formant filter global parameters

- *Bands slider and field:* Set the number of frequency bands (up to 20) used by the filter banks.

  The greater the number of frequency bands, the more precisely the sound can be reshaped. As the number of bands is reduced, the source signal frequency range is divided up into fewer bands, and the resulting sound is formed with less precision by the synthesis engine. You may find that a good compromise between sonic precision—allowing incoming signals such as speech and vocals to remain intelligible—and resource usage is around 10 to 15 bands.

- *Resonance knob and field:* Determine the basic sonic character of the vocoder. Low settings result in a softer character; high settings result in a sharper character. Technically, increasing the Resonance value emphasizes the middle frequency of each frequency band.

Formant filter range parameters

- *Low/Hi Freq. sliders and fields:* Set the lowest and highest frequencies allowed to pass by the formant filter. Frequencies outside these boundaries are cut.
    - The Low/Hi Freq. values represent the frequency range for both analysis and synthesis (unless Formant Stretch or Formant Shift is used).
- *LowBand Mode buttons:* Determine whether the lowest filter band acts as a bandpass or lowpass filter. In bandpass mode, the frequencies above and below the highest band are ignored. In lowpass mode, all frequencies above the highest band are filtered.
- *HiBand Mode buttons:* Determine whether the highest filter band acts as a bandpass or highpass filter. In bandpass mode, the frequencies above and below the lowest band are ignored. In highpass mode, all frequencies below the lowest band are filtered.

Formant parameters

The dedicated formant filter LFO controls the Formant Shift parameter in the filter bank, enabling you to produce dynamic phasing-like effects.

- *Stretch slider and field:* Change the width and distribution of all bands in the synthesis filter bank. This can be a broader or narrower frequency range than that defined by the Low and Hi Freq. parameters.
    - When Formant Stretch is set to 0, the width and distribution of the bands in the synthesis filter bank match the width of the bands in the analysis filter bank. Low values narrow the width of each band in the synthesis filter bank, whereas high values widen the bands. The control range is expressed as a ratio of the overall bandwidth.
- *Formant Shift slider and field:* Move all bands in the synthesis filter bank up or down the frequency spectrum.
    - When Formant Shift is set to 0, the positions of the bands in the synthesis filter bank match the positions of the bands in the analysis filter bank. Positive values move the synthesis filter bank bands up in frequency, whereas negative values move them down—in respect to the analysis filter bank band positions.

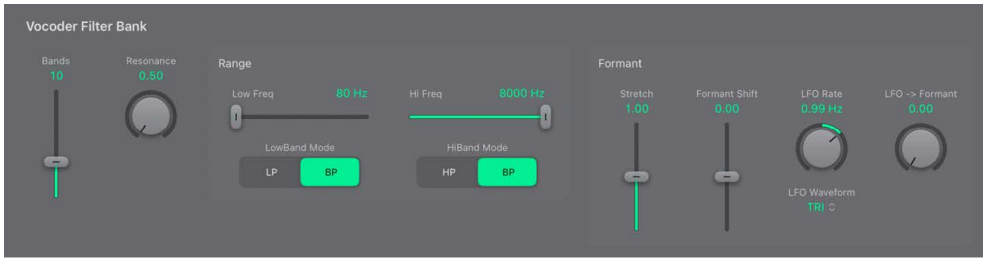
When combined, (Formant) Stretch and Formant Shift alter the formant structure of the resulting vocoder sound, which can lead to interesting timbral changes. For example, using speech signals and tuning Formant Shift up results in “Mickey Mouse” effects.

(Formant) Stretch and Formant Shift are also useful if the frequency spectrum of the synthesis signal does not complement the frequency spectrum of the analysis signal. You could create a synthesis signal in the high-frequency range from an analysis signal that mainly modulates the sound in a lower-frequency range, for example.

Note: The use of the (Formant) Stretch and the Formant Shift parameters can result in the generation of unusual resonant frequencies when high Resonance settings are used.

EVOC 20 PS filter modulation in Logic Pro for iPad

The formant filter LFO (LFO 1) controls the Formant Shift parameter in the filter bank, enabling you to produce dynamic phasing-like effects. It can either run freely or can be synchronized with the project tempo.



Formant Filter modulation parameters

- *LFO Rate knob and field:* Set the speed of modulation. Values to the left (of the centered position) are synchronized with the host application tempo. These include bar values, triplet values, and so on. Values to the right (of the centered position) are nonsynchronized, and are displayed in hertz—cycles per second.

  Note: The ability to use synchronous bar values could be used to perform a formant shift every four bars on a cycled one-bar percussion part, for example. Alternatively, you could perform the same formant shift on every eighth-note triplet within the same part. Either method can generate interesting results and lead to new ideas, or add life to existing audio material.

- *LFO Waveform pop-up menu:* Select the waveform type used by the Shift LFO. You can choose from the following waveforms for each LFO:

  - Triangle
  - Falling and rising sawtooth
  - Square up and down around zero (bipolar, good for trills)
  - Square up from zero (unipolar, good for changing between two definable pitches)
  - Random stepped waveform (S & H)
  - Smoothed random waveform

- *LFO->Formant knob and field:* Define the amount of formant shift modulation by LFO2.

Un/Voiced controls

EVOC 20 PS Un/Voiced detection in Logic Pro for iPad

Human speech consists of a series of voiced sounds—tonal sounds or formants—and unvoiced (U/V) sounds. The main distinction between voiced and unvoiced sounds is that voiced sounds are produced by an oscillation of the vocal cords, whereas unvoiced sounds are produced by blocking and restricting the air flow with lips, tongue, palate, throat, and larynx.

If speech containing voiced and unvoiced sounds is used as a vocoder analysis signal but the synthesis engine doesn't differentiate between voiced and unvoiced sounds, the result sounds rather weak. To avoid this problem, the synthesis section of the vocoder must produce different sounds for the *voiced* and *unvoiced* parts of the signal.

EVOC 20 PS includes an Unvoiced/Voiced detector for this specific purpose. This unit detects the unvoiced portions of the sound in the analysis signal and then substitutes the corresponding portions in the synthesis signal with noise, with a mixture of noise and synthesizer signal, or with the original signal. If the U/V detector detects voiced parts, it passes this information to the Synthesis section, which uses the normal synthesis signal for these portions.

A formant is a peak in the frequency spectrum of a sound. In the context of human voices, formants are the key component that allows humans to distinguish between different vowel sounds—based purely on the frequency of the sounds. Formants in human speech and singing are produced by the vocal tract, with most vowel sounds containing four or more formants.



Un/Voiced detection parameters

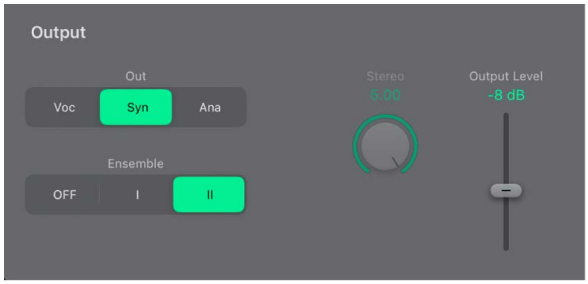
- *U/V Sensitivity knob and field:* Determine how responsive U/V detection is. Use higher settings to recognize more of the individual, unvoiced portions of the input signal. When high settings are used, the increased sensitivity to unvoiced signals can lead to the U/V sound source being used on the majority of the input signal, including voiced signals. Sonically, this results in a sound that resembles a radio signal that is breaking up and contains a lot of static, or noise. The U/V sound source is determined by the Mode pop-up menu.
- *U/V Level knob and field:* Set the volume of the signal used to replace the unvoiced content in the input signal.

  Important: Take care with the Level knob, particularly when a high Sensitivity value is used, to avoid internally overloading EVOC 20 PS.

- *U/V Source buttons:* Choose the sound source used to replace the unvoiced content in the input signal.
  - *Noise:* Uses noise alone for the unvoiced portions of the sound.
  - *N(oise) + Syn(th):* Uses noise and the synthesizer for the unvoiced portions of the sound.
  - *Blend:* Uses the analysis signal after it has passed through a highpass filter for the unvoiced portions of the sound. The Sensitivity parameter has no effect when this setting is used.

EVOC 20 PS output parameters in Logic Pro for iPad

The Output section controls the type of signal, stereo width, and level of signal that is sent from EVOC 20 PS. The Output section also has an integrated ensemble effect processor.



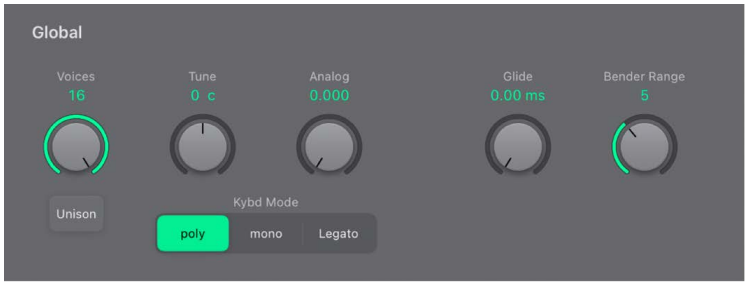
Output parameters

- *Out buttons:* Choose the signal that is sent to the main outputs.
  - *Voc(oder):* Choose to hear the vocoder effect.
  - *Syn(thesis):* Choose to hear only the synthesizer signal.
  - *Ana(lysis):* Choose to hear only the analysis signal.

  Note: The last two settings are mainly useful for monitoring purposes.
- *Ensemble buttons:* Turn the ensemble effect on or off and determine the type of sound. The three slider/switch positions from top to bottom:
  - *Off:* Choose to turn the ensemble effect off.
  - *I:* Choose for a special chorus effect.
  - *II:* Choose for a fuller and richer sound.
- *Stereo knob and field:* Distribute the output signals of the Synthesis section filter bands in the stereo field.
  - At the 0 position to the left, the outputs of all bands are centered.
  - At the centered position, the outputs of all bands ascend from left to right.
  - At the Full position to the right, the bands are output—alternately—to the left and right channels.
- *Output Level slider and field:* Set the overall volume of the output signal.

EVOC 20 PS global parameters in Logic Pro for iPad

The global parameters determine the keyboard mode and number of voices used by EVOC 20 PS.



Global parameters

- *Voices knob and field:* Set the maximum number of voices in the numeric field (only when Poly is turned on).
- *Unison button:* Turn Unison mode on or off.
  - In Unison/Poly mode—where both the Unison and Poly buttons are active—each voice is doubled. This cuts polyphony in half (to a maximum of eight voices, shown in the Voices field). The doubled voices are detuned by the amount defined with the Analog knob.
  - In Unison/Mono mode—where both the Unison and Mono or Legato buttons are active—up to 16 voices can be stacked and played monophonically. The Voices field displays the number of stacked voices that are heard.

  Important: Stacking voices in Unison/Mono mode increases the output volume. To avoid overloading the instrument channel strip output, set a low Level slider value and gradually increase it.
- *Tune knob and field:* Set the overall tuning in cents. One hundred cents equals one semitone step.
- *Analog knob and field:* Set the amount of random pitch detuning. Analog simulates the instability of analog circuitry found in vintage vocoders by randomly altering the pitch of each note. This behavior is much like that of polyphonic analog synthesizers.
- *Kybd Mode switch:* Determine the keyboard mode.
  - *Poly:* When on, you can set the maximum number of voices with the Voices knob. (When Mono or Legato is on, only a single voice is heard.)
  - *Mono:* When on, Glide is always active and the envelopes are retriggered by every note played (multi trigger behavior).
  - *Legato:* When on, Glide is active only on tied notes. Envelopes are not retriggered when tied notes are played (single trigger behavior).
- *Glide knob and field:* Determine the time it takes for the pitch to slide from one note to another—portamento.
- *Bender Range knob and field:* Determine the pitch bend modulation range, in semitone steps.

Performance tips

EVOC 20 PS level and frequency tips in Logic Pro for iPad

The tips in this section can help you achieve the best possible vocoder results with EVOC 20 PS. Also see tips on avoiding sonic artifacts and enhancing speech intelligibility.

A vocoder always generates the intersection point of the analysis and synthesis signals. If there's no treble portion in the analysis signal, the resulting vocoder output also lacks treble. This is also the case when the synthesis signal has a lot of high-frequency content. Because this is true of each frequency band, the vocoder demands a stable level in *all* frequency bands from *both* input signals to obtain the best results.

Achieving a great "classic" vocoder effect requires both the analysis and synthesis signals to be of excellent quality, and it also requires care to be taken with the vocoder parameters. These tips can help you achieve the best possible results.

- The less the level changes, the better the intelligibility of the vocoder. You should therefore compress the analysis signal in most cases.
- Due to the way human hearing works, the intelligibility of speech is highly dependent on the presence of high-frequency content. To aid in keeping speech clear, consider using equalization to boost or cut particular frequencies in analysis signals before you process them.
    - If the analysis signal consists of vocals or speech, a simple shelving filter should be sufficient to boost the high-mid and treble range, which is important for speech intelligibility.
    - If the *synthesis* signal lacks treble energy, it can be generated with a distortion effect.

Avoid sonic artifacts in EVOC 20 PS in Logic Pro for iPad

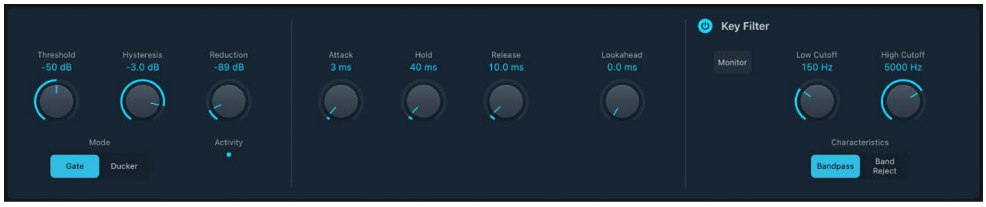
The tips in this section can help you achieve the best possible vocoder results with EVOC 20 PS. Also see tips on setting level and frequency and enhancing speech intelligibility.

A common problem with vocoder sounds involves sudden signal interruptions—ripping, breaking sounds—and rapidly triggered noises during speech pauses.

The (Sidechain Analyser) Release parameter defines the time it takes for a given synthesis frequency band to decrease in level if the signal level of the respective analysis band decreases abruptly. The sound is smoother when band levels decrease slowly. To achieve this smoother character, use higher Release values in the Sidechain Analyser section. Take care to avoid setting an over-long release time, because this can result in a less distinct, washy sound. Use short Attack values when a fast reaction to incoming signals is required.

If the analysis signal is compressed as recommended, the level of breath, rumble, and background noise rises. These unwanted signals can cause the vocoder bands to open unintentionally. To eliminate these artifacts, use a noise gate before using compression and boosting the treble frequencies. If the analysis signal is gated appropriately, you may be able to reduce the Release value.

When you gate speech and vocals with the Noise Gate plug-in, use Threshold to define the level above which the gate opens, and use Hysteresis to define a lower Threshold level below which the gate closes. The Hysteresis value is relative to the Threshold level.



Unwanted triggering by low or high frequency noise is avoided by the dedicated sidechain filters of the Noise Gate plug-in.

Enhance speech intelligibility in EVOC 20 PS in Logic Pro for iPad

The tips in this section can help you achieve the best possible vocoder results with EVOC 20 PS. Also see tips on setting level and frequency and avoiding sonic artifacts.

Keep these points in mind to achieve the best possible speech intelligibility:

- The spectra of the analysis and synthesis signals should almost completely overlap. Coupling low male voices with synthesis signals in the treble range doesn't work well.
- The synthesis signal must be constantly sustained, without breaks. The incoming side chain signal should be played or sung legato, because breaks in the synthesis signal stop the vocoder output. Alternatively, the ENV Release parameter in the Synthesizer section—not the Release time in the Sidechain Analyser section—can be set to a longer time. You can also achieve nice effects by using a reverberation signal as a synthesis signal. Note that the two latter methods can lead to harmonic overlaps.
- Do not overdrive the vocoder. This can happen easily, and distortion can occur.
- Enunciate your speech clearly if the recording is to be used as an analysis signal. Spoken words with a relatively low pitch work better than sung vocals—even if the creation of vocoder choirs is your goal. Pronounce consonants well, as exemplified in the rolled *"R"* of "We are the Robots," by Kraftwerk, a classic vocoder track. This exaggerated pronunciation was specifically made to cater to the vocoder.
- You can freely set formant parameters. Shifting, stretching, or compressing the formants has a minimal effect on the intelligibility of speech, as does the number of frequency bands. The reason for this is due to the human ability to differentiate the voices of children, women, and men, whose skulls and throats vary. Such physical differences cause variations in the formants that make up their voices. Human perception, or recognition, of speech is based on an analysis of the *relationships* between these formants. In the EVOC 20 plug-ins, these relationships are maintained even when extreme formant settings are used.

Vocoder history

The development of the vocoder dates back to the 1930s in the telecommunications industry.

Homer Dudley, a research physicist at Bell Laboratories in New Jersey, developed the vocoder (short for *voice encoder*) as a research machine. It was originally designed to test compression schemes for the secure transmission of voice signals over copper phone lines.

It was a composite device consisting of an analyzer and an artificial voice synthesizer, as follows:

- *Parallel bandpass vocoder:* A speech analyzer and resynthesizer.
- *Vocoder speech synthesizer:* A voice modeler, this valve-driven machine was played by a human operator. It had two keyboards, buttons to recreate consonants, a pedal for oscillator frequency control, and a wrist-bar to switch vowel sounds on and off.

The analyzer detected the energy levels of successive sound samples, measured over the entire audio frequency spectrum via a series of narrow band filters. The results of this analysis could be viewed graphically as functions of frequency against time.

The synthesizer reversed the process by scanning the data from the analyzer and supplying the results to a number of analytical filters, hooked up to a noise generator. This combination produced sounds.

In World War II, the vocoder (known then as the *voice encoder*) proved to be of crucial importance, scrambling the transoceanic conversations between Winston Churchill and Franklin Delano Roosevelt.

Werner Meyer-Eppler, the director of Phonetics at Bonn University, recognized the relevance of the machines to electronic music—following a visit by Dudley in 1948. Meyer-Eppler used the vocoder as a basis for his future writings which, in turn, became the inspiration for the German “Elektronische Musik” movement.

In the 1950s, a handful of recordings ensued.

In 1960, the Siemens Synthesizer was developed in Munich. Among its many oscillators and filters, it included a valve-based vocoding circuit.

In 1967, a company called Sylvania created a number of digital machines that used time-based analysis of input signals, rather than bandpass filter analysis.

In 1971, after studying Dudley’s unit, Bob Moog and Wendy Carlos modified a number of synthesizer modules to create their own vocoder for the *Clockwork Orange* soundtrack.

Peter Zinovieff’s London-based company EMS developed a standalone—and altogether more portable—vocoder. EMS is probably best known for the Synthi AKS and VCS3 synthesizers. The EMS Studio Vocoder was the world’s first commercially available machine, released in 1976. It was later renamed the EMS 5000. Among its users were Stevie Wonder and Kraftwerk. Stockhausen, the German “Elektronische Musik” pioneer, also used an EMS vocoder.

Sennheiser released the VMS 201 in 1977, and EMS released the EMS 2000, which was a cut-down version of its older sibling.

1978 saw the beginning of mainstream vocoder use, riding on the back of popularity created through the music of Herbie Hancock, Kraftwerk, and a handful of other artists. Among the manufacturers who jumped into vocoder production at this time are Synton/Bode, Electro-Harmonix, and Korg, with the VC-10.

In 1979, Roland released the VP 330 ensemble/vocoder keyboard.

The late 1970s and early 1980s were the heyday of the vocoder. Artists who used them included ELO, Pink Floyd, Eurythmics, Tangerine Dream, Telex, David Bowie, Kate Bush, and many more.

On the production side, vocoders could—and can still—be picked up cheaply in the form of kits from electronics stores.

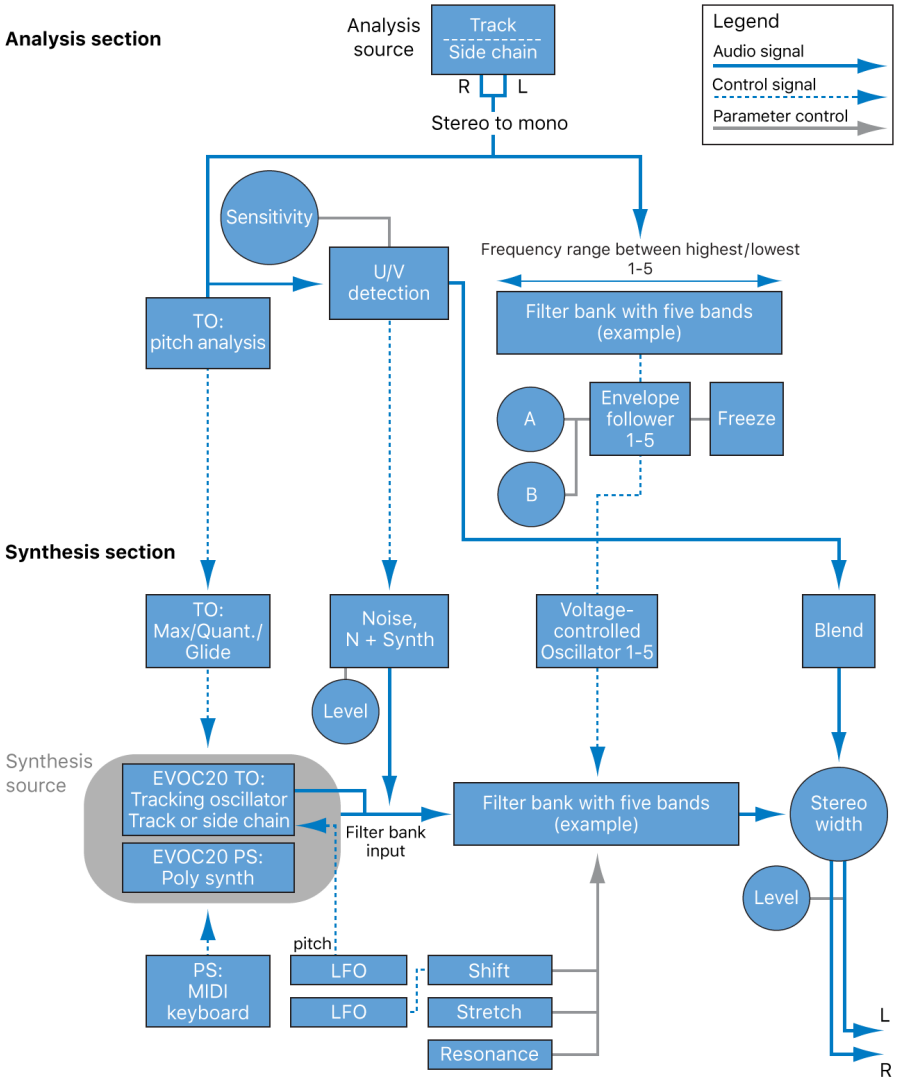
From 1980 to the present, EMS in the UK, Synton in Holland, and PAiA in the USA have been—and remain—the main flyers of the vocoding flag.

In 1996, Doepfer in Germany and Music and More joined the vocoder-producing fraternity.

From the late 1990s to the present, a number of standalone and integrated software-based vocoders—like the EVOC 20—have appeared.

EVOC 20 block diagram for Logic Pro for iPad

This block diagram illustrates the signal path in EVOC 20 TrackOscillator and EVOC 20 PS.



Quick Sampler

Quick Sampler in Logic Pro for iPad

Quick Sampler lets you quickly create sampler instruments consisting of a single audio file. You can drag a sample or Apple Loop from the Browser into Quick Sampler.

Quick Sampler offers independent control of pitch, filter, and amp parameters, coupled with flexible sampler modes and modulation options. If you're new to samplers, synthesizers and the concepts behind modulation generators, such as LFOs and envelopes, filters, and other components, see Intro to synthesizers.

Quick Sampler is inserted in instrument channel strips and is useful as both a playable instrument and an audio manipulation utility. You can use it in a number of ways in your productions, such as experimentation with Live Loops.

To add Quick Sampler to your project, choose it from the Instrument > Sample submenu in an instrument channel strip or the Plug-ins area. See Intro to plug-ins.

In the Quick Sampler interface, you can see two primary sections:



- The upper section contains all sample-related functions, including the sampler mode, the waveform display, and analysis, playback, mapping, and other options. See Choose a Quick Sampler mode.
- The lower section contains two LFOs and Pitch, Filter, and Amp panes that each have an independent envelope. A dedicated Mod Matrix pane provides extensive modulation options. See Quick Sampler Mod Matrix pane.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Add audio to Quick Sampler in Logic Pro for iPad

Quick Sampler provides two direct methods to add an audio file, Apple Loop, or region. Once you've added the file, you can choose different modes to change playback behavior, you can directly edit waveform markers, and you can alter the tonal color and performance characteristics with the synthesis and modulation parameters.

You can also import audio from other locations on your iPad or record audio directly into Quick Sampler. See Import media.

You can quickly replace the sound for Quick Sampler on a software instrument track by dragging an audio file or Apple Loop from the Browser to the track header. When you drag audio material directly into the Quick Sampler waveform display, you can choose whether Quick Sampler uses the original tuning, loudness, looping, and length of the material, or analyzes the material and optimizes its tuning, searches for loop points, and crops silence.

Add an audio file with the Sample name field

1. In Logic Pro, tap the "Sample name" field at the top center, and choose Browse Samples to open the Browser.
2. In the Browser, browse to the file you want to import, then drag it into Quick Sampler where two boxes appear.
   - *Original:* Adds the audio file to the waveform display, which uses the tuning, loudness, looping, and length characteristics of the source file.
   - *Optimized:* Analyzes the source file, optimizing its tuning, loudness, and length, then adds the audio file. If the audio is rhythmic and/or cyclical (looped), Quick Sampler automatically adds loop and crossfade markers to the waveform display. Silence at the beginning or end of the source audio is cropped (cut), shortening the imported audio.

Drag and drop content into Quick Sampler

This task outlines use of content in the Browser. You can also import audio from other locations on your iPad. See Import media.

1. In Logic Pro, drag an audio file or Apple Loop from the Browser into the Quick Sampler waveform display.
2. Drop the file into either the Original or the Optimized portion of the display.
   - *Original:* Adds the audio file to the waveform display, which uses the tuning, loudness, looping, and length characteristics of the source file.
   - *Optimized:* Analyzes the source file, optimizing its tuning, loudness, and length, then adds the audio file. If the contents are rhythmic and/or cyclical (looped), Quick Sampler automatically adds loop and crossfade markers to the waveform display. Silence at the beginning or end of the source audio is cropped (cut), shortening the imported content.

     Note: A resampling process is triggered when you drop a region into Quick Sampler. The region is bounced offline and added to the waveform display.

Drag and drop an audio file using Slide Over

You can add files on your iPad to Quick Sampler using Slide Over. See Intro to importing media.

Replace the sound for Quick Sampler on a software instrument track using drag and drop

- In Logic Pro, drag an audio file or Apple Loop from the Browser to a software instrument track header with a Quick Sampler instrument inserted.

Save a Quick Sampler setting

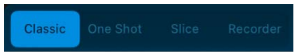
In Logic Pro, tap the plug-in menu bar More button ••• to access Quick Sampler file commands.

- *Save:* Saves the current instrument state. When you create a new instrument and save it for the first time, you are asked to provide a name. If you have edited an existing instrument and use this command, the existing filename is used and the original instrument is overwritten.
- *Save As:* Saves the current instrument state, but you're prompted to provide a different filename. Use this command when you want to save a copy or multiple versions of an edited Quick Sampler instrument, rather than overwriting the original version. This command may be useful when you want to save a Quick Sampler setting that is unique to a specific project. Storing this in a location outside of user folders may also be practical for sharing a copy of your Quick Sampler setting with a colleague or friend.

Modes

Choose a Quick Sampler mode in Logic Pro for iPad

You can tap the Classic, One Shot, Slice, and Recorder buttons to determine the sample playback mode.



- *Classic button:* Turn on Classic playback mode. The sample is played back while you hold a key and stops when the key is released, depending on the envelope settings. Playback starts from the start marker position. Classic mode also enables looped playback, set with parameters below the waveform display. This is the most useful mode if you want to "play" a sound across the keyboard range. See Quick Sampler Classic mode.
- *One Shot button:* Turn on One Shot playback mode. Sample playback begins at the start marker position and finishes at the end marker position when a key is pressed or a note is received. This mode is great for quickly dropping a processed sample into an arrangement, for drum loop playback, and for "effects" use. See Quick Sampler One Shot mode.
- *Slice button:* Turn on Slice playback mode to divide samples into multiple segments (slices) mapped to keys starting from the defined start key. Hold a key to start playback from the beginning of each slice. Depending on settings, playback continues until the next slice marker or the end marker while the key is held. When the Gate parameter is active, playback stops when you release the key. A number of Slice mode parameters are shown below the waveform display. This mode is ideal for manipulation of musical phrases and looped, rhythmic material, allowing you to play different slices in any order. See Quick Sampler Slice mode.

  You can also quickly create new Drum Machine Designer instruments.
- *Recorder button:* Turn on Recorder mode to capture any audio signal as an audio recording. After you have finished recording, switch to another mode to edit your sample. See Record in Quick Sampler.

Quick Sampler Classic mode in Logic Pro for iPad

Use Quick Sampler Classic mode to play and loop full or partial samples. The audio file is mapped to keys above and below the defined root key. Keyboard notes below this will play the sample at a lower pitch and slower speed. Keys above this will play the sample at a higher pitch and faster speed.

This mode is useful for a number of simple playback scenarios, including use on tracks with Flex activated and when using Live Loops.



Quick Sampler Classic mode parameters

- *Start and end markers:* Drag the blue start and end markers to set the sample start and end points. Playback occurs between these markers.

  Tip: When you tap any marker handle, parameter values are shown below the waveform display. Tap ✕ in the parameter display bar to revert to the default behavior and parameter view.

- *Loop start and end markers:* Drag the yellow loop start and end markers to set loop boundaries. Playback begins from the start marker position and cycles between the loop start and end markers while you hold a key. Drag the yellow shaded area between the loop start and end markers to move the entire loop.

- *Fade in and fade out markers:* Drag the gray fade in or fade out marker to adjust the length of the fade at the beginning and end of the audio file segment between the start and end markers.

- *Crossfade marker:* Drag the gray crossfade marker to adjust the length of the crossfade at the beginning and end of loop boundaries. Crossfading helps to smooth out audible glitches at the point where the loop cycles across the loop end and start points.

- *Root Key field:* Drag vertically to choose a keyboard note value that is used to play the sample at the original pitch. Keys below this will play the sample at a lower pitch and slower speed. Keys above this will play the sample at a higher pitch and faster speed.

- *Tune field:* Drag vertically to set a tuning value for the assigned root key in cents (1/100 of a semitone).

- *Playback mode buttons:* Activate Forward or Reverse playback from the start marker position, inclusive of loop playback.

- *Loop mode pop-up menu:* Choose a loop playback mode.
  - *No Loop:* Turn off looped playback. This hides loop markers and crossfades from the waveform display.
  - *Forward:* Playback cycles from the loop start point to the loop end point while you hold a key.
  - *Reverse:* Playback cycles from the loop end point to the loop start point while you hold a key.
  - *Alternate:* Playback continuously cycles from the loop start point to the loop end point, then switches from the loop end point to the loop start point, while you hold a key.
  - *Play to End on Release:* When you release a key, the loop plays to the loop end marker position, and playback smoothly continues to the sample end marker position—provided that the amp release time is long enough for the audio portion after the loop to be audible. This feature is useful for allowing the natural decay of a sampled acoustic instrument to be heard during the envelope release phase, for example.
- *Flex On/Off button:* Turn Flex mode on or off. If Flex mode is turned on, an audio sample is played at its original speed for all note pitches. See Use Flex in Quick Sampler.
- *Follow Tempo button:* When Flex mode is active, turn on to follow the project tempo.

  Tip: The Functions > Derive Tempo from Loop Length command in the More menu calculates a tempo for the audio file based on the Loop Length. If using the Follow Tempo button does not yield the desired results, you can choose this option to calculate a revised tempo at which the loop is aligned to the beat. See Quick Sampler More menu.
- *(Flex) Speed pop-up menu:* When Flex mode is active, choose a playback speed division or multiplication value.

  Tip: Flex Speed is also available as a modulation target.

Quick Sampler One Shot mode in Logic Pro for iPad

Use Quick Sampler One Shot mode to play an audio file, or a portion of it. It provides fade in and fade out parameters. Notes run from the Sample Start to the Sample End marker regardless of when the played note is released on the keyboard.

One Shot mode is useful for adding effects such as a reversed portion of a sample played alongside the original, or fading in a slightly detuned version to double parts. Use Classic mode if you want to loop part or all of the sample.



Quick Sampler One Shot mode parameters

- *Fade in/fade out markers:* Drag the gray fade in or fade out marker to adjust the length of the fade at the beginning and end of the audio file segment between the start and end markers.

  Tip: You can tap any marker handle to permanently display parameter values below the waveform display. Tap ✕ at the left of the parameter display bar to revert to the default behavior and parameter view.

- *Start and end markers:* Drag the blue start and end markers to set the sample start and end points for playback.
- *Root Key pop-up menu:* Drag vertically to choose a keyboard note value that is used to play the sample at the original pitch. Keys below this will play the sample at a lower pitch and slower speed. Keys above this will play the sample at a higher pitch and faster speed.
- *Tune field:* Drag vertically to set a tuning value for the assigned root key in cents (1/100 of a semitone).
- *Playback mode buttons:* Activate Forward or Reverse playback between the start and end marker positions. Loop markers are ignored.
- *Flex On/Off button:* Turn Flex mode on or off. If Flex mode is turned on, an audio sample is played at its original speed for all note pitches. See Use Flex in Quick Sampler.
- *Follow Tempo button:* When Flex mode is active, turn on to follow the project tempo.

  Tip: The Functions > Derive Tempo from Loop Length command in the More menu calculates a tempo for the audio file based on the Loop Length. If using the Follow Tempo button does not yield the desired results, you can choose this option to calculate a revised tempo at which the loop is aligned to the beat. See Quick Sampler More menu.

- *(Flex) Speed pop-up menu:* When Flex mode is active, choose a playback speed division or multiplication value.

  Tip: Flex Speed is also available as a modulation target.

Quick Sampler Slice mode in Logic Pro for iPad

Use Quick Sampler Slice mode to divide the audio file into segments (slices). You can map each segment to a keyboard key and play each slice independently. This mode is useful for playing individual hits or portions of a sample. Slices can be played in any order, enabling you to totally change the rhythm or pattern. For example, you may sequentially play every second or third note to create pseudo gating effects.

In Slice mode, you can do the following:

- Insert a slice marker by tapping the waveform display.
- Reposition a slice marker by horizontally dragging the slice marker handle.
- Delete a slice marker by double-tapping the handle or tapping the trashcan icon in the parameter display bar.
- Tap a slice marker handle to display slice parameter values below the waveform display. Tap ✕ in the parameter display bar to close it.

  Note: This is the *only* way to view the fade in and fade out parameters in Slice mode.

- Tap the note name shown below a slice marker to play the slice.



Quick Sampler Slice mode parameters

- *Slice markers:* Drag any yellow slice marker handle to adjust the playback start position and length of the sample segment. Playback of each segment starts when you strike the corresponding key.

  Tip: Tap the note name shown at the bottom of each slice marker to play the slice.

- *Start and end markers:* Drag the blue start and end markers to set the sample start and end points for playback.

  Tip: When you tap any marker handle, parameter values are shown below the waveform display. Tap ✕ in the parameter display bar to revert to the default behavior and parameter view.

- *Fade in and fade out fields:* Drag vertically to set the length of the fade at the beginning and end of the audio file segment between the start and end markers. The fade time values you set are applied to all slices. Depending on the sliced audio material, a small fade may help to avoid clicks that sometimes occur at the start or end of a slice.

  Note: These fields are shown *only* in the parameter display bar below the waveform display when you have tapped either the sample start or the sample end marker in Slice mode.

- *Mode pop-up menu:* Choose the slicing mode. You can automatically set divisions at transient or beat positions, or divide the audio file equally. You can also manually set divisions by placing slice markers. Your choice of mode determines the parameter field shown alongside the menu.

  - *Sensitivity field:* Shown when you choose Transient from the Mode pop-up menu. Set the number of slice markers, based on detection of transients in the audio file. Higher values display more slice markers.
  - *Division field:* Shown when you choose Beat Divisions from the Mode pop-up menu. Set the number of slice markers in the audio file by beat values. Higher values display more slice markers.
  - *Slices field:* Shown when you choose Equal Divisions from the Mode pop-up menu. Set the number of slice markers shown between the start and end markers. Higher values display more slice markers.

- *Start Key field:* Drag vertically to assign the key (note) for the first slice.

- *Start Key Mapping pop-up menu:* Choose Chromatic, White, or Black to map slices to keys above the assigned Start key.
- *Gate button:* Turn on to activate the release phase of Pitch, Filter, and Amp envelopes when the key is released. Turn off to play the sample in One Shot mode.
- *Play to End button:* Turn on to play the triggered slice to the end marker position.
- *Flex On/Off button:* Turn Flex mode on or off. If Flex mode is turned on, an audio sample is played at its original speed for all note pitches. See Use Flex in Quick Sampler.
- *Follow Tempo button:* When Flex mode is active, turn on to follow the project tempo.
- *(Flex) Speed pop-up menu:* When Flex mode is active, choose a playback speed division or multiplication value.

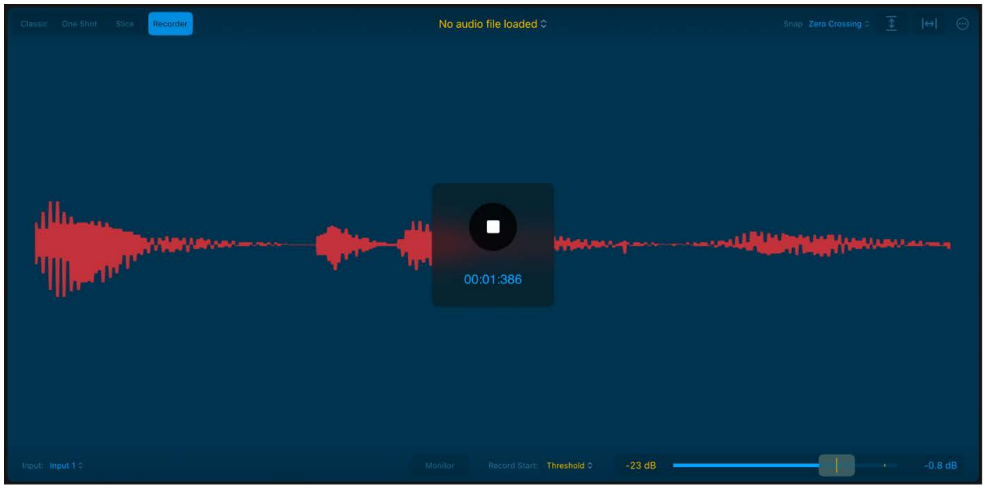
  Tip: Flex Speed is also available as a modulation target.

Have slice markers ignore the Sensitivity setting

- To keep a slice marker that would otherwise disappear when you lower the Sensitivity setting (using the Sensitivity slider), select the slice marker, then tap “Respond to Sensitivity” pop-up menu in the strip below the waveform display and choose Off.
- If you later decide to have the slice marker respond to Sensitivity, select the slice marker, then tap “Respond to Sensitivity” pop-up menu in the strip below the waveform display and choose On.

Recorder mode in Quick Sampler in Logic Pro for iPad

You can use Quick Sampler to record the signal from any audio input.



Quick Sampler Recorder mode parameters

- *Record button:* Tap to start and stop recording.
- *Input pop-up menu:* Choose the audio input source.
- *Monitor button:* Turn on to hear the incoming signal.

  Tip: Take care with levels to avoid audio feedback.

- *Record Start pop-up menu:* Choose to start recording immediately when the Record button is pressed or when the signal reaches the defined threshold level.

  Note: If “Wait for signal to pass Threshold” is chosen in the Record Start pop-up menu, recording won’t start until the Record button is tapped.
- *Level meter:* Shows the input signal level.
- *Level meter slider:* Set the threshold level for the input signal.

Record audio in Quick Sampler

1. In Logic Pro, choose an input from the Input pop-up menu.
2. Tap the Record button.
3. Choose the Record Start pop-up menu option you want to use.
   - To begin recording when you tap the Record button, choose “Start immediately.”
   - To begin recording when a defined level is reached, choose “Wait for signal to pass Threshold.”
4. To hear the incoming audio signal, turn on the Monitor button.

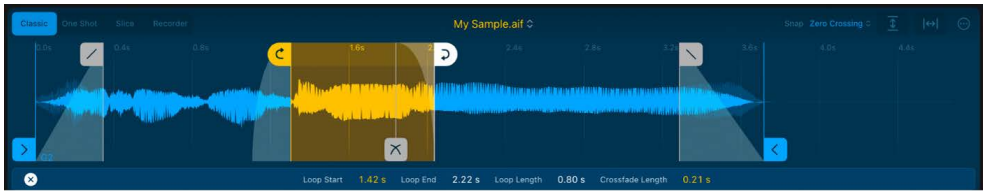
   Tip: Take care with levels to avoid audio feedback.
5. If you chose “Wait for signal to pass Threshold” in the Record Start pop-up menu, keep an eye on the level meter to set the level meter slider value.
6. Tap the Record button to begin recording.
7. Tap the Record button again to stop recording.

Waveform display

Quick Sampler waveform display in Logic Pro for iPad

You can see the current audio file in the waveform display and directly edit a number of sample playback parameters. You can zoom in or out with pinch gestures, or scroll using swipes or by dragging the scroll bar. You can change the height of the waveform display with the resize handle.

When you tap or drag markers and handles in the waveform display, parameters and values related to the current action are shown below the waveform display. Tap ⊗ in the parameter display bar to revert to the default behavior and parameter view.



Note: Some editing features are available only in certain modes.



Waveform display parameters

- *Sample name field and pop-up menu:* Choose, rename, or perform file-handling tasks for audio.
  - *Rename Current File:* Opens a file renaming dialog. Type the new filename and tap OK.
  - *Remove Current File:* Removes the selected audio file, indicated with a checkmark beside the filename.
  - *Clear History:* Clears all but the most recently used file.
  - *Browse Samples:* Opens the Browser, where you can audition audio files. Drag the audio file directly into the waveform display area, where you can choose an Original or Optimized import. See Add audio to Quick Sampler.
- *Snap pop-up menu:* Choose a value. Edits to crossfade, sample, slice, or loop start and end markers in the waveform display automatically snap to the nearest possible value.
- *Zoom vertical button:* Tap ↕ to switch between the maximum vertical zoom view and the default waveform display view.
- *Zoom horizontal button:* Tap |↔| to switch between the last manually set zoom level, if applicable, and an optimized zoom level that shows the area between the sample start and end markers. When no manual zoom level is set, the entire audio file is shown.

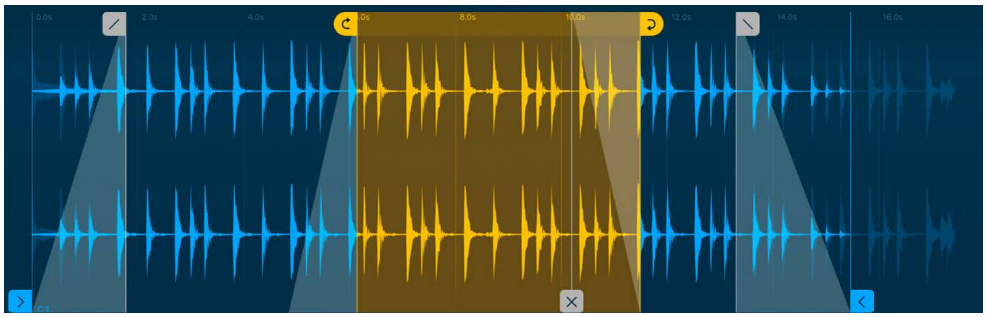
  Tip: You can horizontally zoom in or out on the waveform display with pinch gestures, or scroll using swipes or by dragging the scroll bar.

  Note: To make this facility useful, you should change the height of the waveform display with the Zoom vertical button.
- *More menu:* Tap ⋯ to choose a sample handling or processing command, or choose a crossfade, display, or MIDI behavior option. See Quick Sampler More menu.
- *Resize handle:* Drag vertically to change the height of the waveform display.

Use Quick Sampler start, end, loop, fade, crossfade, and slice markers

In Logic Pro, you can use markers to alter audio playback. You can define the possible positions for markers using the Snap menu.

Note: Different marker types are shown in each mode.



- *Start and end markers:* Drag the blue start or end marker to set the sample start and end point. Playback occurs between these markers.
- *Loop start and end markers:* Drag the yellow loop start or end marker to set loop boundaries. Playback cycles between these markers when you hold a note. Drag the yellow shaded area between the loop start and end markers to move the entire loop.

  Note: Loop boundaries can't be dragged past the sample start and end markers.
- *Crossfade marker:* Drag the gray crossfade marker to set the length of the crossfade at the beginning and end of loop boundaries, smoothing out audible glitches as the loop cycles across the loop end and start points.
- *Fade in/fade out markers:* Drag the gray fade in or fade out marker to adjust the length of the fade at the beginning and end of the audio file segment between the start and end markers.
- *Slice marker:* Shown in Slice mode. Drag any yellow slice marker to set its position. Tap between slice markers to create a new slice marker. Double-tap a slice marker to delete it.

Use slice markers to create new instruments and regions

In Logic Pro, you can use slice markers to create Drum Machine Designer tracks and to create MIDI regions containing note-on events.



In the Slice mode waveform display, drag the slice handles to adjust existing transient and start and end markers. You can also choose a number of commands from the More menu.

In Logic Pro, do any of the following:

- Tap the More button in Quick Sampler, tap Functions, then tap Create Drum Machine Designer Track.

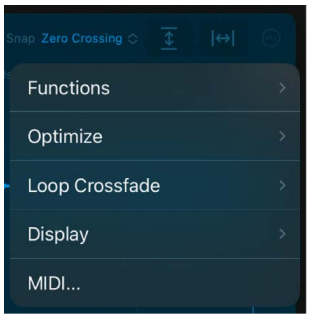
  A new Drum Machine Designer track is created, and a new MIDI region is created on this track. The MIDI region contains note-on events that correspond to each slice between the start and markers, and you can edit these as you can any other MIDI region. Individual audio slices are automatically mapped to pads in Drum Machine Designer, and you can edit, replace, process, or route these as you like.

- Tap the More button in Quick Sampler, tap Functions, then tap Copy MIDI Pattern. This analyzes and copies all slice markers between the start and end markers to the Clipboard.

  You can paste the Clipboard contents to a MIDI or instrument track as a new MIDI region. This feature is ideal for creating perfectly synchronized instrument parts and for drum replacement, Foley, and other uses.

Quick Sampler More menu in Logic Pro for iPad

You can tap the More button to choose a number of sample-handling commands that differ in Classic, One Shot, and Slice modes. The More menu also contains crossfade, display, and MIDI handling options.



Functions submenu

- *Auto-Loop:* Analyzes the audio and automatically sets a loop. You can use the command multiple times to try different automatic loops.
- *Auto-Loop within Loop Area:* Analyzes the audio and automatically sets a loop within the area defined by the loop start and end markers. You can use the command multiple times to try shorter automatic loops.
- *Retune:* Analyzes the audio and sets the root key and tuning value automatically.
- *Initialize Synth Parameters:* Recalls a neutral setting for all parameters in the Pitch, Filter, Amp, Mod Matrix, and LFO panes. This provides a “clean slate” when adjusting the parameters of your instrument.
- *Reimport Original:* Reimports the current audio with the tuning, loudness, looping, and length characteristics of the source file.

- *Reimport Optimized:* Reimports the current audio with optimized tuning, loudness, and length characteristics of the source file. Quick Sampler automatically adds loop and crossfade markers to the waveform display for appropriate material and crops (cuts) silence at the beginning or end of the source audio, shortening the imported audio.
- *Re-Analyze Transients and Tempo:* Re-analyzes the current audio for transient and tempo changes, following edits you have made.
- *Derive Tempo from Loop Length:* Calculates a tempo for the audio file based on the loop length. If the Follow Tempo button doesn't yield the desired results, use this option to recalculate a loop tempo aligned to the beat.
- *Crop Sample:* Crops (cuts) the portion(s) of the sample outside the start and end markers.
- *Crop Loop:* Crops (cuts) the portion(s) of the sample outside the loop start and end markers.
- *Create Drum Machine Designer Track:* Creates a new Drum Machine Designer track that contains the current Quick Sampler audio material.
- *Create Sample Alchemy Track:* Creates a new Sample Alchemy track that contains the current Quick Sampler audio material.
- *Copy MIDI Pattern:* Analyzes and copies slice markers to the Clipboard. You can paste the Clipboard contents to a MIDI or instrument track as a new MIDI region. This feature is ideal for creating perfectly synchronized instrument parts and for drum replacement, Foley, and other uses.

Optimize submenu

- *Optimize Loop Start:* Use to automatically adjust the loop start point to create a smooth loop cycle.
- *Optimize Loop Crossfade/End:* Use to automatically set crossfade values at the point in the loop cycle where the loop end and loop start markers cross over. Loop length is not affected.
- *Optimize Sample Gain:* Analyzes the audio and sets automatic gain values.

Other submenus

- *Loop Crossfade submenu:* Set the crossfade gain value behavior.
  - *Linear Crossfade:* Evenly scales the amplitude for the crossfade.
  - *Equal Power Crossfade:* Applies an exponential crossfade curve that causes a volume boost of 3 dB in the middle of the crossfade range. This fades out/fades in at an equal volume level.
- *Display submenu:* Choose Display Sample, Seconds, or Beat Units values for the time ruler in the waveform display. Choose Display Mono Sum or Stereo Channels to show a summed mono or stereo waveform view in the waveform display.

- *MIDI submenu:* Set the MIDI Mono mode and pitch bend range.
  - *MIDI Mono Mode pop-up menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16).

    In either MIDI Mono mode, each voice receives on a different MIDI channel. Per-voice channels support pitch bend, aftertouch, modulation wheel, and controller assignment messages. See Mod Matrix pane. Controllers and MIDI messages sent on the base channel affect all voices.
  - *Mono Mode Pitch Range field:* Drag vertically to set a value from 0 to 96.

    The chosen pitch bend range affects individual note pitch bend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar-to-MIDI converters use this range by default.

Use Flex in Quick Sampler in Logic Pro for iPad

The Quick Sampler Flex parameters are used to synchronize the audio playback tempo. This is ideal for synchronously playing a melodic Apple Loop in a key that matches the key of other tracks in Logic Pro, for example.



The Flex parameters are found at the lower right of the Quick Sampler waveform display in Classic, One Shot, and Slice modes. Flex works for files with tempo information, including:

- Apple Loops
- Bounced audio files

Use Flex to synchronize an Apple Loop in Quick Sampler

Follow these steps to use Flex to play an Apple Loop synchronously with other tracks in your project.

1. Load a project with at least a few tracks.
2. Open the Browser.
3. Drag a melodic Apple Loop, such as a rhythmic acoustic or electric guitar part, into the Quick Sampler waveform display. Drop it on the Original dropzone.
4. Play some notes on your keyboard over a few octaves. You will hear that the pitch of the loop changes, along with the playback speed.

5. Tap below the waveform display and play some notes on your keyboard over a few octaves.

   You will hear that the pitch of the loop changes, but the playback speed doesn't.

6. Start playback of your project and play a few notes on your keyboard.

   You will hear that the pitch of the loop changes, but the playback speed isn't synchronized with the project tempo.

7. While the project is playing, tap the Follow Tempo button below the waveform display and play some notes on your keyboard.

   You will hear that the pitch of the loop changes, and the playback speed is perfectly synchronized with the project tempo.

   Tip: The Derive Tempo from Loop Length command in the More menu calculates a tempo for the audio file based on the Loop Length. If using the Follow Tempo button does not yield the desired results, you can choose this option to calculate a revised tempo at which the loop is aligned to the beat.

8. As an option, you can choose a value in the Speed pop-up menu to divide or multiply the synchronized playback speed of the Apple Loop. Try this while the project is playing.

   Tip: Flex Speed is also available as a modulation target.

Modulation

Quick Sampler Mod Matrix pane in Logic Pro for iPad

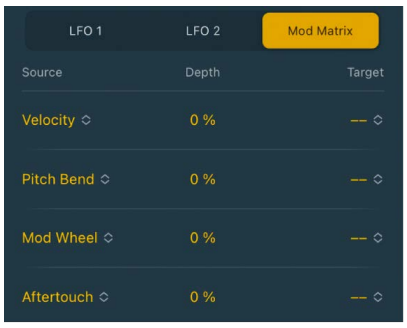
Quick Sampler LFOs and envelopes are known as *modulation generators*. These modulation sources are used to control modulation targets, such as oscillator pitch or filter cutoff.

You can assign up to four independent routings of modulation sources and targets in the Mod Matrix pane.

If you're new to synthesizers and the concepts behind modulation generators, such as LFOs and envelopes, see Intro to synthesizers.

Quick Sampler provides two LFOs and dedicated Pitch, Filter, and Amplitude envelopes that can also be assigned as modulation sources or targets in the Mod Matrix pane.

Your keyboard modulation wheel, aftertouch, pitch bend, velocity, and MIDI continuous controller features can also be assigned as real-time control sources for Quick Sampler parameters in the Mod Matrix.



Mod Matrix parameters

- *Source pop-up menu:* Choose a modulation source.
- *Depth field:* Drag vertically to set the maximum value or intensity of modulation. You can also tap the field to enter a numerical value.
- *Target pop-up menu:* Choose a modulation target.

Set up a modulation routing

You can assign Quick Sampler LFOs and envelopes as modulation sources or targets in the Mod Matrix pane.

You can also assign your keyboard modulation wheel, aftertouch, pitch bend, velocity, and MIDI continuous controllers as real-time control sources for Quick Sampler target parameters in the Mod Matrix pane.

In the Mod Matrix pane:

1. Choose a modulation target from the Target pop-up menu.
2. Choose a modulation source from the Source pop-up menu.

   As an example: Use Velocity Inverted to modulate a target with a soft keystrike, and no modulation when struck firmly.

   Note: The envelope modulators shown in the image are hardwired to control Pitch, Filter, and Amplitude, but you can also assign them as sources to modulate other Quick Sampler parameters in the Mod Matrix pane. The envelopes and LFOs are also available as modulation targets.
3. Drag the value in the Depth field up or down to set the maximum value or intensity of modulation.

Set up a modulation routing of sample or loop start and end, or loop position

The Sample Start & End, Loop Start & End, and Loop Position targets can be quantized in musical values. For example, if you modulate the loop position (the entire loop) using an LFO, a quantization of one bar moves the loop back and forth along the timeline in one-bar increments instead of the usual smooth LFO motion.

You could also choose to assign your keyboard modulation wheel as a real-time control source for Loop Position, or perhaps to Sample Start or Loop Start, providing you with direct physical control of these parameters.

In the Mod Matrix pane:

1. Choose an LFO from the Source pop-up menu.
2. Choose a Sample Start & End, Loop Start & End, or Loop Position option from the Target pop-up menu.

   The quantization value you choose in the modulation Target pop-up menu applies to *all* modulation routings assigned to this target.

   - *Sample Start & End:* Choose None, or Bar, Beat, or Triplet values to rhythmically modulate the sample start and end positions.
   - *Loop Start & End:* Choose None, or Bar, Beat, or Triplet values to rhythmically modulate the loop start and end positions.
   - *Loop Position:* Choose None, or Bar, Beat, or Triplet values to rhythmically modulate the loop position.

3. Drag the value in the Depth field up or down to set the maximum value or intensity of modulation.
4. As an optional second modulation routing, set up your keyboard modulation wheel (Mod Wheel) as the source, and choose Loop Start as the target.

Quick Sampler LFO controls in Logic Pro for iPad

Quick Sampler features two identical LFO units. Tap the tab at the top of the modulation pane to choose LFO 1 or LFO 2.

You can use the LFO units to modulate, or control, other parameters. Parameters defined as modulation targets are indicated by a white dot when a note is played. The modulation range is shown as an orange ring around target parameters.

Each LFO can be used as a modulation source and target for multiple parameters in the Quick Sampler Mod Matrix pane.

If you're new to synthesizers and the concepts behind modulation generators, such as LFOs and envelopes, see Intro to synthesizers.



Quick Sampler LFO parameters

- *On/Off button:* Turn the LFO on or off.
- *Rate knob and field:* Set the LFO modulation speed. Values are in hertz, or cycles per second. When the Sync button is turned on, bar or beat values—synchronized with the project tempo—are shown.
- *Sync button:* Turn on or turn off synchronization of the LFO with the project tempo. The Sync button note icon is highlighted when active.
- *Fade Mode pop-up menu:* Choose either Fade In or Fade Out. You set the fade in or out time with the Fade Time knob.
- *Fade Time knob and field:* Set the time it takes for the LFO modulation to fade in or fade out.
- *Phase knob and field:* Set the LFO waveform start point when a new key is struck. Set Trigger Mode to Poly to make effective use of this parameter.
- *Waveform pop-up menu:* Set the waveform type used by the LFO.

  The Waveform pop-up menu also contains two options that set waveform polarity.

  - *Off:* Choose to activate bipolar LFO waveform cycles.
  - *On:* Choose to activate unipolar LFO waveform cycles.

- *Poly button:* Turn on to modulate each voice independently with the LFO. When the Poly button is off, the LFO modulates all voices in the same way. You must release all notes before the LFO can be retriggered. If you play legato, or any key is held, the LFO does not restart from the beginning of the waveform cycle.
- *Key Trigger button:* Turn on to reset the LFO cycle to its start point, which you set with the Phase parameter, when a key is played.
- *Target Depth slider and field:* Set the amount of LFO modulation. When via is used, you can set the minimum and maximum modulation amount with two Amount slider handles. You can choose a second modulation source from the Via pop-up menu, which is used to control the modulation amount of the LFO.
- *Via pop-up menu:* Choose a modulation source to control the amount of LFO modulation.
- *Target pop-up menu:* Choose a modulation target for the LFO.

Set up an LFO modulation routing

The LFOs each feature an independent modulation routing of any target, with further control available through use of a via modulation source. You can also use the LFOs as modulation sources for other target parameters in the Mod Matrix pane.

In either LFO pane:

1. Choose a modulation target for the LFO from the Target pop-up menu.
2. Set the amount of LFO modulation with the Target Depth slider.

   You can also choose a second modulation source from the via pop-up menu, which is used to control the modulation amount, or range, of the LFO.
3. Choose a modulation source from the Via pop-up menu.

   When a via source is active, two handles are shown for the Target Depth slider.

   - Use the left slider handle to set the minimum LFO amount.
   - Use the right slider handle to set the maximum LFO amount, controlled by the via source.
   - You can drag either slider handle to increase or decrease the modulation range between them. You can also directly drag the modulation range area to move both sliders.

Quick Sampler Pitch controls in Logic Pro for iPad

Quick Sampler Pitch controls affect the playback pitch behavior of the current audio file. You can control pitch over time with a dedicated multimode envelope. Parameters that are modulation targets are indicated by a white dot when a note is played. The modulation range is shown as an orange ring around target parameters.

Tap the pitch envelope display to open the Pitch edit pane. You can drag points or lines in the pane to adjust envelope parameter values. Alternatively, in envelope parameter fields, drag values vertically to adjust them, or tap the field to open a dialog and enter values.

Tap Close at the top right of the edit pane to close it.

You can quickly switch between the Pitch, Filter, and Amp edit panes with the pop-up menu at the top left.

If you're new to synthesizers and the concepts behind components such as filters, LFOs, and envelopes, see Intro to synthesizers.



Quick Sampler Pitch parameters

- *Tune knob and field:* Tune the instrument in semitone steps.
- *Fine Tune knob and field:* Tune the instrument in cents. One cent is 1/100 of a semitone.
- *Glide Time knob and field:* Set the amount of time it takes to slide between the pitches of each played note.
- *Depth knob and field:* Set the amount of envelope modulation.
- *Pitch Bend (Up) pop-up menu:* Set the pitch bend range in semitones.
- *Key Track button:* Turn on to change the pitch and speed of sample playback when different notes are played. Turn off to play the sample at the original pitch and speed when any key is struck.
- *Pitch envelope display:* Shows the current pitch envelope. Tap to open the Pitch edit pane.

Quick Sampler Pitch Envelope parameters

- *Type pop-up menu:* Choose the pitch envelope type. This alters the number and appearance of envelope parameter fields and the graphical envelope display. The envelope types shown are abbreviations for the controls in the envelope shape: AD is an envelope that provides Attack and Decay controls. AR is an envelope that provides Attack and Release controls. ADSR provides Attack, Decay, Sustain, and Release parameters. AHDSR provides Attack, Hold, Decay, Sustain, and Release parameters.
  - *Pitch Envelope Attack handle and field:* Drag horizontally to set the time it takes for the envelope to reach the initial level. Drag the field vertically.
  - *Pitch Envelope Hold handle and field:* Drag horizontally to set the time the full level is held, following the attack phase, before the decay phase begins. Drag the field vertically.
  - *Pitch Envelope Decay handle and field:* Drag horizontally to set the time it takes for the envelope to fall to the sustain level, following the hold phase or the initial attack time. Drag the field vertically.
  - *Pitch Envelope Sustain handle and field:* Drag vertically to set the sustain level, which is held until you release the key. Drag the field vertically.
  - *Pitch Envelope Release handle and field:* Drag horizontally to set the time it takes for the envelope to fall from the sustain level to a level of zero. Drag the field vertically.

- *Pitch Envelope Velocity slider:* Set the intensity of pitch envelope modulation in response to incoming velocity data.
  - If the Velocity slider is set to zero, the envelope outputs its maximum level when you strike the keys at any velocity.
  - At a Velocity slider value of 100%, the entire dynamic range is under velocity control.

    To explain, raising the slider value reduces the envelope minimum amplitude, with the difference being dynamically controlled by keyboard velocity. For example, when you set the Velocity slider to 25%, the minimum envelope amplitude is reduced to 75%. The remaining 25% is added in response to the velocities of keys you play. A key played with a zero velocity results in an envelope amplitude of 75%. A key played with a MIDI velocity value of 127 will result in an envelope amplitude of 100%. When you raise the Velocity slider value, the minimum amplitude decreases even further.

Quick Sampler Filter controls in Logic Pro for iPad

Quick Sampler provides an extensive range of filter types, including lowpass, highpass, bandpass, and band reject filters.

You can control the filter section over time with a dedicated multimode envelope. Parameters that are modulation targets are indicated by a white dot when a note is played. The modulation range is shown as an orange ring around target parameters.

Tap the filter envelope display to open the Filter edit pane. You can drag points or lines in the pane to adjust envelope parameter values. Alternatively, in envelope parameter fields, drag values vertically to adjust them, or tap the field to open a dialog and enter values.

Tap Close at the top right of the edit pane to close it.

You can quickly switch between the Pitch, Filter, and Amp edit panes with the pop-up menu at the top left.

If you're new to synthesizers and the concepts behind components such as filters, LFOs, and envelopes, see Intro to synthesizers.



Quick Sampler Filter parameters

- *On/Off button:* Turn the filter on or off.
- *Type pop-up menu:* Choose a filter characteristic. Each option provides a different tonal color and response to Cutoff, Drive, and Res control values. See Quick Sampler filter types.
- *Cutoff knob and field:* Set the cutoff frequency for the filter. Higher frequencies are attenuated, and lower frequencies are allowed to pass in a lowpass (LP) filter. The reverse is true in a highpass (HP) filter. In bandpass (BP) mode, cutoff determines the center frequency of the band that is allowed to pass. Band Reject (BR) works the same way, but the center frequency is not allowed to pass.

- *Reso knob and field:* Boost or cut signals in the frequency band that surrounds the cutoff frequency.
- *Drive knob and field:* Overdrive the filter. This can lead to intense distortions, depending on filter type.
- *Env Depth knob and field:* Set the amount of filter envelope modulation.
- *Keyscale knob and field:* Set the filter cutoff frequency intensity by keyboard position. Set to zero to filter all notes equally. Set to 100% to open the filter for higher played notes.
- *Filter envelope display:* Shows the current filter envelope. Tap to open the Filter edit pane.

Quick Sampler Filter Envelope parameters

- *Type pop-up menu:* Choose the envelope type. This alters the number and appearance of envelope parameter fields and the graphical envelope display.
  - *Filter Envelope Attack handle and field:* Drag horizontally to set the time it takes for the envelope to reach the initial level. Drag the field vertically.
  - *Filter Envelope Hold handle and field:* Drag horizontally to set the time the full level is held, following the attack phase, before the decay phase begins. Drag the field vertically.
  - *Filter Envelope Decay handle and field:* Drag horizontally to set the time it takes for the envelope to fall to the sustain level, following the hold phase or the initial attack time. Drag the field vertically.
  - *Filter Envelope Sustain handle and field:* Drag vertically to set the sustain level, which is held until you release the key. Drag the field vertically.
  - *Filter Envelope Release handle and field:* Drag horizontally to set the time it takes for the envelope to fall from the sustain level to a level of zero. Drag the field vertically.
- *Filter Envelope Velocity slider:* Set the intensity of filter envelope modulation in response to incoming velocity data.
  - If the Velocity slider is set to zero, the envelope outputs its maximum level when you strike the keys at any velocity.
  - At a Velocity slider value of 100%, the entire dynamic range is under velocity control.

    To explain, raising the slider value reduces the envelope minimum amplitude, with the difference being dynamically controlled by keyboard velocity. For example, when you set the Velocity slider to 25%, the minimum envelope amplitude is reduced to 75%. The remaining 25% is added in response to the velocities of keys you play. A key played with a zero velocity results in an envelope amplitude of 75%. A key played with a MIDI velocity value of 127 will result in an envelope amplitude of 100%. When you raise the Velocity slider value, the minimum amplitude decreases even further.

Quick Sampler filter types in Logic Pro for iPad

Quick Sampler provides multiple filter types you can choose in the Filter controls. Each filter type has unique sonic characteristics and responds differently to incoming signals. This flexible collection of filters let you subtly or dramatically sculpt the tone of your instruments.

Quick Sampler filter types

- *Lowpass (LP):* This filter type passes the portion of a signal below a specified cutoff frequency and rolls off the portion above that frequency.
- *Bandpass (BP):* This filter type passes the portion of a signal occupying a band surrounding the cutoff frequency and rolls off the portions above and below that band.
- *Highpass (HP):* This filter type passes the portion of a signal above a specified cutoff frequency and rolls off the portion below that frequency.
- *Band reject (BR):* This filter type cuts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.
- *Peaking:* This filter type boosts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

There are multiple two-pole, four-pole, multi-pole state-variable and analog-modeled LP, BP, and HP filter designs in Sampler, each with distinctive characteristics that you may prefer for a given purpose. The available LP, BP, and HP filter designs include Creamy, Edgy, Gritty, Lush, Lush (Fat), and Sharp variants.

- *Creamy:* Multi-pole state-variable filter.
- *Edgy:* Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- *Gritty:* Two-pole filters designed to saturate heavily at higher Resonance and Drive settings.
- *Lush:* Four-pole lowpass analog-modeled filters.
- *Lush (Fat):* Four-pole analog-modeled filters.
- *Sharp:* Two-pole analog-modeled filters.

The three principal filter controls have standard functions for all filter types.

- *Cutoff:* Controls the filter cutoff frequency.
- *Resonance:* Controls the filter resonance or emphasis. Higher settings boost frequencies in the immediate vicinity of the cutoff frequency.
- *Drive:* Allows the filter to be overdriven; the precise effect varies with each filter design.

Quick Sampler Amp controls in Logic Pro for iPad

Quick Sampler Amp controls set the level, pan position, and polyphony.

You can control the level over time with a dedicated multimode envelope. Parameters that are modulation targets are indicated by a white dot when a note is played. The modulation range is shown as an orange ring around target parameters.

Tap the amp envelope display to open the Amp edit pane. You can drag points or lines in the pane to adjust envelope parameter values. Alternatively, in envelope parameter fields, drag values vertically to adjust them, or tap the field to open a dialog and enter values.

Tap Close at the top right of the edit pane to close it.

You can quickly switch between the Pitch, Filter, and Amp edit panes with the pop-up menu at the top left.

If you're new to synthesizers and the concepts behind envelopes, see Intro to synthesizers.



Quick Sampler Amp parameters

- *Amp Pan knob and field:* Set the overall panorama position in the stereo field.
- *Voices pop-up menu:* Set the maximum number of voices that can be played simultaneously.
- *Volume knob and field:* Set the overall output volume level.
- *Amp envelope display:* Shows the current amplitude envelope. Tap to open the Amp edit pane.

Quick Sampler Amp Envelope parameters

- *Type pop-up menu:* Choose the envelope type. This alters the number and appearance of envelope parameter fields and the graphical envelope display.
- *Amp Envelope Attack handle and field:* Drag horizontally to set the time it takes for the envelope to reach the initial level. Drag the field vertically.
- *Amp Envelope Hold handle and field:* Drag horizontally to set the time the full level is held, following the attack phase, before the decay phase begins. Drag the field vertically.
- *Amp Envelope Decay handle and field:* Drag horizontally to set the time it takes for the envelope to fall to the sustain level, following the hold phase or the initial attack time. Drag the field vertically.
- *Amp Envelope Sustain handle and field:* Drag vertically to set the sustain level, which is held until you release the key. Drag the field vertically.
- *Amp Envelope Release handle and field:* Drag horizontally to set the time it takes for the envelope to fall from the sustain level to a level of zero. Drag the field vertically.

- *Amp Envelope Velocity slider:* Set the sensitivity of amplitude envelope modulation in response to incoming velocity data.
  - If the Velocity slider is set to zero, the envelope outputs its maximum level when you strike the keys at any velocity.
  - At a Velocity slider value of 100%, the entire dynamic range is under velocity control.

    To explain, raising the slider value reduces the envelope minimum amplitude, with the difference being dynamically controlled by keyboard velocity. For example, when you set the Velocity slider to 25%, the minimum envelope amplitude is reduced to 75%. The remaining 25% is added in response to the velocities of keys you play. A key played with a zero velocity results in an envelope amplitude of 75%. A key played with a MIDI velocity value of 127 will result in an envelope amplitude of 100%. When you raise the Velocity slider value, the minimum amplitude decreases even further.

Retro Synth

Retro Synth in Logic Pro for iPad

Retro Synth is a flexible 16-voice synthesizer that can produce a wide variety of sounds.

Retro Synth provides four different synthesizer engines—Analog, Sync, Wavetable, and FM. Each engine can generate unique sounds that are difficult or impossible to achieve with other types of synthesizers.

Retro Synth is very easy to use, with many identical controls found in each synthesizer engine.

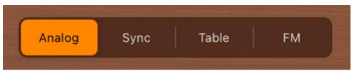
If you're new to synthesizers, it might be best to start off with Intro to synthesizers, which will introduce you to the fundamentals and terminology of different synthesis systems.

To add Retro Synth to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

The first step in creating a new sound is to choose a Retro Synth synthesizer engine. Your choice should be guided by the type of sound you want to generate.

Choose a synthesizer engine

- In Logic Pro, tap the name of the synthesizer engine that you want to use:



  - *Analog:* Use for classic synthesizer sounds, such as leads, pads, and basses. See Retro Synth Analog oscillator.
  - *Sync:* Use for aggressive synthesizer sounds, particularly leads and basses. See Retro Synth Sync oscillator.
  - *Table:* Use for clean digital synthesizer sounds, such as pads and basses, and evolving effect sounds. See Retro Synth Table oscillator.
  - *FM:* Use for classic digital synthesizer sounds. Of note are bells, electric piano, clavinet, and spiky bass sounds. See Retro Synth FM oscillator.

Your choice of synthesizer engine changes the controls available. Most of these changes are seen in the Oscillator section.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Synthesizer engines

Retro Synth Analog oscillator in Logic Pro for iPad

The synthesizer oscillators are used to generate one or more waveforms. You set the basic tonal color with the chosen waveform or waveforms, adjust the pitch of the basic sound, and set the level relationships between oscillators. The signal of one or both oscillators is then sent to other parts of the synthesizer engine for shaping, processing, or manipulation. See filter controls, amp and effect controls, modulation, and global and controller settings.

Analog synthesizer sounds are typically attributed with having a warm and rich tone. You can create a wide variety of timbres using this synthesis method, notably string and pad sounds, synthetic brass, bass, and percussion.



Analog oscillator 1 and 2 parameters

- *Oscillator 1/2 Waveform buttons:* Choose the type of waveform that each oscillator generates. The waveform is responsible for the basic tonal color. The oscillators output a number of standard waveforms—noise, sawtooth, square, and triangle.
- *Osc 1/2 PW knobs and fields:* Adjust the pulse width (shape) of the *square* waveform when chosen for oscillator 1 or 2. This makes the square waveform more rectangular and nasal-sounding.
- *Semitone knob and field:* Set the pitch of oscillator 2 in semitone steps, over a range of ±2 octaves.
- *Detune knob and field:* Precisely adjust the frequency of oscillator 2 in cents (1 cent = 1/100th semitone).

Analog oscillator modulation and mix parameters

- *Shape Mod knob and field:* Set the intensity of waveform shape modulation. The centered (off) position prevents all waveform shape modulation with the LFO or filter envelope.
  - Left of center = LFO modulation.
  - Right of center = Filter Envelope modulation.
- *Vibrato Depth knob and field:* Set the amount of vibrato (pitch modulation).
- *Oscillator Mix slider and field:* Crossfade (set the level relationships) between the oscillators.

Retro Synth Sync oscillator in Logic Pro for iPad

The synthesizer oscillators are used to generate one or more waveforms. You set the basic tonal color with the chosen waveform or waveforms, adjust the pitch of the basic sound, and set the level relationships between oscillators. The signal of one or both oscillators is then sent to other parts of the synthesizer engine for shaping, processing, or manipulation. See filter controls, amp and effect controls, modulation, and global and controller settings.

Oscillator sync sounds are typically more aggressive than sounds generated with other synthesis methods, making this engine most suitable for lead and hard bass instruments. On each waveform cycle of oscillator 1 the waveform of oscillator 2 is reset to its start position, thus oscillator 2 is hard synced to oscillator 1.



Sync oscillator 1 and 2 parameters

- *Oscillator 1/2 Waveform buttons:* Choose the type of waveform that each oscillator generates. The waveform is responsible for the basic tonal color. The oscillators output a number of standard waveforms—sawtooth, square, and triangle.
- *Osc 1/2 PW knobs and fields:* Adjust the pulse width (shape) of the *square* waveform when chosen for oscillator 1 or 2. This makes the square waveform more rectangular and nasal-sounding.
- *Oscillator 2 Sync slider and field:* Set the maximum amount of sync modulation. This makes the sound more or less aggressive. Technically, this control raises the pitch of oscillator 2 in relation to oscillator 1.

Sync oscillator modulation and mix parameters

- *Shape Mod knob and field:* Set the oscillator sync modulation intensity. The centered (off) position prevents all waveform (oscillator sync) modulation with the LFO or filter envelope.
  - Left of center = LFO modulation.
  - Right of center = Filter Envelope modulation.
- *Vibrato Depth knob and field:* Rotate to set the amount of vibrato (pitch modulation).
- *Oscillator Mix slider and field:* Move to crossfade (set the level relationships) between the oscillators.

Retro Synth Table oscillator in Logic Pro for iPad

The synthesizer oscillators are used to generate one or more waveforms. You set the basic tonal color with the chosen waveform or waveforms, adjust the pitch of the basic sound, and set the level relationships between oscillators. The signal of one or both oscillators is then sent to other parts of the synthesizer engine for shaping, processing, or manipulation. See filter controls, amp and effect controls, modulation, and global and controller settings.

Wavetable synthesis is useful for creating evolving textures and more clinical sounds. It is well-suited for pad creation, basses, and sound effects. Despite the clean tone, wavetable synthesis can also sound warm when combined with the right filter type. A wavetable consists of a series of single-cycle waveforms.



Table oscillator 1 and 2 parameters

- *Wavetables pop-up menu:* Choose a factory or custom wavetable.
  - *Custom Wavetable:* Loads the custom wavetable in memory. You can switch between this and a factory wavetable.
  - *App Wavetables submenu:* Load a factory-supplied wavetable. You can switch between a factory wavetable and the custom wavetable.
- *Reverse Wavetable button:* Reverses playback of the loaded wavetable. For example, a wavetable with 10 waveforms would sequentially play waveform 10 through to 1 when reversed.
- *Oscillator 1/2 Shape knobs and fields:* Rotate to move through the waveforms in the active wavetable. A wavetable consists of a series of single-cycle waveforms.
- *Semitone knob and field:* Rotate to set the pitch of oscillator 2—in semitone steps, over a range of ±2 octaves.
- *Detune knob and field:* Rotate to precisely adjust the frequency of oscillator 2 in cents (1 cent = 1/100th semitone).

Table oscillator modulation and mix parameters

- *Shape Mod knob and field:* In shape mode, set the modulation intensity. In formant mode, stretch or compress the formant spectrum of the active wavetable. The centered (off) position prevents all wavetable shape modulation with the LFO or filter envelope. The mode is chosen with the Osc Env Target pop-up menu.
  - Left of center = LFO modulation.
  - Right of center = Filter Envelope modulation.

  Note: This parameter is also available as the Wave Variation (Formant) real-time modulation target. See Retro Synth global and controller settings.
- *Osc Env Target pop-up menu:* Switch between shape and formant modes.
  - *Shape mode:* Choose waveforms from default or custom wavetables with the Shape knobs.
  - *Formant mode:* Use the Shape Modulation knob to stretch or compress the formant spectrum—a series of fixed frequency peaks—in the active waveform (chosen with the Shape knobs). This is similar to grain compression in a granular synth.
- *Vibrato Depth knob and field:* Rotate to set the amount of vibrato (pitch modulation).
- *Oscillator Mix slider and field:* Move to crossfade (set the level relationships) between the oscillators.

Retro Synth FM oscillator in Logic Pro for iPad

The synthesizer oscillators are used to generate the basic tonal color. This signal is then sent to other parts of the synthesizer engine for shaping, processing, or manipulation. See filter controls, amp and effect controls, modulation, and global and controller settings.

In FM synthesis, the basic sound is generated by setting different tuning ratios between the modulator and carrier oscillators. You can set the level of overtones created by this process.

At the core of the Retro Synth FM synthesis engine, you'll find a multiwave modulator oscillator—controlled with the FM Shape slider, and a sine wave carrier oscillator—controlled with the FM Intensity slider. The basic sine wave of the carrier oscillator is a pure, characterless tone.

To make things more sonically interesting, the modulator oscillator is used to modulate the frequency of the carrier oscillator. This modulation occurs in the audio range (you can actually hear it), and results in a number of new harmonics becoming audible, thus changing the tonal color.

The pure sine wave (of the carrier oscillator) is combined with the newly generated harmonics, making the sound much more interesting.

You can make fine changes to the tuning ratio of the two oscillators (and therefore the levels of the harmonics) by adjusting the FM Harmonic and FM Inharmonic controls.

FM synthesis is noted for synthetic brass, bell-like, electric piano, and spiky bass sounds.



FM oscillator parameters

- *FM Intensity slider and field:* The carrier waveform is a simple sine wave. Drag up to add harmonics.
- *Harmonic/Inharmonic sliders and fields:* Precisely change the levels of these sonic elements, and therefore, the tonal color of your sound. Technically, you're changing the tuning ratio between the carrier and modulator oscillators, resulting in harmonic or inharmonic content becoming more or less audible. This parameter is also available as the Wave Variation (FM Harmonic) real-time modulation target. See Retro Synth global and controller settings.

  Note: The harmonic complexity can change significantly when you adjust the (Wave) Shape slider, so avoid using it if making a subtle alteration to the harmonic or inharmonic content of your sound.
- *FM Shape slider and field:* Change the carrier and modulator waveform. This control and the FM slider interact as you adjust either, resulting in a range of tones with more or less harmonic/inharmonic content.

FM oscillator modulation and mix parameters

- *Shape Mod knob and field:* Choose a modulation source (LFO or Filter Envelope), and set the modulation intensity. This modulates the target chosen with the FM/Harmonic switch.
- *Osc Env Target pop-up menu:* Choose a modulation target—FM Intensity, Harmonic, or both—for the LFO or Filter Envelope.
  - FM: This lets you use the LFO or Filter Envelope to modulate the FM Intensity.
  - FM+Harmonic: This lets you use the LFO or Filter Envelope to modulate the FM Intensity and Harmonic content at the same time.
  - Harmonic: This lets you use the LFO or Filter Envelope to modulate the Harmonic content.
- *Vibrato Depth knob and field:* Rotate to set the amount of vibrato (pitch modulation).
- *Oscillator Mix slider and field:* Crossfade (set the level relationships) between the modulator and carrier oscillators.

Retro Synth filter controls in Logic Pro for iPad

Retro Synth features a flexible filter that can operate as a lowpass, highpass, bandpass, band reject, or peak filter. The filter can subtly, or dramatically, affect the basic tone sent from the oscillators.

Filter use is straightforward. Choose one of the available filter types and adjust the filter cutoff and resonance controls to sculpt the sound. You can also control the filter cutoff and resonance controls while playing—either manually or by using keyboard position, an envelope, or the LFO to modulate these filter controls automatically. Real-time changes to filter cutoff and resonance can make your performance much more dynamic and interesting. You can do this with MIDI keyboard controllers and with modulation section controls. See Use Retro Synth modulation and Retro Synth global and controller settings.



Filter parameters

- *On/Off button:* Turn the filter section on or off. The filter is turned on by default (indicated by the highlighted button at the top left of the filter section). Turn off the filter when adjusting other sound controls because this makes it easier to hear changes.
- *Cutoff knob and field:* Set the brilliance of the signal.
  - *In a lowpass filter:* The higher the cutoff frequency is set, the higher the frequencies of signals that are allowed to pass.
  - *In a highpass filter:* Cutoff sets the point where low frequencies are suppressed.
  - *In a bandpass, band reject, or peak filter:* Cutoff sets the center frequency of the band that is allowed to pass, is suppressed, or is emphasized.
- *Resonance knob and field:* Boost or cut signal portions above, below, or surrounding the cutoff frequency.
- *Filter Type pop-up menu:* Choose a filter type from the menu. This changes the sonic character and behavior of other filter parameters. There are eight lowpass filters with different slopes, four highpass, four bandpass, a band reject, and a peak filter available. Use the descriptive names—Creamy, Edgy, Gritty, Lush, Lush (Fat), and Sharp—to make a choice that's right for your sound. See Retro Synth filter types.
  - *LP (lowpass):* Allows frequencies that fall below the cutoff frequency to pass. You can choose one of four slopes from the eight models that change the tonal characteristics of the filter, making it sound brighter, mellow, thinner, or fuller—particularly in the bass end of the sound.
  - *HP (highpass):* Allows frequencies above the cutoff frequency to pass. There are three slopes to choose from: 6, 12, and 24 dB/octave.

- *BP (bandpass):* The frequency band directly surrounding the cutoff frequency is allowed to pass. All other frequencies are cut. The Resonance control sets the width of the frequency band. Bandpass is a two-pole filter with a slope of either 6 or 12 dB/octave on each side of the center frequency.
- *BR (band reject):* The frequency band directly surrounding the cutoff frequency is rejected, but frequencies outside the band can pass. The Resonance control sets the width of the rejected frequency band. Band reject has a slope of 6 dB/octave.
- *Peak:* A peak filter allows the level in a frequency band to be increased. The center of the frequency band is set with the Cutoff control. The width of the band is set with the Resonance control.

- *Filter FM/Drive knob and field:* Depending on the chosen filter type, set the intensity of filter cutoff modulation with the Osc1 sine wave generator or increase filter input gain.
  - *Filter FM:* Positions to the left set the strength of static sine wave modulations. Positions to the right set the strength of envelope-controlled sine wave modulations. The centered (off) position prevents filter frequency modulation by the Oscillator 1 sine wave generator.
  - *Drive:* You can alter the signal level at the filter input. This is typically used to overdrive the signal, which distorts the waveform and changes the filter response, leading to more aggressive tones.

  Note: The Oscillator 1 sine wave generator always generates a sine signal at the frequency of Oscillator 1.
- *Filter Keyscale slider and field:* Determine the effect that keyboard pitch (the note number) has on filter cutoff frequency modulation.

  At the top position, the filter follows keyboard pitch, resulting in a constant relationship between cutoff frequency and pitch. This mirrors the properties of many acoustic instruments where higher notes sound both brighter in tone and higher in pitch. At the bottom position, the cutoff frequency does not change, regardless of which key (pitch) you strike. This makes the lower notes sound relatively brighter than the higher ones.
- *Cutoff by LFO knob and field:* Set the strength of filter cutoff frequency modulation with the LFO. Positions further away from the centered (off) position make modulation more or less intense. See Retro Synth LFO and Vibrato.
- *Cutoff by Env knob and field:* Set the strength of filter cutoff frequency modulation with the Filter Envelope. Positions further away from the centered (off) position make modulation more or less intense. See Retro Synth envelopes.

Retro Synth filter types in Logic Pro for iPad

Retro Synth provides multiple filter types.

Retro Synth filter types: lowpass, bandpass, highpass

A lowpass (LP) filter passes the portion of a signal below a specified cutoff frequency and rolls off the portion above that frequency. A bandpass (BP) filter passes the portion of a signal occupying a band surrounding the cutoff frequency and rolls off the portions above and below that band. A highpass (HP) filter passes the portion of a signal above a specified cutoff frequency and rolls off the portion below that frequency.

There are multiple two-pole, four-pole, multi-pole state-variable and analog-modeled LP, BP, and HP filter designs in Retro Synth, each with distinctive characteristics that you may prefer for a given purpose. The available LP, BP, and HP filter designs include Creamy, Edgy, Gritty, Lush, Lush (Fat), and Sharp variants.

- Creamy: Multi-pole state-variable filter.
- Edgy: Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- Gritty: Two-pole filters designed to saturate heavily at higher Resonance and Drive settings.
- Lush: Four-pole lowpass analog-modeled filters.
- Lush (Fat): Four-pole analog-modeled filters.
- Sharp: Two-pole analog-modeled filters.

The three principal filter controls have standard functions for all filter types.

- *Cutoff:* Controls the filter cutoff frequency.
- *Resonance:* Controls the filter resonance or emphasis. Higher settings boost frequencies in the immediate vicinity of the cutoff frequency.
- *Filter FM/Drive:* Depending on the selected filter type, the Drive parameter changes to a Filter FM parameter and vice versa. The precise effect of this control varies with each filter design.

Retro Synth filter types: band reject and peaking

A band reject filter cuts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

A peaking filter boosts a narrow band around a resonant frequency. The remainder of the signal is affected minimally.

- *Cutoff:* Sets the frequency of the cut band.
- *Resonance:* Controls the filter resonance or emphasis. Higher settings boost frequencies in the immediate vicinity of the cutoff frequency.

Retro Synth amp and effect controls in Logic Pro for iPad

Retro Synth amp controls set the overall volume. You can also mix a sine wave directly into the output stage, which thickens the sound. You can make the sound richer with the integrated Chorus effect or can add a sweeping, metallic character with the Flanger effect. If you're new to synthesizers and the concepts behind amp controls, see Intro to synthesizers.



Amp parameters

- *Sine Level slider and field:* Mix a sine wave at the frequency of oscillator 1 (Shape 1) directly into the output stage. This sine signal is not processed by the filter.
- *Output Volume slider and field:* Set the overall output level.

Effect parameters

- *On/Off button:* Turn the effect section on or off.
- *Rate knob and field:* Set the modulation speed of the effect.
- *Intensity knob and field:* Set the level of the effect and balance between the original and effect signals.
- *Type pop-up menu:* Choose either the Chorus or Flanger effect.
  - The Chorus effect is based on a delay line, the output of which is mixed with the original, dry signal. The short delay time is modulated periodically, resulting in pitch deviations. The modulated deviations, in conjunction with the original signal pitch, produce the chorus effect.
  - The Flanger effect works in a similar fashion to the chorus, but with even shorter delay times. The output signal is fed back into the input of the delay line. This feedback results in the creation of harmonic resonances that cyclically move through the frequency spectrum, resulting in a sweeping, metallic sound.

Tip: Use Logic Pro effects if you need more precise control of chorus and flanging or want to use both effects simultaneously.

Modulation controls

Retro Synth modulation in Logic Pro for iPad

Retro Synth Glide/Autobend, LFOs, and envelopes are known as modulation generators. These modulation sources are used to control modulation targets, such as oscillator pitch or filter cutoff.

Glide—also known as *portamento*—and Autobend are hardwired to control oscillator pitch. See Retro Synth Glide and Autobend.

The Amp Envelope is dedicated to control of the sound level over time. The Filter Envelope controls the filter over time. See Retro Synth envelopes.

The LFO is used as a source for multiple modulation targets. The Vibrato modulation source is dedicated to control of oscillator pitch. See Retro Synth LFO and Vibrato.

You can also use your keyboard modulation wheel, aftertouch, and velocity as realtime control sources. See Retro Synth global and controller settings.

You should make use of all modulation options because they can help you to create expressive performances.

If you're new to synthesizers and the concepts behind modulation generators, such as LFOs and envelopes, see Intro to synthesizers.

Modulate the oscillator waveform

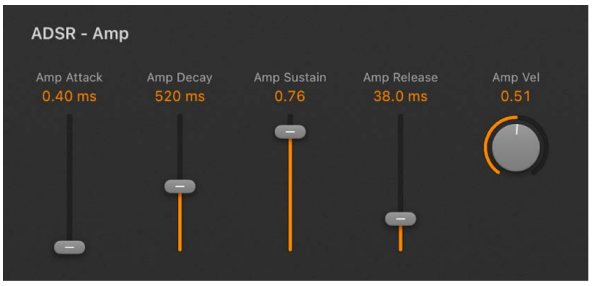
The Analog, Sync, and Wavetable oscillator waveform shapes can be modulated by following these steps. In the FM synth engine, you can modulate the FM or Harmonic amount (or both).

1. In Logic Pro, move the Shape Mod control to a position away from the centered (off) position.
2. Adjust the controls of the LFO and ADSR - Filter sections. See LFO and Vibrato and envelopes.
3. If you're using the LFO, select a waveform.



4. If the (LFO) Sync switch is turned off:
   - Adjust the LFO Via Amount knob to set the maximum modulation intensity.
   - Move your MIDI keyboard modulation wheel to change the LFO depth. If you don't want to use your keyboard modulation wheel, tap the LFO Via Source pop-up menu to assign a different MIDI controller.

5. If you're using the Filter Envelope (ADSR - Filter), drag the handles to set the filter attack, decay, sustain, and release values. Drag the Filt Vel knob to set the sensitivity of envelope modulation by velocity.



Use vibrato to modulate oscillator pitch

1. In Logic Pro, rotate the Via Amount knob to set the amount of vibrato (pitch modulation).



2. Select a vibrato waveform.
3. If the Sync switch is turned off, adjust the Rate knob to set the vibrato speed. If the Sync switch is turned on, vibrato speed is controlled by the project tempo. See Retro Synth LFO and Vibrato.
4. If the (Vibrato) Sync switch is turned off:
   - Adjust the Via Amount knob to set the maximum modulation intensity.
   - Move your MIDI keyboard modulation wheel to change the vibrato depth. If you don't want to use your keyboard modulation wheel, tap the Via Source pop-up menu to assign a different MIDI controller.

Retro Synth glide and bend in Logic Pro for iPad

In glide mode, the pitch of a played note slides to the pitch of the following played note. Bend automatically bends note pitches when you strike a key.

Glide mode behavior changes when legato is selected with the Polyphony control. See Retro Synth global and controller settings.



Glide/Bend parameters

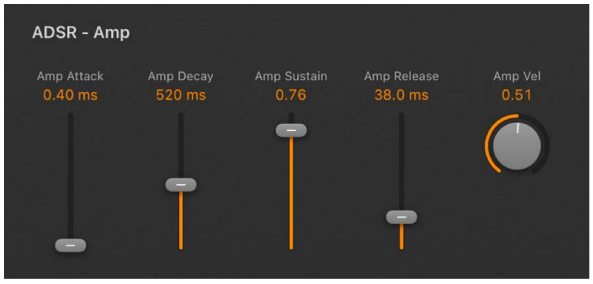
- *On/Off button:* Turn the Glide/Bend section on or off.
- *Glide/AB Type pop-up menu:* Choose Glide or Autobend mode.
- *Glide/AB Mode pop-up menu:* Choose the parameter that you want to bend. Choose from: Oscillator 1 + Sine, Oscillator 2, All Oscillators, Opposed (with one oscillator bending up, while the other bends down by an equal amount), and Oscillators + Filter.
- *Glide/AB Time knob and field:* Set the time it takes for the pitch of one played note to travel to the pitch of another played note.
- *Autobend Depth knob and field:* (Autobend mode only) Set the pitch bend range (over a range of ±3 octaves).

Retro Synth envelopes in Logic Pro for iPad

Retro Synth features two identical attack, decay, sustain, and release envelopes that shape the filter cutoff (ADSR - Filter section) and the level of the sound over time (ADSR - Amp section).

When you think of different sounds, such as a snare drum, piano, or strings, they're not only tonally different, but the characteristics of the sound change over time. Both the snare drum and piano are heard immediately when struck. This is because they both have a short attack phase. Bowed strings, on the other hand, slowly ramp up in level—they have a long attack time, in other words.

If you break down any sound over time, you can emulate snare drum-like, piano-like, or string-like characteristics easily with Retro Synth envelopes.



Envelope parameters

- *Attack slider and field:* Set the time it takes for the envelope to reach the initial level.

  Note: Oscillators automatically switch from free mode to synced mode when the Attack time is set to values below 0.50 ms. This has a pronounced effect on stacked voices, in particular. See Retro Synth global and controller settings.

- *Decay slider and field:* Set the time it takes for the envelope to fall to the sustain level, following the initial attack time.
- *Sustain slider and field:* Set the sustain level, which is held until the key is released.
- *Release slider and field:* Set the time it takes for the envelope to fall from the sustain level to a level of zero.
- *Velocity knob and field:* Determine how sensitive the envelope is to incoming velocity.
  - If the Velocity knob is set to zero, the envelope outputs its maximum level when you strike the keys at any velocity.
  - At a Velocity knob value of 100%, the entire dynamic range is under velocity control.

    To explain, raising the Velocity knob value reduces the envelope minimum amplitude, with the difference being dynamically controlled by keyboard velocity. For example, when you set the Velocity knob to 25%, the minimum envelope amplitude is reduced to 75%. The remaining 25% is added in response to the velocities of keys you play. So, a key played with a zero velocity results in an envelope amplitude of 75%. A key played with a MIDI velocity value of 127 will result in an envelope amplitude of 100%. When you raise the Velocity knob value, the minimum amplitude decreases.

Retro Synth LFO and Vibrato in Logic Pro for iPad

The Retro Synth LFO (Low Frequency Oscillator) is a multiwaveform, polyphonic modulation generator that modulates each voice, or note you play, individually. It can be used as a source for multiple modulation targets.



Retro Synth also provides a dedicated Vibrato LFO for pitch modulation.



Although they are oscillators, LFOs are not audible—but their effects can certainly be heard. The sole purpose of an LFO is to modulate other sound generating elements of the synthesizer.

LFO/Vibrato parameters

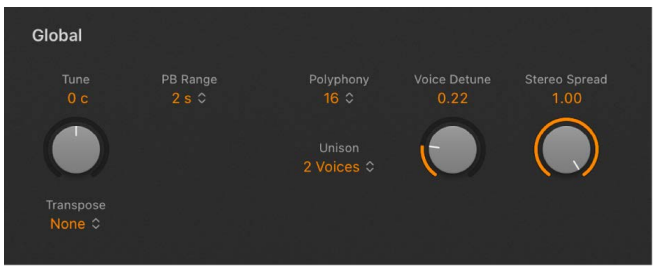
- *LFO/Vibrato Wave pop-up menus:* Choose an LFO or Vibrato waveform.
  - The sawtooth waves are suitable for bubbling, rhythmic effects.
  - The triangle wave is suitable for vibrato and other evenly-modulated effects.
  - The rectangular waves switch between two values, which is useful for stepping the oscillator pitch by a fifth, for example.
- *LFO/Vibrato Rate knobs and fields:* Independently set the maximum LFO or Vibrato speed.
- *LFO/Vibrato Sync buttons:* Turn on to synchronize the modulation speed with the host tempo. Turn off to control the modulation speed manually.
- *LFO Via Amount knob and field:* Set the maximum LFO modulation amount. This parameter is controlled with the MIDI controller chosen in the LFO Via Source pop-up menu.
- *LFO Via Source pop-up menu:* Choose your MIDI keyboard Mod Wheel, Aftertouch, or Modwheel + Aftertouch as the control source for the LFO amount level.
- *Vibrato Via Amount knob and field:* Set the maximum vibrato amount. This parameter is controlled with the MIDI controller chosen in the Vibrato Via Source pop-up menu.
- *Vibrato Via Source pop-up menu:* Choose your MIDI keyboard Mod Wheel, Aftertouch, or Modwheel + Aftertouch as the control source for the vibrato amount level.

Retro Synth global and controller settings in Logic Pro for iPad

Retro Synth global controls are used to set the overall tuning, polyphony, and other aspects of your instrument.

The controller settings let you assign MIDI keyboard features to Retro Synth controls. You can use three MIDI controllers—velocity, modulation wheel, and aftertouch—to change Filter Cutoff, Wave Shape (Pulse Width), or LFO/Vibrato Rate controls. Multiple MIDI controllers can be assigned to the same control, so you could change filter cutoff with both velocity and aftertouch, for example. Alternatively, a single MIDI controller can be assigned to multiple Retro Synth parameters—with aftertouch affecting both filter cutoff and LFO speed, for example.

If you're new to synthesizers and the concepts behind modulation controls, see Intro to synthesizers.



Global parameters

- *Tune knob and field:* Tune Retro Synth in semitone steps.
- *Transpose pop-up menu:* Choose a value to transpose Retro Synth ±2 octaves.
- *PB Range pop-up menu:* Choose a value to set the maximum upward/downward pitch bend. Pitch bend modulation is typically performed with your MIDI keyboard pitch bend wheel or joystick.
- *Polyphony pop-up menu:* Choose the maximum number of notes that can be played simultaneously (up to 16) or run as a monophonic synthesizer.
  - If you choose Legato and play in a legato style (strike a new key while holding another) the envelope generators are triggered only for the first note you play legato, and continue their curve until you release the last legato played key. This means that if you play legato, a portamento occurs (the portamento time is set with the Autobend / Glide Time control). If you release each key before pressing a new one, the envelope is not triggered by the new note, and there is no portamento.
  - If you choose Mono, staccato playing retriggers the envelope generators every time a new note is played.
- *Unison pop-up menu:* Set the number of voices played in unison mode. Behavior in unison mode depends on the Polyphony parameter value. One of the strengths of polyphonic analog synthesizers is unison—or stacked voices—mode. Traditionally, in unison mode classic analog polysynths run monophonically, with all voices playing simultaneously when a single note is struck. Because the voices of an analog synthesizer are never perfectly in tune, this results in a rich, chorus-like effect with great sonic depth.
  - Polyphonic unison mode: When 2–16 voices are selected in the Polyphony pop-up menu, voices are stacked, but you can play polyphonically.
  - Monophonic unison mode: When Mono or Legato is chosen in the Polyphony pop-up menu, all voices are stacked, but you can only play monophonically or in a legato style.
- *Voice Detune knob and field:* Tune Retro Synth in cents (1 cent = 1/100th semitone).
- *Stereo Spread knob and field:* Set the amount of voice panning, relative to the center position. Voices are panned left or right in an alternating, symmetrical pattern.

  Note: Detuning and panning works in Single and Double voice mode. In Double voice mode, detuning and panning affects the respective voice pairs.

Controller parameters

The modulation targets available in the pop-up menus listed below change when different synthesizer engines are active.



- *MW Mod Amnt knob and field:* Set the maximum modulation depth for your keyboard mod wheel.
- *Mod Wheel To pop-up menu:* Choose a modulation target for your keyboard mod wheel.
- *Vel Mod Amnt knob and field:* Set the maximum modulation depth with keyboard velocity.
- *Velocity To pop-up menu:* Choose a target for modulation with keyboard velocity.
- *Touch Mod Amnt knob and field:* Set the maximum modulation depth with keyboard aftertouch.
- *Aftertouch To pop-up menu:* Choose a target for modulation with keyboard aftertouch.
- *Ctrl X Mod Amnt knob and field:* Set the maximum modulation depth with the MIDI controller chosen in the Ctrl X Source pop-up menu.
- *Ctrl X To pop-up menu:* Choose a target for modulation with the MIDI controller chosen in the Ctrl X Source pop-up menu.
- *Ctrl X Source pop-up menu:* Choose a MIDI continuous controller to use as a control source.

  Note: This modulation source is ideal for use with MIDI CC#4 Foot Controller that's often used in conjunction with aftertouch. It's also useful for MPE devices that offer enhanced controller functions.

Retro Synth MIDI mono mode in Logic Pro for iPad

Retro Synth provides additional parameters that determine response to incoming MIDI messages.

MIDI Mono Mode (MPE) parameters

- *MIDI Mono Mode pop-up menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel16).

  In either mode, each voice receives on a different MIDI channel. Per-voice channels support pitchbend, aftertouch, mod wheel, and CC messages. Controllers and MIDI messages sent on the base channel affect all voices.

- *Pitch Bend Ran(ge) knob:* Set a value from 0 to 96.

  The chosen pitch bend range affects individual note pitch bend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar to MIDI converters use this range by default.

Sample Alchemy

Sample Alchemy in Logic Pro for iPad

Sample Alchemy is designed to allow you to quickly resynthesize a single sample and transform it into a unique playable instrument. It provides a variety of synthesis techniques, such as granular, additive, and spectral synthesis, which can be combined to create a wide range of sounds, including unique sound beds, pads, effects, and rhythms.

You can control up to four independent sound generation sources using handles. Labeled A, B, C, and D, the handles control separate layers and can be placed at precise points on a waveform.

The five flexible play modes offer different ways to play back a sample and interact with it, from Classic mode, which lets you play the sample from start to finish, to Loop mode, where you place the handles on the waveform to create up to two snippets of looped audio. In addition, Scrub mode lets you move the handles across the waveform to trigger it as if scrubbing through tape, and Bow mode replicates the bow action used to play stringed instruments. Finally, Arp (arpeggiator) mode can generate repeating patterns of notes that cycle through different sections of the sample, creating intricate sequences based on MIDI notes.

Sample Alchemy is a sample-based instrument, so you can quickly begin creating sounds by loading samples and loops directly from the Browser, Files app, or regions in the Tracks area. Sample Alchemy works best with monophonic instruments, vocals, or found sounds. When you record your instruments or vocal samples directly in Logic Pro for iPad, you can conveniently drag audio regions straight into an instance of Sample Alchemy.

You can use Sample Alchemy in a number of ways in your projects, such as building unique playable instruments or recording automation of the handles to add unique sound effects and synth elements. Here are a few examples of the types of sounds that you can create with Sample Alchemy:

- Rich and complex synth pads
- Evocative keys
- Rhythmic and evolving arpeggiator patterns
- Unique and playable effects
- Dynamic and evolving soundscapes
- Big fat basses
- Vocal-like formants

Additionally, with a library of predesigned sounds and a wide variety of sound-manipulation tools such as filters, synthesis effects, and modulators, Sample Alchemy allows you to create sounds tailored to your needs.

If you're new to samplers, synthesizers, and the concepts behind modulation generators, such as LFOs and envelopes, filters, and other components, see Intro to synthesizers.

To add Sample Alchemy to your project, you can replace the instrument on a software instrument track in the Plug-ins area or on a software instrument channel strip in the Mixer. In the Instrument menu, choose Sampler > Sample Alchemy. You can also change the default plug-in for software instrument tracks in the New Tracks dialog.

Replace an instrument plug-in with Sample Alchemy

If an instrument plug-in is already loaded, you can replace it with Sample Alchemy by doing the following:

1. In the Plug-ins area in Logic Pro, touch and hold the instrument plug-in name, then tap Replace.
2. Choose Sampler > Sample Alchemy from the menu.

Add the Sample Alchemy plug-in

If you have removed the default plug-in or changed the default plug-in configuration for software instrument tracks, you can add Sample Alchemy in the Plug-ins area in Logic Pro, by doing the following:

- In the Plug-ins area in Logic Pro, tap the Add Instrument button ＋.

The Sample Alchemy plug-in is added to the signal chain.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Sample Alchemy interface in Logic Pro for iPad

The Sample Alchemy interface consists of three primary sections:



- The upper section contains the Edit Mode buttons, the sample name and lock, and the Amp/Mod button for the envelope generators. This view changes depending on the selected edit mode.
- The middle section contains the source buttons, Mixer button, Play Mode buttons, Snap menu, and Mod Matrix. The central part of this view includes the sample waveform display and the source handles. Here you can interact with the sound by setting a play mode and moving the handles. See play modes, Motion mode, and Trim mode.
- The lower section contains the source controls on the left, the synthesis modes and their parameters in the middle, and the Filter controls on the right.

Add source material to Sample Alchemy in Logic Pro for iPad

Sample Alchemy provides various ways to add an audio file, Apple Loop, or region. Once you've added the file, you can choose different modes to change playback behavior, you can directly edit waveform markers, and you can alter the tonal color and performance characteristics with the synthesis and modulation parameters.

Drag a sample or loop from the Browser into Sample Alchemy

- Drag a sample or loop from the Browser into the Sample Alchemy waveform display.

  Tip: The Tonal filter accessible in the Browser under Descriptors is a good way to find sounds that work well in Sample Alchemy. See Find sounds in the Browser.

Drag an audio region from the arrangement into Sample Alchemy

- Drag an audio region from the arrangement in your project into the Sample Alchemy waveform display.

Drag an audio file to Sample Alchemy using Slide Over

- Files on your iPad can be added to Sample Alchemy using Slide Over. See Intro to importing media.

Drag an audio file from the Browser onto a track header

1. Drag a sample or loop from the Browser to a software instrument track header.
2. In the Create new track with dialog, tap Sample Alchemy.

Add an audio file using the Sample menu

1. Tap the Sample menu at the top center of Sample Alchemy to open the Browser.
2. In the Browser, browse to the file you want to import, then drag it into the Sample Alchemy waveform display.

Save a Sample Alchemy preset in Logic Pro for iPad

In Logic Pro for iPad, tap the More button ••• in the plug-in menu bar to access Sample Alchemy file commands.

- *Save:* Saves the currently loaded instrument. When you create a new instrument and save it for the first time, you are asked to provide a name. If you have edited an existing instrument and use this command, the existing filename is used and the original instrument is overwritten.
- *Save As:* Saves the currently loaded instrument, but you are prompted to provide a different filename. Use this command when you want to save a copy or multiple versions of an edited Sample Alchemy instrument, rather than overwriting the original version. This command (and the Save A Copy As command) may be useful when you want to save a Sample Alchemy setting that is unique to a specific project. Storing this in a location outside of user folders may also be practical for sharing a copy of your Sample Alchemy setting with a colleague or friend.

Sample Alchemy edit modes in Logic Pro for iPad

In Sample Alchemy, you can tap Play, Motion, or Trim buttons to choose from three edit modes:

- *Play mode button:* Select Play mode. There are five play modes, each providing a different way to play back the sample. See Sample Alchemy play modes.
- *Motion button:* Select Motion mode. Motion mode lets you record the movement of the source handles. After recording, the movement plays back in sync with the tempo of your project when the sound is triggered. See Sample Alchemy Motion mode.
- *Trim button:* Select Trim mode. This mode lets you crop the sample. See Sample Alchemy Trim mode.

Sample Alchemy play modes in Logic Pro for iPad

There are five play modes, each providing a different way to play back the sample. You can tap the Classic, Loop, Scrub, Bow, and Arp buttons to determine the play mode.

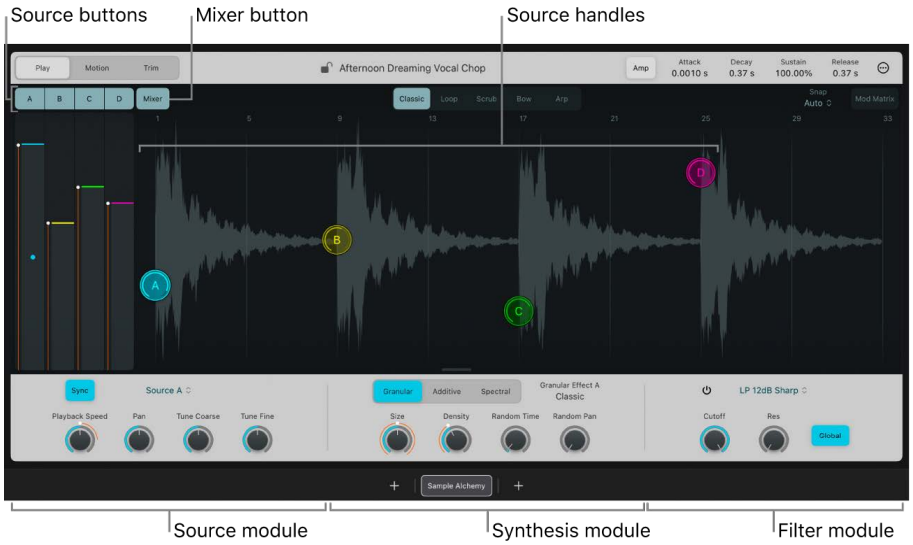
- *Classic button:* Select Classic mode to play a sample from beginning to end. Sample playback begins from the handle point and finishes at the end of the sample. This mode is great for playing a sample in a conventional manner. In this mode, the first source parameter (Playback Speed) determines the sample playback speed.
- *Loop button:* Select Loop mode to loop between two points within a sample. In this mode, playback starts from the defined start point, playing to the defined loop end position, then skips to the start point and repeats. These positions are set on the sample using the source handle and source handle end point. You can also place the handle after the loop end point to play the sample in reverse, and move the entire audio section between these markers by dragging the bar between the loop start and end points. In this mode, the first source parameter (Loop Speed) determines the sample playback speed. Set the playback speed of each loop on each source independently to create more dynamic sounds. This mode is ideal for manipulating musical phrases and looped, rhythmic material. For instance, it lets you play particular sections of a waveform and repeat them as the basis for a new rhythmic sound.
- *Scrub button:* Select Scrub mode to play the sample at the touch point and in unison with up to four sources. Play the sample at the position you touch on the waveform, or scrub through the waveform as you touch and move source handles. Up to four sources can be heard simultaneously, depending on how many have been turned on. Scrub mode is great for selecting precise points of the sample and playing all sources in unison for VA synthesizer–style sounds or scrubbing through a sample waveform like a tape machine. In this mode, the first source parameter (Scrub Jitter) determines how much random movement is applied to the handle position for playback. This can be useful for creating a unison-like effect.
- *Bow button:* Select Bow mode to play the sample at each handle position with the bow action mechanism used to play stringed instruments. The up-and-down motion of a bow is replicated to play the sample sources. The up motion plays the sample normally, and the down bow plays the sample in reverse. Up to four sources can be heard simultaneously, depending on how many have been turned on. Bow mode is great for selecting precise points of the sample and playing them back and forth in unison. In this mode, the first source parameter (Bow rate) determines the speed of the bow action. The speed of the bow action can also be synced to the tempo of your project using the Sync button.
- *Arp button:* Select Arp mode to generate repeating patterns of notes that trigger different sections of the sample to create intricate sequences based on the notes played in real time or from a MIDI region. In this mode, the first source parameter (Arp Speed) determines the rate of the arpeggiator. The rate of the arpeggiation is automatically synced to the tempo of your project.

Sample Alchemy sources in Logic Pro for iPad

Sample Alchemy sound-generating modules are called *sources*. Four independent sources (labeled A/B/C/D) are available in each preset, and each source has an identical set of controls.

Source components are shown when you tap the A, B, C, and D buttons to select the source you want to edit. Some parameters can be set globally or per source. Global parameters override individual source settings. If you're new to synthesis or unfamiliar with different synthesis approaches, see Intro to synthesizers.

The components in each source are displayed in three modules: source, synthesis, and filter.



- *Source buttons:* Turn a source on or off. When turned on, a source is a sound-generating module indicated by a handle labeled A/B/C/D that is positioned on the waveform.
- *Sample Lock button:* Tap the lock to keep the current sample when changing presets.
- *Sample name:* Displays the name of the current sample. Tap to open the Browser and load a new sample.
- *Source handles:* Tap the handles labeled A/B/C/D to hear the sample preview. Drag left or right to adjust the playback position, and drag up or down to adjust the first parameter in the source module. When preview mode is turned on in the More menu settings and you tap a handle, Sample Alchemy plays a single MIDI note that you can record to a MIDI region in Logic Pro. See Sample Alchemy More menu. You can also record handle movements using automation or Motion mode. See Sample Alchemy Motion mode.
- *Mixer button:* Show or hide the mixer pane. The mixer lets you adjust the volume for each source.
- *Mixer sliders:* Adjust the volume for each source. A dot indicates which source you're currently adjusting.

- *Source module:* The first module displays the parameters for the selected source. The first parameter available here changes depending on the selected play mode. For example, in Classic mode you can control the speed at which the sound is played, and in Loop mode you can control the loop speed. The other parameters in this column let you set the panning and tuning for each source.
- *Source pop-up menu:* Choose the source (A/B/C/D) you want to edit, or choose Select All to edit all sources.
- *Synthesis module:* The second module provides multiple sound-generating modes based on different methods of synthesis. Here you can set a synthesis mode for each source. See Sample Alchemy synthesis modes.
- *Filter module:* The third module contains the filter. Here you can set the filter for each source or globally. See Sample Alchemy Filters.

Source module parameters

- *Playback Speed knob:* Set the sample playback speed of the sample. Set low speed values to create gradually evolving textures.
- *Playback Speed Sync button:* Turn on to synchronize the playback speed with the project tempo. Turn off to freely set the playback speed. This button is active only when the loaded sample contains tempo information.
- *Loop Speed knob:* Set the sample loop speed between the start point and end point.
- *Loop Speed Sync button:* Turn on to synchronize the loop speed with the project tempo. Turn off to freely set the loop speed. This button is active only when the loaded sample contains tempo information.
- *Scrub Jitter knob:* Set the depth of the jitter action.
- *Bow Rate knob:* Set the rate of the bow action.
- *Bow Rate Sync button:* Turn on to set the rate in tempo-synced note values instead of Hz. Turn off to freely set the bow rate.
- *Arp Rate knob:* Set the duration of the arpeggiator steps. The arpeggiator is synchronized with the project tempo, and the Rate is set from whole notes (1) to 1/32 notes.
- *Pan knob:* Set the source output position in the stereo field.
- *Tune Coarse knob:* Tune the source in semitone increments.
- *Tune Fine knob:* Tune the source pitch in cent increments.

Turn on a source in Sample Alchemy

- Tap a source button (A/B/C/D) to turn on a source.

Turn off a source in Sample Alchemy

- Tap a highlighted source button (A/B/C/D) to turn off a source.

Select a source in Sample Alchemy

- Tap a source handle (A/B/C/D).

Select multiple sources in Sample Alchemy

- Tap the Source menu on the lower left side of Sample Alchemy, then choose Select All.

Mix sources in Sample Alchemy

- Tap the Mixer button on the upper-left side of Sample Alchemy, then drag a volume level up or down.

Record handle movements to a MIDI region

1. Select the track that has the Sample Alchemy plug-in loaded.
2. Open the Sample Alchemy plug-in window with a sample loaded.
3. In the Track inspector, ensure that the Internal MIDI In > Instrument Output submenu has this track selected.
4. Start recording your project and move the handles in Sample Alchemy.

The MIDI region records a MIDI note every time you tap a handle, and the movement of the handle is recorded as region automation. For information about routing MIDI internally in Logic Pro, see Route MIDI internally to software instrument tracks.

Sample Alchemy synthesis modes in Logic Pro for iPad

Each source has an independent set of parameters and therefore can be set to a different synthesis type. For example, you can combine granular synthesis with additive synthesis or spectral synthesis. Each synthesis method has inherent strengths and weaknesses that make it more suitable for certain sound types than other synthesis engines.

If you're new to synthesis or unfamiliar with different synthesis approaches, see Intro to synthesizers.



The Granular, Additive, and Spectral buttons in the lower section show synthesis engine parameters. See the following sections for detailed information on parameters and functions:

- Granular effect controls
- Additive effect controls
- Spectral effect controls

Sample Alchemy granular effect controls in Logic Pro for iPad

Granular synthesis is a technique used to create and manipulate sounds by breaking them down into small pieces, or “grains,” and manipulating these grains independently.

In granular synthesis, a sound is typically broken down into a series of short, overlapping grains, each of which is a few milliseconds in length. These grains are then played back in sequence, either as a continuous stream or in a randomized or more structured pattern.

You can create a wide range of sounds and timbres by manipulating various parameters of the grains, such as their pitch, duration, and position in the original sound waveform. Granular synthesis can be used to create everything from subtle changes in a sound to radical transformations, and it is often used to create unique and unconventional sounds that are difficult to achieve using other synthesis methods.

The parameters in this section are shown when Granular is selected in a synthesis module.

Tap the source handles to select the source you want to edit.



Granular module parameters

- *Size knob:* Adjust the duration of each grain from 2 ms to 230 ms.
- *Density knob:* Determine the number of potentially overlapping grains from 1 (no overlap) to 10.

  The Size and Density parameters interact with each other. When the Density value is 1, a single grain is sent to the output stream. As soon as one grain finishes, the next one is sent. A Size value of 100 ms sends a new grain every 100 ms.

  Increasing Density to 2 adds a second grain that is sent in between those of the first, resulting in a new grain every 50 ms, assuming a Size value of 100 ms. The first and second grains overlap each other. Higher Density values inject additional new grains into the output stream. These new grains occur more frequently and overlap more heavily.

  Setting Size to around 100 ms and Density to around 5 grains is often suitable for smooth pad sounds with no sharp transients. Setting Size between 40 and 80 ms and Density to around 2 grains is useful for drums and other sounds featuring sharp transients. Small Size values tend to produce a buzz that masks the original pitch of the sample. Large Size values tend to break up the sound. You can counteract both tendencies by increasing the Density.
- *Random Time knob:* Add a small random offset to grain extraction positions in the sample. The default value is 3% because a small amount of randomization helps to smooth the output of the granular element.
- *Random Pan knob:* Add a random offset to the stereo position of each grain.

Sample Alchemy additive effects in Logic Pro for iPad

Additive synthesis represents each sound as a sum of individual partials. Each partial is synthesized using a sine wave and is represented in terms of four parameters: amplitude, pitch, pan, and phase, each of which changes over time.

You can think of the additive data as a series of snapshots, each of which captures the amplitude, pitch, pan, and phase of every partial at a particular point in time. In between snapshots, each parameter updates smoothly toward the following snapshot value. When played in succession and with the right timing, the series of snapshots describes a potentially complex and continuously evolving sound.



Sample Alchemy additive effect controls in Logic Pro for iPad

The parameters in this section are shown when Additive is selected in a synthesis module. The controls also vary depending on the selected additive effect.

Tap one of the handles labeled A/B/C/D to select the source you want to edit.



Harmonic

The Harmonic effect allows you to control groups of partial levels, with controls relating to harmonic intervals.

- *Odd/Even knob:* Set the balance between odd or even harmonics. Low values increase the level of odd-numbered partials (1, 3, 5, 7, and so on), making the sound more hollow. High values increase the level of even harmonics (retaining the fundamental tone: harmonic/partial 1) to make the sound brighter and sweeter.
- *Fifths knob:* Set the level of the fundamental tone and all partials at fifth intervals (7 semitones) above it. Higher values boost harmonics 1, 3, 9, 27, and so on, with a corresponding reduction in the levels of other harmonics. Low values have the reverse effect and can make the sound more cutting and edgy.
- *Octaves knob:* Set the level of the fundamental tone and all partials at whole octave intervals above it. Set to zero to completely remove harmonics 1, 2, 4, 8, 16, and so on, while boosting the levels of non-octave harmonics. Set to higher values to boost the levels of octave harmonics while reducing the levels of other harmonics.
- *Fundamental knob:* Set the level of the fundamental tone and all partials above it. Set to zero to completely remove the fundamental tone. Set to 100% to hear the fundamental tone in isolation. Higher values tend to make the sound thicker.

Partials Lock

Partials Lock is an effect that sets all of the partials to the same zero phase value at the start. It sets the partials to have no variation in pitch over the course of the sound, resulting in a clean, artificial sound.

- *Symmetry knob:* Alter the symmetry, or shape, of the sine waves by lengthening the first half of the waveform while shortening the second, or the reverse. The audible effect is similar when the knob is turned in either direction. Symmetry alters waveforms until they are no longer pure sine waves in shape, resulting in each partial developing independent harmonics and making the sound brighter.
- *Odd/Even knob:* Set the balance between odd or even harmonics. Low values increase the level of odd-numbered partials (1, 3, 5, 7, and so on), making the sound more hollow. High values increase the level of even harmonics (retaining the fundamental tone: harmonic/partial 1) to make the sound brighter and sweeter.
- *Num Partials knob:* Set the number of additive partials that are generated. The number of oscillators required depends on the sound. For example, a flute has a limited number of harmonics and requires fewer partials than a cello or a violin. The playable register can also affect the number of oscillators required: high notes will accommodate only a small number of higher harmonics before reaching the limits of audibility, whereas low bass notes may have hundreds of harmonics without reaching the limit. Always set Num Partials to the lowest number of partials that are required by the sound because this helps reduce CPU load.
- *Pitch Var knob:* Tune all partials simultaneously. This occurs before processing by the additive effect modules that stretch/shift partial tunings. Set to 0% to tune all partials in a perfect harmonic series. Set to 100% to make each partial follow the pitch fluctuations detected in the original audio file. The sonic impact of this parameter is highly dependent on the audio material: sounds with strong inharmonic content, such as bells, are dramatically changed by reducing pitch variations. If all partials are tuned to the harmonic series, however, the knob has no influence on the sound.

Partials

Partials is an effect that allows you to manipulate the spectral content of a sound by modifying individual partials within the sound.

- *Odd/Even knob:* Set the balance between odd and even harmonics. Low values increase the level of odd-numbered partials (1, 3, 5, 7, and so on), making the sound more hollow. High values increase the level of even harmonics (retaining the fundamental tone: harmonic/partial 1) to make the sound brighter and sweeter.
- *Symmetry knob:* Alter the symmetry, or shape, of sine waves by lengthening the first half of the waveform while shortening the second, or the reverse. The audible effect is similar when the knob is turned in either direction. Symmetry alters waveforms until they are no longer pure sine waves in shape, resulting in each partial developing independent harmonics and making the sound brighter.

- *Pitch Var knob:* Tune all partials simultaneously. This occurs before processing by the additive effect modules that stretch/shift partial tunings. Set to 0% to tune all partials in a perfect harmonic series. Set to 100% to make each partial follow the pitch fluctuations detected in the original audio file. The sonic impact of this parameter is highly dependent on the audio material: sounds with strong inharmonic content, such as bells, are dramatically changed by reducing pitch variations. If all partials are tuned to the harmonic series, however, the knob has no influence on the sound.
- *Num Partials knob:* Set the number of additive partials that are generated. The number of oscillators required depends on the sound. For example, a flute has a limited number of harmonics and requires fewer partials than a cello or a violin. The playable register can also affect the number of oscillators required: high notes will accommodate only a small number of higher harmonics before reaching the limits of audibility, whereas low bass notes may have hundreds of harmonics without reaching the limit. Always set Num Partials to the lowest number of partials that are required by the sound because this helps reduce CPU load.

Formant

Formant is an effect that allows you to shape the spectral content of a sound by emphasizing or attenuating specific frequency bands.

- *Shift knob:* Shift all synthesized formant filters up or down in semitones. Higher values can make sounds seem brighter or thinner. Lower values can create a darker, thicker character.
- *Key Track knob:* Determine how the formant filter tracks notes on the keyboard. At 100%, filter resonances shift up or down in pitch with the note. Set to lower values to reduce key tracking, which may make some sounds playable over a wider keyboard range.
- *Size knob:* Stretch the formant filter to alter the perceived size of the resonant chamber. Size works in conjunction with the Center knob.
- *Center knob:* Set the center frequency for the formant stretch that you set with the Size knob. Resonances below the center frequency are shifted upward as the Size value is increased. A corresponding downward shift occurs to resonances above the center frequency.

  Note: The Center knob has no effect when the Size knob is set to 100%.

Formant Synth

Formant Synth is an effect that applies a vocal formant effect to shape the timbre of the synthesized sound.

- *Shift knob:* Shift the formants up or down in semitones. Higher values can make sounds seem brighter or thinner. Lower values can create a darker, thicker character.
- *Size knob:* Stretch the formant filter to alter the perceived size of the resonant chamber. Size works in conjunction with the Center knob.
- *Center knob:* Set the center frequency for the formant stretch that you set with the Size knob. Resonances below the center frequency are shifted upward as the Size value is increased. A corresponding downward shift occurs to resonances above the center frequency. Note: The Center knob has no effect when the Size knob is set to 100%.
- *Vowel knob:* Morph smoothly through the four filter shapes: A, E, I, and O. The displayed value indicates position. Whole numbers indicate a particular filter unit, and fractional values indicate a position between filters.

Sample Alchemy spectral effects in Logic Pro for iPad

Spectral resynthesis analyzes the changing frequency spectrum of a signal and attempts to recreate these spectral characteristics. In Sample Alchemy, the audible spectrum of a signal is split into a large number of spectral bins. Energy distribution across these bins is analyzed and the sound is recreated by filling each spectral bin with the required amount of signal, using either sine waves or filtered noise. The results are then summed.



Sample Alchemy spectral effect controls in Logic Pro for iPad

The parameters in this section are shown when Spectral is selected in a synthesis module. The controls also vary depending on the selected spectral effect.

Tap one of the handles labeled A/B/C/D to select the source you want to edit.



Formant

Formant is an effect that allows you to shape the spectral content of a sound by emphasizing or attenuating specific frequency bands.

- *Shift knob:* Shift the formant filter up or down in semitones. Higher values can make sounds seem brighter or thinner. Lower values can create a darker, thicker character.
- *Key Track knob:* Determine how the formant filter tracks notes on the keyboard. At 100%, filter resonances shift up or down in pitch with the note. Set to lower values to reduce key tracking, which may make some sounds playable over a wider keyboard range.
- *Size knob:* Stretch the formant filter to change the perceived size of the resonant chamber. Use this parameter to alter the size of a guitar body or to make a child's vocal sample sound like that of a giant, for example. The Size knob works in conjunction with the Center parameter.
- *Center knob:* Set the center frequency for formant stretching (controlled with the Size knob). Resonances below the center frequency are shifted upward as the Size knob value is increased. A corresponding downward shift occurs to resonances above the center frequency.

  Note: The Center knob has no effect when the Size knob is set to 100%.

Low/High Cut

Use the Low and High Cut knobs to shape the tonal characteristics of the sound. The Low Cut and High Cut parameters work in conjunction with each other to act as a bandpass filter, where signals that fall within the two cutoff ranges are allowed to pass.

- *Low Cut knob:* Set a cutoff frequency. All signals above this frequency are allowed to pass. Signals below the frequency are cut.
- *High Cut knob:* Set a cutoff frequency. All signals below this frequency are allowed to pass. Signals above the frequency are cut.

Blur

Blur produces a frequency-blurring effect.

Tip: Try a melodic loop with pitch variations to best hear the impact of this effect.

- *Mix knob:* Set the balance between the original signal and the processed sound.
- *Length knob:* Set the time period that frequencies are sustained (blurred over time).
- *Variance knob:* Set the degree of variation for frequency selection (frequencies that are blurred).
- *Gate knob:* Adjust the volume threshold so that only frequency bands louder than the threshold are played back. It's similar to a noise gate but applied to each band individually.

Cloud

Cloud produces what might best be described as a cloud of frequency grains, resulting in a textured chorus effect.

Tip: Try this effect on vocal samples.

- *Mix knob:* Set the balance between the original signal and the processed sound.
- *Threshold knob:* Set the number of semitones that the affected bands are shifted up.
- *Attack knob:* Set the time it takes for frequencies emphasized by the Threshold setting to fade in.
- *Simplify knob:* Reduce lower amplitude frequencies to enhance prominent frequencies, lessening detail in favor of an increasingly pure tone.

Metallize

Metallize produces classic comb filter–style effects.

Tip: Experiment with drum loops to clearly hear the impact of the controls.

- *Mix knob:* Set the balance between the original signal and the processed sound.
- *Interval knob:* Set the number of semitones that the affected bands are shifted up.
- *Simplify knob:* Reduce the number of effect-generated frequencies, resulting in a simplified sound.
- *Feedback knob:* Set the intensity of the effect. Higher settings emphasize harmonics, creating metallic resonances.

Noise

Use Noise to fill spectral bins with filtered noise. The Low Cut and High Cut parameters work in conjunction to act as a bandpass filter, where signals that fall within the two cutoff ranges are allowed to pass.

- *Low Cut knob:* Set a cutoff frequency. All signals above this frequency are allowed to pass. Signals below the frequency are cut.
- *High Cut knob:* Set a cutoff frequency. All signals below this frequency are allowed to pass. Signals above the frequency are cut.

Sample Alchemy filters in Logic Pro for iPad

In a Sample Alchemy, the filter module modifies the harmonic content of the sound being produced. It can shape the tonal characteristics of the sound by removing or reducing certain frequencies while allowing other frequencies to pass through.

Sample Alchemy provides an extensive range of filter types, including lowpass, highpass, comb, downsampler, and FM filters. Each filter type has unique sonic characteristics and responds differently to incoming signals.

The filters in Sample Alchemy can also be modulated by an envelope, an LFO (low frequency oscillator), or other modulation sources, which allows them to be controlled over time to create dynamic and evolving sounds. Modulation can be assigned in the Mod Matrix. See Sample Alchemy Mod Matrix.

If you're new to synthesizers and the concepts behind components such as filters, LFOs, and envelopes, see Intro to synthesizers.



Sample Alchemy filter types in Logic Pro for iPad

This flexible collection of filters allows you to subtly or dramatically sculpt the tone of your instruments:

- *Lowpass (LP):* This filter type passes the portion of a signal below a specified cutoff frequency and rolls off the portion above that frequency. See Low, bandpass, and highpass filters.
- *Bandpass (BP):* This filter type passes a certain band of frequencies and rolls off frequencies on either side of the band. See Low, bandpass, and highpass filters.
- *Highpass (HP):* This filter type passes the portion of a signal above a specified cutoff frequency and rolls off the portion below that frequency. See Low, bandpass, and highpass filters.
- *Comb PM:* This filter mixes the original signal with one or more copies of the signal, which are delayed by a very short time interval. See Sample Alchemy Comb PM filter.

- *Downsampler:* This filter creates a lo-fi digital effect (similar to a bitcrusher). See Sample Alchemy downsampler filter.
- *FM:* This filter uses a modulator oscillator and a sine wave carrier oscillator. The modulator oscillator modulates the frequency of the waveform generated by the carrier oscillator within the audio range, thus producing new harmonics. See Sample Alchemy FM filter.

Sample Alchemy filter general parameters

- *On/Off button:* Turn the filter module on or off.
- *Filter Type pop-up menu:* Choose a filter characteristic.
- *Global button:* Turn on the Global button and choose a filter type and configuration to use for all sources, overriding their individual filter type settings.

Sample Alchemy lowpass, bandpass, and highpass filters in Logic Pro for iPad

A lowpass (LP) filter passes the portion of a signal below a specified cutoff frequency and rolls off the portion above that frequency. A bandpass (BP) filter passes the portion of a signal occupying a band surrounding the cutoff frequency and rolls off the portions above and below that band. A highpass (HP) filter passes the portion of a signal above a specified cutoff frequency and rolls off the portion below that frequency.

There are multiple LP, BP, and HP filter designs in Sample Alchemy, each with distinctive characteristics that you may prefer for a given purpose. The available LP, BP, and HP filter designs include:

- *Sharp:* Two-pole analog-modeled filters.
- *Edgy:* Two- or four-pole analog-modeled filters. Four-pole variants provide a steeper roll-off of frequencies beyond the cutoff.
- *Clean:* Bi-Quad filters.
- *Gritty:* Two-pole filters designed to saturate heavily at higher resonance (Res) settings.

Sample Alchemy lowpass, bandpass, and highpass filter parameters

The filter controls have standard functions for all lowpass (LP), bandpass (BP), and highpass (HP) filter types.

- *Cutoff knob:* Controls the filter cutoff frequency.
- *Res(onance) knob:* Controls the filter resonance or emphasis. Higher settings boost frequencies in the immediate vicinity of the cutoff frequency.

Sample Alchemy Comb PM filter in Logic Pro for iPad

A comb filter is a type of digital audio effect that creates a characteristic “comb” pattern of peaks and troughs in the frequency spectrum of an audio signal. It is named after the shape of the frequency response curve, which looks like the teeth of a comb.

The Comb PM filter is useful for classic bright Karplus-Strong style sounds, where the exciter impulse is not easily heard and the comb is more prominent. Be careful with your resonance level because it is capable of quickly going to extremes, which can lead to feedback. Start with a resonance level of zero, and increase (or decrease) slowly to find a suitable effect strength.

Comb PM filter parameters

- *Note:* Set the modulation frequency.
- *Feedback:* Controls the amount of feedback in the comb circuit.

Sample Alchemy downsampler filter in Logic Pro for iPad

The downsampler filter is a type of digital audio effect that reduces the sampling rate of a digital audio signal. This can be used to create a range of different effects, such as creating a lo-fi or vintage sound.

Downsampling works by reducing the number of samples that are used to represent the audio signal. This can be done by discarding some of the samples. The resulting audio signal has a lower sample rate and a lower frequency range, which can give it a different character or timbre.

Downsampler filter parameters

- *Freq:* Set the downsample frequency.
- *Mix:* Set the balance between the original and filtered signals. High values result in stronger downsampling.

Sample Alchemy FM filter in Logic Pro for iPad

Frequency modulation (FM) in Sample Alchemy has a different character from classic FM synths. Unlike dedicated FM synths, Sample Alchemy does not have preconfigured algorithms or a mod matrix setup specifically for FM.

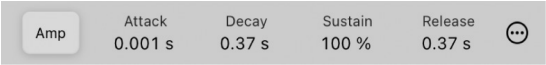
FM in Sample Alchemy is more like working with FM on analog synths, where you are modulating oscillator frequency rather than phase. As a result, Sample Alchemy’s FM is great for adding different kinds of effects to your sound, as well as “organic” distorted textures.

FM filter parameters

- *Note:* Set the carrier oscillator frequency.
- *Mod:* Set the degree to which the modulator (source audio) can modulate the frequency of the carrier.

Sample Alchemy envelope generators in Logic Pro for iPad

You can control the level of the amplitude or modulation over time with dedicated envelope generators. Use the Amp/Mod button to access each envelope. The parameters for each envelope are the same.



Amp and Mod envelope parameters

- *Amp/Mod button:* Choose the envelope type. Here you can choose between the Amp (amplitude) envelope or Mod (modulation) envelope.
- *Attack value:* Drag up or down to set the time it takes for the envelope to reach the initial level.
- *Decay value:* Drag up or down to set the time it takes for the envelope to fall to the sustain level, following the hold phase or the initial attack time.
- *Sustain value:* Drag up or down to set the sustain level, which is held until you release the note.
- *Release value:* Drag up or down to set the time it takes for the envelope to fall from the sustain level to a level of zero after you release the note.

Sample Alchemy Mod Matrix in Logic Pro for iPad

Sample Alchemy LFOs and envelopes are known as *modulation generators*. These modulation sources are used to control modulation targets, such as filter cutoff, source synthesis parameters, and source controls. You can assign up to four independent routings of modulation sources and targets in the Mod Matrix pane.

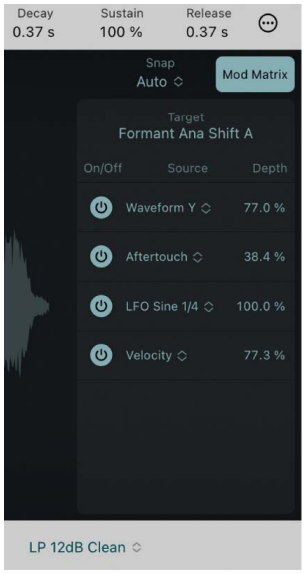
Sample Alchemy provides four LFOs and dedicated modulation and amplitude envelopes that can also be assigned as modulation sources or targets in the Mod Matrix pane.

Use the Mod Matrix to control how the sound changes as you move handles up and down the waveform using the Waveform Y modulator. Your keyboard modulation wheel, aftertouch, pitch bend, velocity, and MIDI continuous controller features can also be assigned as real-time control sources for Sample Alchemy parameters in the Mod Matrix pane.

When a parameter is the target of one or more modulators, an orange modulation arc is shown beside the blue value arc for the knob. This indicates that the knob is an active modulation target and shows the modulation range. The amount of depth you assign in the Mod Matrix pane determines how much a modulation source affects its target.

The Mod Matrix pane shows the modulators applied to the currently selected control in Sample Alchemy. This is shown via the Target field at the top of the Mod Matrix pane as well as by the dot that appears in the center of the currently selected knob.

If you're new to synthesizers and the concepts behind modulation generators, such as LFOs and envelopes, see Intro to synthesizers.



Mod Matrix parameters

- *Mod Matrix button:* Show or hide the Mod Matrix pane to assign up to four independent routings of modulation to a target.
- *Target pop-up menu:* Displays the selected target. Tap a parameter to select a new modulation target.
- *On/Off button:* Turn the row of source modulation for the selected target on or off.
- *Source pop-up menu:* Choose a modulation source.
- *Depth field:* Drag vertically to set the maximum value or intensity of modulation. You can also tap the field to enter a numerical value.

Set up a Sample Alchemy modulation routing in Logic Pro for iPad

You can assign Sample Alchemy LFOs and envelopes as modulation sources or targets in the Mod Matrix pane. You can also assign Waveform Y and your keyboard modulation wheel, aftertouch, pitch bend, velocity, and MIDI continuous controllers as real-time control sources for Sample Alchemy target parameters in the Mod Matrix pane.

When a parameter is the target of one or more modulators, an orange modulation arc is shown beside the blue value arc for the knob. This indicates that the knob is an active modulation target and shows the modulation range.

Route the source handles to control volume

By default, the movement of the source handles (A/B/C/D) along the y-axis (vertical axis) of the sample waveform is mapped to modulate the first parameter in the synthesis module. To map the source handles to control volume instead, follow these steps:

1. In the Source module in Logic Pro, tap the Source pop-up menu and choose All to edit all sources.
2. Tap the Mod Matrix button to show the Mod Matrix.
3. Tap the first synth knob in the Synthesis module to select it.
4. In the Mod Matrix, tap Waveform Y to open the Source pop-up menu, then choose None to remove the current mapping.
5. Tap the Mixer button to open the mixer, then tap slider A to select it as the modulation target in the Mod Matrix.
6. In the Mod Matrix, tap the Source pop-menu and choose Waveform Y.
7. Adjust the Depth value in the Mod Matrix, and adjust the level of the mixer sliders to fine-tune your sound.

Sample Alchemy Motion mode in Logic Pro for iPad

Using Motion mode, you can record the movement of source handles to automate various parameters so that they change over time, producing dynamic and evolving sounds.

After you record a motion sequence, it is automatically looped and remains tempo-synchronized to your project. When you play back the sound, the Motion sequence you recorded is visually replicated on the screen.

Add to your recording by making overdubs or manually setting the Loop Start and Loop End points. If you're unsatisfied with your recording, you can use the Clear button to erase the motion recording and start over.

Tip: Instead of using Motion mode to record the movement of the handles, you can record it directly to a region. After you record your performance, you can edit the automation captured in the region to suit your project. See Show region automation.



Motion mode parameters

- *Record button:* Tap the Record button (if necessary) to start recording motion. The Record button flashes until you touch the handles or a MIDI input is received. Recording when a recording already exists will cause any additional touches to override that particular section of the recording, in a similar manner to Touch automation.
- *Clear button:* Delete the motion recording. This button only appears after a motion recording has been made.
- *Timeline:* Displays the playback position of the latest note, with beat markers as the axis.
- *Loop Start:* Set the motion playback loop start point in beats.
- *Loop End:* Set the motion playback loop end point in beats.
- *Duration:* Set the duration of the recording in beats. Changing this value will stretch the motion recording and loop start and end positions accordingly.

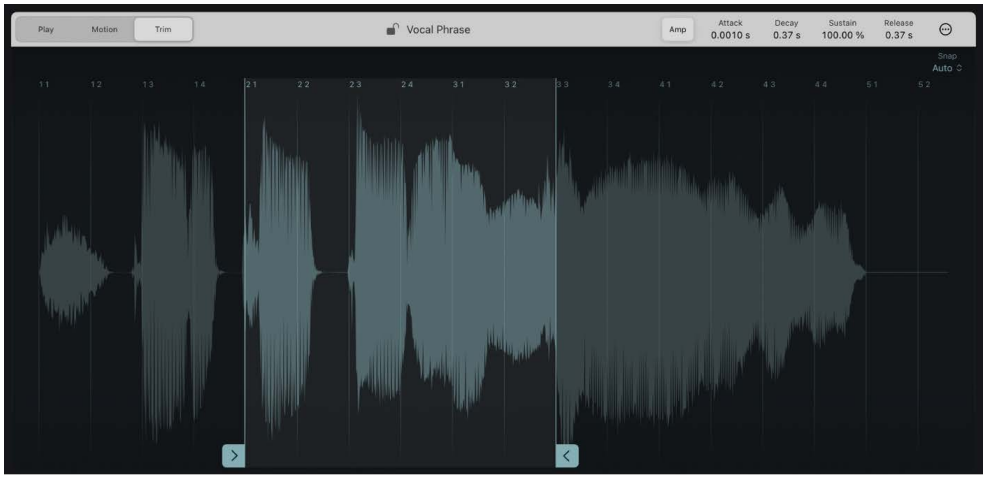
Record a motion sequence

1. Tap the Record button to turn on the motion recorder (if necessary). The Record button flashes until you touch the handles or a MIDI input is received.
2. Move the source handles as required for the duration of the recording.
3. Release the handles to automatically stop the recording, or tap the Stop button.
4. Tap Record again if you want to overdub the motion recording.
5. Play a MIDI note to listen to and visualize your motion recording. You can now switch to Play mode if you want. Any movement of the handles shifts your motion recording up/down/left/right.

Sample Alchemy Trim mode in Logic Pro for iPad

Trim mode lets you select the exact part of the sample you want to use. You can see the current audio file in the waveform display and directly trim the sample using markers. You can zoom in or out with pinch gestures or scroll using single or two-finger swipes. When you zoom in, the scroll bar indicates the current position within the waveform.

When you tap or drag markers and handles in the waveform display, you can trim the waveform more accurately by choosing a Snap value, which allows you to snap the markers to a transient or beat.



Trim mode parameters

- *Start and end markers:* Drag the blue start or the end marker to set the sample start and end points. Playback occurs between these markers.
- *Snap pop-up menu:* Choose a Snap value. In play modes and Motion mode, this affects the movement of source handles. In Trim mode, the Snap value affects edits to loop start and end markers in the waveform display. The following options are available in the Snap pop-up menu:
  - *Auto:* The Snap value is automatically set to the best value based on the selected mode and the sample.
  - *Off:* Turn snap off.
  - *Transients:* Snap to transients in the sample.
  - *Beat:* Snap to beat values in the sample.
  - *Fixed:* Set the Snap value to allow source handles to move only on the Y axis (vertically) in play modes and Motion mode.
- *Zoom in/out:* Use the pinch gesture to zoom in and out.

Set trim start and end markers

To set the start and end markers in Trim mode, do any of the following:

- Tap the Snap menu and choose a Snap value.
- Tap the start marker, then drag it left or right to set the start position of the sample.
- Tap the end marker, then drag it left or right to set the end position of the sample.

  Note: You can pinch the waveform to zoom in and out for more precise editing. If you zoom in to the waveform, swipe to the left or right to see the start or end markers.

Sample Alchemy More menu in Logic Pro for iPad

Tap the More button at the upper right to choose a number of global, sample, and MIDI handling options.

Global settings

- *Volume:* Set the volume level of the preset.
- *Polyphony:* Set the maximum polyphony of a preset (up to 16 voices). A value of 1 results in a monophonic preset or source.
- *Glide:* Set the portamento rate. Glide causes slides from one note pitch to the next.
- *Play Mode:* Determine how new notes are treated. This parameter interacts with the Polyphony and Glide controls.
  - *Always:* If the Polyphony value is 1, a trigger is generated at the start of each legato group, and portamento occurs at the start of every note. For all other Polyphony values, a trigger is generated at the start of every note, and portamento occurs at the start of every note.
  - *Retrigger:* A trigger is generated at the start of every note, and portamento occurs at the start of every note.

- *Legato:* If the Polyphony value is 1, a trigger is generated at the start of each legato group, and portamento occurs at the start of each legato group. For all other Polyphony values, behavior is unchanged when you play single notes. When you play a chord, each note of the chord is triggered individually.

- *Pitch Bend:* Set the maximum range for upward and downward pitch bend modulation, typically performed with your keyboard pitch bend wheel.
- *Output Limiter:* Turn the output limiter on or off. The output limiter manages the maximum output level of Sample Alchemy, preventing distortion and clipping.

Sample settings

- *Preview Mode:* Turn preview mode off or on (it's on by default). When preview mode is on, a MIDI note is generated when you touch a handle. When you turn off preview mode, there is no sound when you tap the handles, and the preview MIDI note can't be recorded in Logic Pro.
- *Pitch Lock:* Lock the pitch of the sample to the root key. If you import an audio file containing notes with various pitches, Pitch Lock allows you to lock them all to a single note. After this, you can play Sample Alchemy (for example, with a MIDI keyboard), and it will play the notes you hold down, not the differing pitches within the sample.
- *Reverse:* Set the sample to play in reverse.
- *Root Key:* Adjust the pitch of the sound in semitones.
- *Root Cents:* Adjust the pitch of the sound in cents.
- *Tempo:* Set the tempo (shown in beats per minute) of the sample, or choose None if the sample is not rhythmic.
- *Derive Tempo from Loop Length:* Calculate a tempo for the audio file based on the length of the sample between trim handles.

MIDI settings

- *MIDI Mono Mode (MPE):* You can choose the settings for MIDI Mono Mode:
  - *MIDI Mono Mode:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16). In either mode, each voice receives on a different MIDI channel. Per-voice channels support pitch bend, aftertouch, modulation wheel, and controller assignment messages.
  - *Pitch Bend Range:* Set a value from 0 to 96. The chosen pitch bend range affects individual note pitch bend messages received on all but the Common Base Channel. The default is 48 semitones. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar-to-MIDI converters use this range by default.
- *MIDI Assign:* You can choose one of four different modulation sources from the MIDI submenu. Ctrl A/B/C/D can be assigned to modulation targets in the Mod Matrix pane. These are ideal for adding breath and foot controller modulations.
  - *Ctrl A–D:* Set the MIDI continuous controller that is assigned to Ctrl A–D.

Sampler

Sampler in Logic Pro for iPad

Sampler is a sample playback instrument.

Note: Sampler provides no user controls in Details view. A Volume knob that sets the overall instrument level is shown in the Plug-ins area.

Audio files, called *samples*, are combined into tuned, organized collections called *sampler instruments*. A sampler instrument is the file type that is loaded into Sampler. When you choose a sampler instrument, the associated audio files are automatically located and are loaded into RAM. You play and record the loaded sampler instrument in the same way as any software instrument.

Because sampler instruments are based on audio recordings, they are ideally suited to emulating real instruments such as guitars, pianos, and drums.

Sampler provides an extensive library of sampler instruments that includes these and many other sounds. You can load sampler instruments or patches from the Browser.

Logic Pro for iPad Sampler provides playback compatibility with Logic Pro for Mac projects. You can load presets for this plug-in, but parameter editing is available only when using Logic Pro for Mac.

Note: In the Logic Pro for Mac version of Sampler, you can analyze imported samples and can manipulate them using the Sampler synthesis engine. Logic Pro for Mac Sampler provides extensive sample mapping, looping, and grouping facilities that make it easy to create instruments containing hundreds of samples and layers. Dozens of modeled analog and digital filters are available, in addition to an extensive modulation section.

To add Sampler to your project, choose it from the Instrument > Sampler submenu in an instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Sculpture

Sculpture in Logic Pro for iPad

This section contains key information and concepts that you need to understand before looking at Sculpture features and parameters. If you're new to synthesizers, it might be best to start off with Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis methods and how they work.

To add Sculpture to your project, choose it from the Instrument > Synthesizer submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

Sculpture is a synthesizer that generates sounds by simulating the physical properties of a vibrating string. This approach to tone generation is called *component modeling*. It lets you create a virtual model of an acoustic instrument, such as a violin or cello. Components such as the length of the neck, the material the instrument is made of—wood or metal, for example—the diameter, tension, and material of the strings—nylon or steel, for example—and the size of the instrument body can be modeled.

In addition to the physical properties of the instrument, you can determine how and where it is played—softly bowed, or plucked, on top of a mountain, or under the sea. Other aspects such as finger noise and vibrato can also be emulated. You can even hit your virtual instrument strings with a stick, or emulate dropping a coin onto the bridge.

Sculpture is not limited to recreating real-world instruments. You are free to combine components in any way, leading to bizarre hybrids such as a six-foot-long guitar with a bronze bell for a body—played with a felt hammer.

You can also create more traditional synthesizer tones in Sculpture. These benefit from the modeling process itself, which tends to add a level of richness and an organic quality to sounds. The end results are lush, warm pads, deep and round synthesizer basses, and powerful lead sounds. If you need to create an endlessly evolving texture for a film soundtrack, or a spaceship takeoff sound, Sculpture is the perfect instrument for the job.

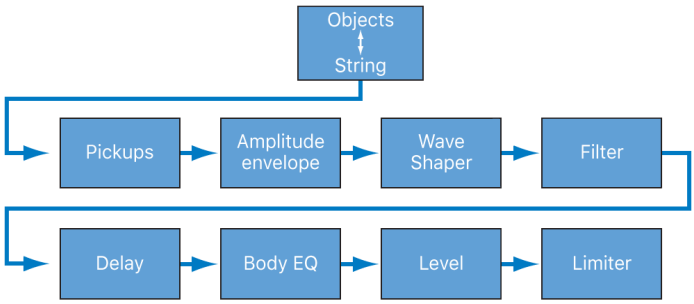
Like a real instrument, Sculpture generates sounds by using an object, such as a fingertip, wind, drumstick, or violin bow, to stimulate another object, such as a guitar string or reed.

Note: For clarity, the stimulated object is always referred to as the *string*.

As with a real instrument, the sound consists of multiple elements. It's not only the string that is responsible for the tonal color, but also the objects that stimulate or otherwise affect the string, and therefore the sound.

For example, imagine a steel-stringed guitar that is alternately strummed with your thumb and then picked strongly with your fingers. Changing to nylon strings, or 12 strings, would significantly change the tone. Now imagine the impact of pressing the strings down onto the fretboard, which not only changes the chord but also momentarily bends the strings, and therefore their pitch. Other aspects to consider are the size and material of the guitar body and how they influence the resonant characteristics of your sound. Further elements, such as the size or type of sound hole—round or F-shaped—the finger noise on the strings, and the medium that the guitar is played in, also have roles to play in the overall sound that you produce.

Sculpture lets you virtually model the physical consistency and behavior of all components involved—hence *component modeling* synthesis.



This figure shows the signal flow of the core Sculpture synthesis engine.

Following the stimulation of the string by various objects, the vibration of the string is captured by two movable pickups—you can view these as being similar, in concept and operation, to the electromagnetic pickups found on guitars, electric pianos, or clavinets.

The pickups send the signal to the ADSR-equipped amplitude stage, a Waveshaper module, and a multimode filter. These all serve to *sculpt* your sound.

Note: All elements described above exist on a per voice basis.

The sum of all voice signals can then be sent to an EQ-like module (the Body EQ), which simulates the spectral shape/body response of your instrument, and then processed by an integrated delay effect. The resulting signal is then fed to a level limiter section.

A vast number of modulation sources are also available, from tempo-synced LFOs to jitter generators and recordable envelopes. These can control the string and object properties, the filter, and other parameters. You can even modulate other modulation sources.

A recordable morph function also allows for smooth or abrupt transitions between up to five morph points. A morph point is essentially a collection of parameter settings at a given moment in time.

Important: The interaction between various sections of the component modeling synthesis engine is more dynamic and more tightly intertwined than that of other synthesis methods. This can lead to some truly unique sounds, but sometimes even a small parameter change can deliver dramatically different, and unexpected, results. Sculpture requires a more measured approach to sound creation than a traditional synthesizer design. Refer to the flowchart while learning the interface and programming.

Sculpture is a performance-oriented synthesizer that benefits from the use of controllers, modulations, and different playing techniques. Take time to experiment with all available controls and parameters when you initially audition some of the supplied sounds, and when you create new ones of your own.

Sculpture is an instrument that requires some investment of your time, but it can reward you with beautifully warm and organic sounds, evolving soundscapes—or a harsh and metallic “Hell’s Bells” patch, if required. Don’t be afraid to experiment; that’s what Sculpture was created to do.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

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Sculpture interface in Logic Pro for iPad



Sculpture is divided into three main parameter groupings.

- *Sound engine:* The upper section of Sculpture contains the sound engine, along with the Morph and Global parameter sections. The sound engine is divided into five subsections:
  - *String parameters:* These are used to create and control the string, thus determining the basic timbre of your sound. See Sculpture string overview.
  - *Object parameters:* The objects are used to stimulate or otherwise affect the string in some way. See Sculpture objects overview.
  - *Processing parameters:* The processing parameters capture the string signal and provide further tonal control. These include the pickups, filter, Waveshaper, and Spectral Shape EQ which affects the tone of the entire instrument.
  - *Global and output parameters:* These affect the overall behavior of Sculpture. Global parameters include bend range, keyboard mode, and tuning controls. Further options include the amplitude envelope, delay effect and output parameters.
- *Modulation section:* The sections below the sound engine contain the modulation sources—LFOs, jitter and random generators, and recordable envelopes. Sculpture modulators also incorporate the morph pad, a dedicated controller for *morphable* parameters, and the Morph Envelope.
- *MIDI control sources:* The area at the bottom of the interface lets you assign MIDI controllers to Sculpture parameters.

String parameters

Sculpture string parameters in Logic Pro for iPad

The *string* is responsible for the basic tone of your sound. You can define its material—what it's made of—with the Material Pad, and can determine its behavior when bowed, plucked, struck, and so on.

The string itself doesn't make a sound unless it is stimulated—excited or disturbed—by at least one object. Up to three different types of objects are used to excite, disturb, or damp the string (make it vibrate or affect its movement). See Sculpture objects overview.

Sculpture's string and the excite/disturb objects are similar to the oscillators in traditional synthesizers. The string is considerably more sophisticated in concept than simple oscillators, however.

In essence, you're creating the waveform, or base timbre, by mathematically describing the string properties, and the properties of its environment. These include, among others, the material the string is made of; the thickness, length, and tension of the string; its characteristics over time; the atmosphere it is being played in (such as water or air); and the way it is being played—struck, bowed, and so on.

Sculpture goes far beyond the mere creation of an infinite number of base timbres, however. One of the key differences between the Sculpture string and a traditional synthesizer waveform is that the base timbre provided by the string is in a constant state of flux. For example, if the Sculpture string is still vibrating for a specific note, retriggering that same note interacts with the ongoing vibration. This is not dissimilar to the effect of repeatedly plucking a guitar string, where the string is still vibrating when the next note is played. This alters the harmonic spectrum each time—which is why acoustic guitars sound organic when a note is played repeatedly, and sampled guitars don't.

This is quite different from other synthesis methods where the base timbre waveform, even if modulated, does not harmonically interact with currently audible notes when retriggered. What usually happens in traditional synthesizers is that the waveform is restarted—from mid-cycle, or from the beginning—with the result being an increase in volume, or a slight cyclical wave shift.

The string parameters apply on a per-voice basis. A number of parameters can be morphed between up to five morph points. These are indicated in the parameter descriptions. See Sculpture morph overview.



String parameters

Resolution, Media Loss, and Tension Mod can be scaled independently above and below middle C. See Sculpture string parameter scaling.

- *Resolution knob and field:* Set the maximum number of harmonics contained in (and spatial resolution of) the sound at C3. Changes to the Resolution value alter the interaction of the string with the objects, which has a corresponding effect on overtone frequencies—very low Resolution values result in inharmonic spectra, even with Stiffness set to 0. Higher resolution values enhance the precision of calculations, increasing computer processing requirements. Resolution behavior interacts with the Render Mode buttons, changing the way it behaves.
- *Render Mode buttons:* Choose Basic, Extended, or High Definition mode. Each Render Mode option changes the number of available elements and/or processing.

  Sculpture's string model can roughly be seen as a chain of springs and masses. The maximum number of elements (masses) is set with the Resolution knob. The Resolution control interacts with the pitch, stiffness and pitch bend range settings to automatically set the number of overtones that are actually used. This Sculpture string model affords advantages over the more common waveguide models, especially when it comes to interactions with the string with multiple or larger objects. An inherent property of this flexible string model is that higher overtones are slightly below integer multiples of the fundamental, leading to increasingly inharmonic higher overtones for a string without any stiffness.

  - *Basic:* Choose to set a maximum of 100 elements, with some internal headroom for extreme key scaling. Suitable for many sound types, and has a lower processing load than other render modes. There is a direct correlation between the number of vibration modes and elements, resulting in a maximum of 99 overtones in the spectrum of a single voice. For example, a 100 Hz bass note (with no string stiffness) has a highest overtone of around 10 kHz, making the more audibly inharmonic upper third of the harmonic series fall into the audible range.
  - *Extended:* Choose to set a maximum of 1000 elements. The Resolution knob, coupled with pitch, stiffness and pitch bend range settings affect the number of elements (overtones) used. This mode automatically reduces the number of audible inharmonic overtones until none of the overtones happen at rates above half the sampling frequency.
  - *High Definition:* Choose to set a maximum of 1000 elements and to also turn on internal 2x oversampling, which adds frequency headroom for more overtones. The Resolution knob, coupled with pitch, stiffness and pitch bend range settings affect the number of elements (overtones) used. This mode is significantly more processor-intensive than Extended mode as it runs at double the frequency and allows more elements per string for the same note pitch.
- *Material Pad:* Drag the gray dot to determine the basic tone of the string by setting the stiffness and inner loss (damping) properties. See Material Pad controls.

- *Media Loss slider and field:* Set the amount of string damping caused by the surrounding media (the atmosphere)—for example, air, water, olive oil, and so on. These losses are independent of frequency. This provides control over the duration of the exponential amplitude decay, after the excitation of the string has stopped. Values above 1.0 cause media losses to increase when the key is released. This parameter can be used to simulate a string that is dropped into a bucket of water after initially vibrating in air, for example. Obviously, this is not what the average violinist would do, but it can be useful for some interesting sound variations.

  Note: Both the Media Loss and Tension Mod sliders are set relative to middle C. As you play above or below this note, tuning and other elements of the string can, and will, change.

- *Tension Mod slider and field:* Set the momentary detuning of the string. Strings, such as those of a guitar, exhibit a particularly prominent nonlinear behavior—if the string excursion is large, the string is detuned upward. Because this detuning is caused by the momentary, rather than the average, excursion of the string, the detuning occurs very quickly. This phenomenon is known technically as *tension modulation nonlinearity*. Nontechnically, setting or modulating the Tension Mod slider to values above 0 emulates this momentary detuning effect in Sculpture.

  Note: This nonlinear effect can deliver surprising results and can also make the entire model unstable, especially when combined with a low Media Loss value. If your sound spikes or drops out during the decay phase, try reducing Tension Mod, and perhaps Resolution.

Sculpture Material Pad controls in Logic Pro for iPad

The Material Pad works as a matrix of Stiffness (x-axis) and Inner Loss (y-axis) values.



The four corners of the Material Pad each represent a combination of maximum/minimum Stiffness and Inner Loss values. The combination of the Inner Loss and Stiffness parameter positions determine the string material and, therefore, the general timbre of your sound. Here are examples of how Inner Loss and Stiffness settings can change the tonal color:

- Low Stiffness values, combined with low Inner Loss values, lead to metallic sounds.
- Higher Stiffness values, combined with low Inner Loss values, make the sound become more bell-like or glass-like.
- Higher Inner Loss values, combined with a low Stiffness level, correspond to nylon or catgut strings.
- High Stiffness values, combined with high Inner Loss values, simulate wood-like materials.

Material Pad parameters

Inner Loss and Stiffness can be scaled independently above and below middle C. See Sculpture string parameter scaling.

Drag the gray dot to control both the Inner Loss and Stiffness parameters simultaneously.

- *Inner Loss:* Emulate damping of the string caused by the string material—steel, glass, nylon, or wood. These are frequency-dependent losses that cause the sound to become more mellow during the decay phase.
- *Stiffness:* Set the rigidity of the string. In reality, this is determined by the string material and diameter—or, to be more precise, by its geometrical moment of inertia. Increasing the Stiffness parameter to the maximum value turns the string into a solid metal bar. Stiffer strings also exhibit an inharmonic vibration, where overtones are not integer multiples of the base frequency. Rather, they have higher frequencies, which can make upper/lower notes sound somewhat out of tune with each other.

Sculpture string parameter scaling in Logic Pro for iPad

The String Parameter Scaling controls determine the behavior of string parameters across the key range.

Tap the Hide, KeyScale, or Release button to show or hide the corresponding parameters.



Hide, KeyScale, and Release buttons

- *Hide button:* Hide Key Scale or Release parameters.
- *KeyScale button:* Show and set parameters for notes that fall below C3 or notes that are positioned above it. In simple terms, the impact of these parameters can be controlled across the keyboard range. For example, a parameter such as string Stiffness could be more intense for high notes and less intense for low notes. In practical terms, this would result in more harmonic (sweeter) sounding bass notes and inharmonic overtones in treble notes (notes above C3).
- *Release button:* Show and set string Release parameters, which affect the vibrations of the string after the key is released.

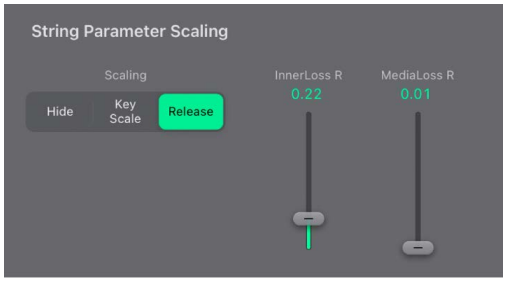
KeyScale parameters

These parameters work in conjunction with controls found in the String Parameters and Material Pad sections.

- *Resolution Low slider and field:* Set the key tracking resolution for notes below middle C (C3). The Resolution Keyscale parameters change the scaling of (harmonic and inharmonic) overtones as you play lower or higher on the keyboard. Use these parameters to smooth out or accentuate these overtones across the key range.
- *Res(olution) H(igh) slider and field:* Set the key tracking resolution for notes above middle C.
- *TensMod Low slider and field:* Set the tension modulation tracking behavior for notes below middle C. The Tension Mod Keyscale parameters change the scaling of the momentary detuning (pitch bend) of the string as you play lower or higher on the keyboard. Use these parameters to smooth out or accentuate this momentary detuning across the key range.
- *TensMod High slider and field:* Set the tension modulation behavior for notes above middle C.
- *Stiffness Low slider and field:* Set the Stiffness key tracking behavior for notes below middle C. The Stiffness Keyscale parameters change the scaling of inharmonic content that is heard as you play lower or higher on the keyboard. Use them to smooth out or accentuate the inharmonic content across the key range.
- *Stiffness High slider and field:* Set the Stiffness key tracking behavior for notes above middle C.
- *InnerLoss Low slider and field:* Set the Inner Loss key tracking behavior for notes below middle C. The Inner Loss Keyscale parameters change the way string damping is scaled as you play lower or higher on the keyboard.
- *InnerLoss High slider and field:* Set the Inner Loss key tracking behavior for notes above middle C.
- *MediaLoss L(ow) slider and field:* Set the Media Loss key tracking behavior for notes below middle C. The Media Loss Keyscale parameters change the way damping of the atmosphere in which the string is vibrating is scaled as you play lower or higher on the keyboard.
- *MediaLoss H(igh) slider and field:* Set the Media Loss key tracking behavior for notes above middle C.

Release parameters

In Release view, you define changes to the damping amount when the key is released. Conservative use of these parameters allows a natural simulation of strings that are dampened when a note-off message is received. See String Parameters and Material Pad.



Note: You can't adjust the release behavior of the Stiffness parameter.

- *InnerLoss R(elease) slider and field:* Set inner loss behavior (string damping) when the key is released.
- *MediaLoss R(elease) slider and field:* Set media loss behavior (the atmosphere in which the string is vibrating) when the key is released.

Objects parameters

Sculpture objects in Logic Pro for iPad

The objects are used to stimulate or otherwise affect the string in some way. The object parameters discussed in this section apply on a per-voice basis. A number of parameters can be morphed between up to five morph points. These are indicated in the parameter descriptions. For more information, see Sculpture morph overview.

Important: At least one object must be used to excite or disturb the string, because the string itself does not make any sound.

There are a number of different string *excite/disturb/damp* models available, such as blow, pluck, bow, and so on. These can radically alter the general timbre of the string attack phase, making it possible to create bowed or plucked flute and bell sounds, or guitars with a flute-like attack, for example.

Judicious use of the object parameters can deliver very accurate emulations of real-world instruments, or sounds that are altogether more other-worldly.

It is important to note that each additional disturb/damp object that is activated affects the string. This in turn alters the interaction of *any* other active object with the string, often resulting in a completely different sonic character.

The goal of changing the sound character is the reason you would use a new object, but the pluck and blow object combination you chose may sound like fingernails on a blackboard, rather than the plucked pan flute you were trying to create—depending on other string settings. Therefore, you need to pay special attention to the model type and strength of objects. You may find that the flavor of the excite object (Object 1), for example, has changed significantly—and you may need to adjust or change the parameters of *all* objects (and perhaps several string parameter values) after you introduce a new disturb/damp object (2 or 3). Similarly, the selection of a different *type* of excite object affects the disturb/damp objects—and the string itself—thereby changing the character of your sound.

Repositioning objects also changes the timbre of the string. If you're emulating a guitar, for example, changing an object position would be similar to picking or strumming a string at various spots along the fretboard.



Object parameters

- *On/Off buttons (Object 1, 2, 3):* Turn the object on or off.
- *Type pop-up menus:* Choose the excite, disturb, or damp type. Your choice affects string interaction and changes the behavior of the Timbre and Variation controls. See Sculpture excite objects 1 and 2 and Sculpture disturb and damp objects 2 and 3.
- *Gate Mode pop-up menus:* Determine when the object is active—that is, when it disturbs or excites the string. You can choose from:
  - *Key On:* Between note-on and note-off
  - *Always:* Between note-on and the end of the release phase
  - *Key Off:* Triggered at note-off, and remaining active until the voice is released

  Note: Some object types, such as Gravity Strike, may retrigger the note when you release a key—when in Key On gate mode. If you encounter this artifact, try setting gate mode to Always, or reduce the Strength of the object.
- *Position sliders and fields:* Drag to determine the respective position of each (excite/disturb/damp) object along the string. This parameter can be morphed.
- *Strength knob and field:* Set the intensity of the excitation/disturbance (depending on type). A value of 0.0 effectively prevents excitation/disturbance. In contrast to the On/Off button of each object, you can fade in the Strength parameter with modulation or morphing options. This parameter can be morphed.
- *Timbre knob and field:* Determine the timbre (tonal color) of the chosen excitation/disturbance type. Behavior varies between object types. Zero (0.0) is the default value for the object. Positive values make the sound brighter. Negative values lead to a more mellow sound. This parameter can be morphed.
- *Variation knob and field:* Adjust this additional timbre parameter. Behavior varies between object types. This parameter can be morphed.
- *VeloSens knob and field:* Reduce velocity sensitivity to 0. Excite objects are velocity sensitive, but this may not be appropriate for all sounds, which is where this parameter is useful.

  Note: An object is velocity sensitive only when a type that actively excites the string is selected. The VeloSens control is available only for objects that are velocity sensitive. Object 1 is velocity sensitive. Object 2 can be both, depending on the object type you choose. Object 3 is *not* velocity sensitive.

Sculpture excite objects 1 and 2 in Logic Pro for iPad

Before you look at the tables of object types and properties, you should note the following:

- Object 1 can only use the excite types found in the first table.
- Object 2 can use the excite and disturb/damp types available in both tables.
- Object 3 can only use the disturb/damp types found in the second table. See Sculpture disturb and damp objects 2 and 3.

The table outlines all excite types available for Objects 1 and 2, and provides information on the controls available for each object type.

Name	Description	Strength controls	Timbre controls	Variation controls
Impulse	A short impulse excitation	Impulse amplitude	Width	Velocity dependence of width
Strike	Short excitation, like a piano hammer or mallet	Hammer start speed (velocity dependent)	Hammer mass	Felt stiffness
GravStrike	Like hammer but with gravitation toward the string, leading to multiple hammer-string interactions and disturbed string vibrations	Hammer start speed	Felt stiffness	Gravitation
Pick	Finger or plectrum picking	Pickup force and speed	Force/speed ratio	Plectrum stiffness
Bow	Bowing of the string	Bow speed	Bow pressure	Slip stick characteristics
Bow wide	Same as bow, but wider, resulting in a more mellow tone, especially suited for smooth bow position changes	Bow speed	Bow pressure	Slip stick characteristics
Noise	Noise injected into the string	Noise level	Noise bandwidth/ cutoff frequency	Noise resonance
Blow	Blow into one end of the string (an air column, or tube). At various positions, starting from 0.0 (far left), move the blowing direction and position from along the string toward one end. The string is blown sideways at the chosen position.	Lip clearance	Blow pressure	Noisiness
External (available only for Object 2)	Feeds side chain signal into string.	Level	Cutoff frequency of lowpass filter being used to process side chain signal	Width (size) of the string area being affected by the side chained signal

Sculpture disturb and damp objects 2 and 3 in Logic Pro for iPad

The table outlines all disturb and damp types available for Objects 2 and 3. For information on excite types available for Objects 1 and 2, see Sculpture excite objects 1 and 2.

Name	Description	Strength controls	Timbre controls	Variation controls
Disturb	A disturb object that is placed at a fixed distance from the string resting position	The hardness of the object	The distance from the resting position • *Negative values:* Push the string away from the resting position. • *Positive values:* Do not affect the string in the resting position.	Controls width. • *Negative values:* Affect only a small section of the string. • *Positive values:* Affect a broader section of the string.
Disturb 2-sided	Somewhat like a ring placed around the string, which limits string vibration in all directions	The hardness of the ring	The clearance of the ring (the distance between the ring and string) • *Negative values:* The sides of the damping ring overlap, influencing the string if any movement occurs. • *Positive values:* There is an amount of clearance inside the ring. The string is influenced only if moved sufficiently to actually touch the ring.	No effect
Bouncing	Emulates a loose object lying or bouncing on, and interacting with, the vibrating string. This is very random by nature and can't be synchronized.	Controls the gravity constant for the object lying/bouncing on the string.	The stiffness of the object	The damping of the object
Bound	A boundary that limits and reflects string movement. This is much like a fingerboard that limits string movement when the string is plucked very firmly.	The distance from the boundary center position to the string resting position	The slope (steepness) of the boundary. A value of 0.0 places the boundary parallel to the string. Other values move the boundary closer to the string on one end and farther away on the other.	The amount of reflection at the boundary limits

Name	Description	Strength controls	Timbre controls	Variation controls
Mass	Used to model an additional mass attached to the string. This can lead to inharmonic sounds, and very interesting results, if the position of this mass is modulated along the string.	The mass size/ weight	No effect	No effect
Damp	Localized damper, which is useful for soft damping	The intensity of the damping	The damping characteristics	The width of the damped string section

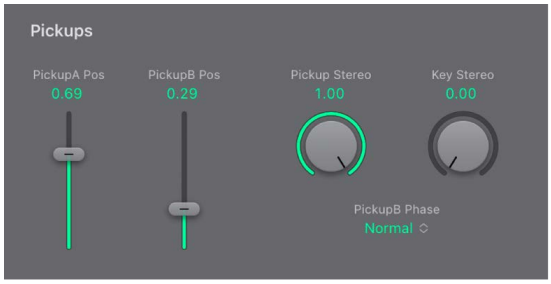
Pickups and amp envelope

Sculpture pickup parameters in Logic Pro for iPad

The pickup parameters discussed in this section apply on a per-voice basis. A number of parameters can be morphed between up to five morph points. These are indicated in the parameter descriptions. See Sculpture morph overview.

The pickups are the first element beyond the sound-generating portion of Sculpture—consisting of the string and objects—and act as the input to the virtual signal processing chain. You can view the pickups as being like those of an electric guitar or clavinet. Obviously, changing their positions alters the tone of your instrument, just like the pickups in Sculpture.

The volume level of the pickup signals is controlled with the amplitude envelope.



Pickup parameters

- *PickupA Pos slider and field:* Set the position of Pickup A along the string. Values of 0.0 and 1.0 determine the left and right ends of the string, respectively. This parameter can be morphed.
- *PickupB Pos slider and field:* Set the position of Pickup B along the string. This parameter can be morphed.
- *Pickup Stereo knob and field:* Use to spread the two pickups across the stereo base.
- *Key Stereo knob and field:* Set the amount of panning (pan position) by MIDI note number. Depending on settings, the farther up or down the keyboard you play, the more the voice is panned left or right.

  Tip: You can create animated width and chorus effects by modulating the Stereo parameters with an LFO or other modulator.

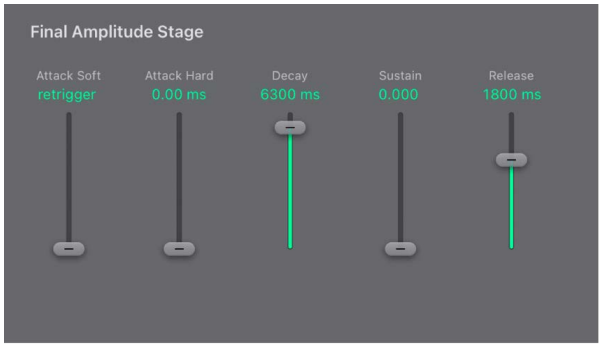
- *PickupB Phase pop-up menu:* Invert the phase of Pickup B. Options are: normal or inverted.

  Note: If the phase of Pickup B is inverted, the sound can become thinner due to portions of the Pickup A and Pickup B signals canceling each other out. Depending on the position of the pickups, however, the reverse may happen, with the sound actually becoming richer.

Sculpture amplitude envelope in Logic Pro for iPad

The parameters discussed in this section apply on a per-voice basis. This is a straightforward ADSR envelope that scales the pickup signals before passing them on to the Waveshaper and filter.

The positioning of the amplitude envelope at this point in the signal path produces more natural-sounding results because you can control signal levels before sending them to the Waveshaper (if used). The Waveshaper can have a significant impact on the spectral content of the sound, which can lead to synthetic-sounding results.



Amplitude envelope parameters

- *Attack Soft/Hard sliders and fields:* Set the attack time for a note played at minimum velocity with the left slider (Soft). Set the attack time for a note played at maximum velocity with the right slider (Hard).

  Important: The attack time parameters of the amplitude envelope have a major impact on the way a single note is retriggered. When both Attack Soft and Hard are set to a value of 0, the vibrating string is retriggered. If either of these parameters is set to a value *above 0*, a new note is triggered. Sonically, the retriggering of a vibrating string results in different harmonics being heard during the attack phase.

- *Decay slider and field:* Set the time it takes for the signal to fall to the sustain level, following the initial strike/attack time.
- *Sustain slider and field:* Set the sustain level. The sustain level is held until the key is released.
- *Release slider and field:* Set the time it takes for the signal to fall from the sustain level to a level of 0. Short Release values help to reduce CPU load because the voice is no longer processed after the release phase has completed.

Note: Even with long decay and release times, the sound may decay quickly. This can be caused by high Inner or Media Loss values in the string material section or by objects (2 or 3) that are used to damp the string.

Processing functions

Sculpture processing functions in Logic Pro for iPad

Sculpture provides sophisticated shaping and filtering processors you can use to change the tonal color and to alter the harmonic spectra. You can also impose the characteristics of an instrument “body” on the overall sound.

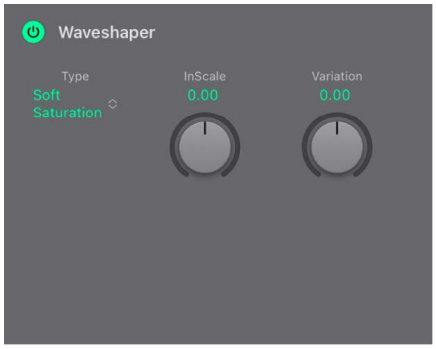
Included are the Waveshaper, the multimode filter, and the Spectral Shape EQ.

The Waveshaper and multimode filter both operate on a per-voice basis.

The Spectral Shape EQ operates on all summed voices.

Use Sculpture Waveshaper in Logic Pro for iPad

The Waveshaper imposes a nonlinear shaping curve on each voice of the signal coming from the pickups and amplitude envelope. This reshaped signal is then passed on to the filter. This process is quite similar to the waveshaping of oscillators in synthesizers such as the Korg O1/W.



Waveshaper parameters

- *Waveshaper On/Off button:* Turn the Waveshaper on or off.
- *Type pop-up menu:* Choose one of four waveshaping curves. See the table.
- *InScale knob and field:* Cut or boost the input signal, prior to processing by the Waveshaper. Positive values result in a richer harmonic spectrum. Any level increase introduced by this parameter is automatically compensated for by the Waveshaper. This parameter can be morphed.

  Note: Given its impact on the harmonic spectrum, InScale (Input Scale) should be viewed and used as a timbral control, rather than a level control. Also note that extreme InScale values can introduce processing noise at the Waveshaper output.
- *Variation knob and field:* Set the value of the preassigned parameter for the selected Waveshaper curve. Behavior varies between curve types. This parameter can be morphed.

Type	Variation controls	Value of 0.0	Negative values	Positive values
Vari Drive	Wet/dry ratio	Provides shaped signal only.	Reduces shaped signal and adds dry signal.	Raises shaped signal and adds phase-inverted dry signal, making sound sharper.
• Soft Saturation • Tube-like distortion • Scream	Bias—alters the symmetry of the shaping curve.	Results in symmetrical shaping.	Alters symmetry.	Alters symmetry.

Sculpture filter parameters in Logic Pro for iPad

The parameters discussed in this section apply on a per-voice basis. A number of parameters can be morphed between as many as five morph points. These are indicated in the parameter descriptions. For more information, see Sculpture morph overview.

The filter parameters provide further timbral/spectral control over your sound. They will be familiar to you if you have any experience with synthesizers. If you're new to the concepts behind synthesizer filters, see Filters overview.



Filter parameters

- *Filter On/Off button:* Turn the filter section on or off.
- *Cutoff knob and field:* Set the cutoff or center frequency, depending on the chosen filter type. In a *lowpass* filter, all frequency portions *above* the cutoff frequency are suppressed, or cut off, hence the name. The cutoff frequency controls the brilliance of the signal. The higher the cutoff frequency is set, the higher the frequencies of signals that are allowed to pass through the lowpass filter. This parameter can be morphed.
- *Resonance knob and field:* Set the filter resonance value. This parameter can be morphed.
  - In highpass and lowpass modes, Resonance emphasizes the portions of the signal that surround the center frequency.
  - In Peak, Bandpass, and Notch modes, Resonance controls the width of the band that surrounds the center frequency.

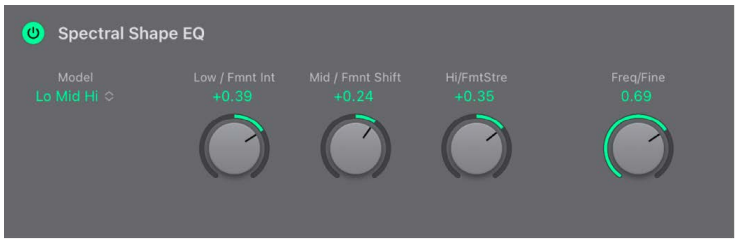
- *KeyTrack knob and field:* Determine how cutoff frequency responds to key position. The farther up or down the keyboard you play, the more bright or mellow the sound becomes. Technically speaking, the cutoff frequency is modulated by the keyboard position. A value of 0.0 prevents key tracking. A value of 1.0 makes the cutoff frequency follow the fundamental of the note across the entire keyboard range. Play an octave higher and the cutoff frequency also changes by an octave.
- *Filter type buttons:* Tap to choose the filter mode.
  - *HP:* Allow frequencies above the cutoff frequency to pass. Because frequencies below the cutoff frequency are suppressed, it's also known as a *low cut filter*. The slope of the highpass filter is 12 dB/octave.
  - *LP:* Allow frequencies that fall below the cutoff frequency to pass. Because frequencies above the cutoff frequency are suppressed, it's also known as a *high cut filter*. The slope of the lowpass filter is 12 dB/octave.
  - *Peak:* Choose to specify the center of a frequency band with Cutoff. Control bandwidth and gain with Resonance. Frequencies outside the band remain at their current level. Peak filters are generally used to enhance a frequency range.
  - *BP:* Allow the frequency band surrounding the center frequency to pass. Resonance controls the width of this band. All other frequencies are cut. The bandpass filter is a two-pole filter with a slope of 6 dB/octave on each side of the band.
  - *BR:* Cut the frequency band surrounding the center frequency. Resonance controls the width of this band. All other frequencies are allowed to pass. Band reject, or "notch" filters are generally used to suppress noise or a particular frequency.
- *VeloSens knob and field:* Determine how cutoff frequency responds to incoming note velocities. The harder you strike the keyboard, the higher the cutoff frequency—and generally the brightness of the sound—becomes. A value of 0.0 turns off velocity sensitivity. A value of 1.0 results in maximum velocity sensitivity.

Sculpture Spectral Shape EQ in Logic Pro for iPad

The Spectral Shape EQ can work as a simple Lo Mid Hi EQ, as a complex spectral shaper, or as a body response simulator. In effect, the Spectral Shape EQ can emulate the resonant characteristics of a wooden or metallic body—such as that of a guitar, violin, or flute.

The various models are derived from impulse response recordings of actual instrument bodies. These recordings have been separated into their general formant structure and fine structure, enabling you to alter these properties separately.

Note: The Spectral Shape EQ affects the summed signal of *all* voices, rather than each voice independently.



Spectral Shape EQ parameters

- *On/Off button:* Turn the Spectral Shape EQ on or off.
- *Model pop-up menu:* Choose from various emulations of acoustic instrument bodies or the basic EQ model (Lo Mid Hi).

  Note: When Lo Mid Hi or another Spectral Shape EQ model is chosen, the knob behaviors change.
- *Low / Fmnt Int knob and field:* Set the gain of a low shelving filter when the Lo Mid Hi model is chosen. When a spectral shape model is chosen, rotate to scale the intensity of model formants. Any formants (harmonics) in the model become louder or are inverted, depending on how this parameter is used. A value of 0.0 results in a flat response. A value of 1.0 results in strong formants. Negative values invert the formants.
- *Mid / Fmnt Shift knob and field:* Set the gain of a peak filter when the Lo Mid Hi model is chosen. This is sweepable—see Freq/Fine knob below. When a spectral shape model is chosen, rotate to shift the formants logarithmically. A value of –0.3, for example, shifts all formants one octave downward, and a value of +0.3 shifts the formants up one octave. A value of +1.0 shifts up by a factor of 10—from 500 Hz to 5000 Hz, for example.
- *Hi/FmntStre knob and field:* Set the gain of a high shelving filter when the Lo Mid Hi model is chosen. When a spectral shape model is chosen, rotate to stretch the formant frequencies, relative to each other. This parameter alters the width of all bands being processed, extending or narrowing the frequency range. Low values move the formants closer together (centered around 1 kHz), whereas high values move the formants farther apart from each other. The control range is expressed as a ratio of the overall bandwidth.

  Note: When combined, the formant stretching and shifting controls alter the formant structure of the sound and can result in some interesting timbral changes.
- *Freq/Fine knob and field:* Sweep the center frequency of the mid band between 100 Hz and 10 kHz when the Lo Mid Hi model is chosen. When a spectral shape model is chosen, rotate to the right of the center position to enhance the spectral (harmonic) structure. This results in a more detailed sound that is harmonically richer and—depending on the model selected—more guitar-like or violin-like, for example. In other words, the cavities of the instrument become more resonant—somewhat like the increased depth of tone provided by a larger-bodied guitar. A value of 0.0 denotes no enhancement. A value of 1.0 results in enhanced/full precision of the selected model.

  Note: Rotating Freq/Fine to the right may not actually result in much difference in your sound. It is highly dependent on several string, Waveshaper, and other parameter settings. As always, use your ears!

Global and output parameters

Sculpture global parameters in Logic Pro for iPad

Sculpture Global parameters affect the overall behavior of the instrument.



Global parameters

- *Voices knob and field:* Specify the number of voices that can be played at any one time. Sixteen voices is the maximum polyphony of Sculpture.
- *Glide Time knob and field:* Set the time required to slide from the pitch of one played note to another. The Glide parameter behavior depends on the keyboard mode you choose.
  - If you set the keyboard mode to Poly or Mono and set Glide to a value other than 0, portamento is active.
  - If you choose Legato and set Glide to a value other than 0, you need to play legato (press a new key while holding the old one) to activate portamento. If you don't play in a legato style, portamento won't work. This behavior is also known as *fingered portamento*.
- *KYBD Mode buttons:* Choose polyphonic, monophonic, and legato behaviors. A *polyphonic* instrument, such as an organ or piano, allows several notes to be played simultaneously. Many older analog synthesizers are *monophonic*, which means that only one note can be played at a time, much like a brass or reed instrument. This shouldn't be viewed as a disadvantage in any way, because it allows playing styles that are not possible with polyphonic instruments.
  - In Mono mode, staccato playing retriggers the envelope generators every time a new note is played. If you play in a legato style (play a new key while holding another), the envelope generators are triggered only for the first note you play legato. They then continue their curve until you release the last legato played key. Mono mode is also known as *multi trigger* mode.
  - Legato mode is also monophonic, but with one difference: the envelope generators are retriggered only if you play staccato—releasing each key before playing a new key. If you play in a legato style, envelopes are not retriggered. Legato mode is also known as *single trigger* mode.

Note: All modes retrigger a potentially sounding voice with the same pitch, instead of allocating a new one. Therefore, multiple triggering of a given note results in slight timbral variations, depending on the current state of the model at note-on time. If the string is still vibrating for a specific note, retriggering that same note interacts with the ongoing vibration, or current state of the string. A true retrigger of the vibrating string happens only if both Attack sliders of the amplitude envelope are set to 0. If either slider is set to any other value, a new voice is allocated with each retriggered note. See Sculpture amplitude envelope.

- *Tune knob and field:* Fine-tune the entire instrument, in cents. A cent is 1/100th of a semitone.
- *Transpose pop-up menu:* Tune the entire instrument by octaves. Given the ability of component modeling to radically alter pitch with certain settings, coarse tuning is limited to octave increments.
- *Warmth knob and field:* Slightly detune each voice to warm or thicken the sound. This parameter emulates the random fluctuations caused by the components and circuitry of analog synthesizers.
- *Bend Up/Dn sliders and fields:* Set the upward/downward pitch bend range.
  - Separate settings are available for upward and downward pitch bends—using your MIDI keyboard pitch bend controller.
  - When Bend Dn is set to "linked" (bottom position), the Bend Up slider value is used to set both the up and down bend range.

    Note: Bending the string, just like the string on a real guitar, alters the shape of the modeled string, rather than acting as a simple pitch bend.

Sculpture delay effect in Logic Pro for iPad

This is a stereo delay that can be synchronized with the project tempo. It can also run freely (unsynchronized).



Sculpture Delay effect parameters

- *Stereo Delay On/Off button:* Turn the Delay effect on or off.
- *Base Time knob and field:* Set the delay time. This can be in either musical note values—1/4, 1/4t (1/4 triplet), and so on (when Time Mode Sync button is on)—or in milliseconds (when Time Mode Free button is on).
- *Time Mode buttons:* Set either free-running (Free) or tempo-synced (Sync) delay modes.
- *LR Spread knob and field:* Adjust for wide stereo delay effects. Values above the default, centered position increase the delay time of the right delay line or decrease the delay time of the left delay line—in effect, smearing the delay times of the left and right channels. Negative values invert this effect.
- *LR Groove knob and field:* Distribute delay taps to the left/right channels rather than smearing them across channels, like the Spread parameter. Value adjustments reduce the delay time of one delay line by a given percentage, while keeping the other delay line constant.

  For example, a value of +50% reduces the right delay time by half. If a value of 1/4 was used as the Base Time, the right delay would equal 1/8th of a note and the left delay would remain at 1/4th of a note. Needless to say, this parameter is perfect for the creation of interesting rhythmic delays—in stereo.
- *Input Balance knob and field:* Move the stereo center of the Delay input to the left or right, without the loss of any signal components. This makes it ideal for ping-pong delays.
- *Feedback knob and field:* Set the amount of delay signal that is routed back from the delay unit output channels to the delay unit input channels. Negative values result in phase-inverted feedback.
- *CrossFeed knob and field:* Set the amount of delay signal that is fed from the delay unit left output channel to the right input channel, and vice versa. Negative values result in phase-inverted feedback of the crossfed signal.
- *Lf Damp slider and field:* Determine the cutoff frequency of the highpass filter at the delay line output/feedback loop.
- *Hf Damp slider and field:* Determine the cutoff frequency of the lowpass filter at the delay line output/feedback loop.
- *Output Width knob and field:* Change the stereo base of the wet signal. A value of 0.0 results in mono output. A value of 1.0 results in full stereo output—the left delay line output channel is panned hard left, and the right delay line output channel is panned hard right, but the stereo center is unaffected.

  Note: This parameter is aimed primarily at achieving pure delay grooves in both channels, without hard left/right ping-pong panning.
- *Wet Level knob and field:* Set the Delay output level.

Sculpture output parameters in Logic Pro for iPad

The integrated Level Limiter is useful for softening some of the more aggressive aspects—such as snarling or roaring sonic artifacts—that you may encounter when using Sculpture.



Output parameters

- *Level knob and field:* Set the overall output level of Sculpture.
- *Limiter Mode pop-up menu:*
  - *Off:* Turn the limiter off.
  - *Mono:* Turn on a monophonic limiter that processes the summed signal of all voices.
  - *Poly:* Turn on a polyphonic limiter that processes each voice independently.
  - *Both:* Turn on a combination of both limiter types.

Modulation

Sculpture modulation overview in Logic Pro for iPad

Sculpture is equipped with a huge number of modulation sources and targets, making it an instrument that can generate extraordinary sounds that constantly evolve, sound like audio loops, or are just plain expressive to play.

Some of the modulation sources provided are like those found on traditional synthesizer designs. These include:

- Two freely assignable LFOs, with (project) tempo-syncable rates. See Sculpture LFOs.
- A third LFO that is dedicated to vibrato—pitch modulation. See Sculpture Vibrato parameters.
- Two envelopes that can be used as standard envelopes, but which can also be used quite differently. See Sculpture envelope overview.

Sculpture also includes a number of specially designed modulation sources that are less conventional. These include:

- Two jitter generators with adjustable bandwidth—used to create random variations. See Sculpture Jitter generators.
- Two Randomizers that change values only at note start/on—perfect for emulating the lip, breath, and tongue effects of brass instrument players, for example. See Sculpture note-on random modulators.
- Two recordable envelopes that can be used as MIDI controlled modulators—with the ability to polyphonically play back on a per-voice basis, and modify incoming MIDI controller movements. See Record Sculpture envelopes.

All modulation routings—choosing a modulation target and/or via source—are made within each modulator section or in the MIDI controllers section.

LFOs

Sculpture LFOs in Logic Pro for iPad

Sculpture offers two multiwaveform LFOs. Both can be used either polyphonically, monophonically, or somewhere in-between.

If used monophonically, the modulation is identical for all voices. Imagine a scenario where a chord is played on the keyboard. If LFO 2 is used to modulate pitch, for example, the pitch of all voices in the played chord rise and fall synchronously. This is known as a phase-locked modulation.

In the same scenario, if LFO 2 is used polyphonically—to modulate multiple voices—they are *not* phase-locked.

If a random (in-between) value is used, some notes are modulated synchronously, and others are not modulated synchronously.

Furthermore, both LFOs are key-synced: Each time you play a key, the LFO modulation of this voice is started from 0.

To understand the non-phase-locked characteristic more easily, imagine a situation where a chord is played on the keyboard. If LFO 2 is used to modulate pitch, for example, the pitch of one voice might rise, the pitch of another voice might fall, and the pitch of a third voice might reach its minimum value. As you can see from this example, the modulation is independent for each voice, or note.

The key sync feature ensures that the LFO waveform cycle always starts from 0, which results in consistent modulation of each voice. If the LFO waveform cycles were not synchronized in this way, individual note modulations would be uneven.

Both LFOs can also be faded in or out automatically, courtesy of built-in envelope generators. See Modulate Sculpture LFOs.



LFO parameters

- *Waveform pop-up menu:* Choose the waveform used for LFO modulation. See Sculpture LFO waveforms.
- *Curve knob and field:* Change the shape of modulation waveforms. A pure waveform of the chosen type is active at a value of 0.0. The +1 and –1 positions deform the wave. For example, with a sine wave chosen as the LFO waveform type:
  - *Curve value of 0.0:* Wave is sine-shaped.
  - *Curve values above 0.0:* Wave is smoothly changed into a nearly rectangular wave.
  - *Curve values below 0.0:* The slope at the zero crossing is reduced, resulting in shorter soft pulses to +1 and –1.
- *Rate knob and field:* Set the rate of LFO modulation. This is either a freely definable Hz value (when the Free button is active), or a rhythmic value (when the Sync button is active). When synchronized with the project tempo, available rates range from 1/64 notes to a periodic duration of 32 bars. Triplet and punctuated values are also accessible.
- *Sync Mode buttons:* Choose either free-running (Free) or synchronized (Sync) LFO rates. These buttons interact with the Rate knob. The synchronized value is derived from the Logic Pro tempo and meter.
- *Phase Vari knob and field:* Choose between monophonic or polyphonic LFO modulations. These can have similar phases, completely random phase relationships, key-synced phases, or anything in-between.

  Tip: If you move the Phase Vari(ation) knob slightly away from the mono position, you get nonlocked modulations for all voices running at similar, but not identical, phases. This is ideal for string-section vibratos.
- *RateAmt knob and field:* Set the intensity—the amount—of LFO rate modulation.
- *Rate Mod Src pop-up menu:* Choose a modulation source for the LFO Rate parameter.
- *EG slider and field:* Set the time it takes for the LFO modulation to fade in or fade out. See Modulate Sculpture LFOs.

Sculpture LFO waveforms in Logic Pro for iPad

The LFO Waveform pop-up menus set different waveforms for the LFOs. The table outlines how these can affect your modulations.

Waveform	Comments
Sine	Ideal for constant, even, modulations.
Triangle	Well-suited for vibrato effects.
Sawtooth	Well-suited for helicopter and space gun sounds. Intense modulations of the oscillator frequencies with a negative (inverse) sawtooth wave lead to “bubbling” sounds. Intense sawtooth modulations of lowpass filter cutoff and resonance create rhythmic effects. The waveform can also be inverted, resulting in a different start point for the modulation cycle.
Rectangle	Use of the rectangular waves periodically switches the LFO between two values. The Rectangle Unipolar wave switches between a positive value and 0. The Rectangle Bipolar wave switches between a positive and a negative value set to the same amount above and below 0. An interesting effect can be achieved by modulating pitch with a suitable modulation intensity that leads to an interval of a fifth. Choose the upper rectangular wave to do this.
Sample & Hold	The three Sample & Hold (S & H) waveform settings of the LFOs output *random* values. A random value is selected at regular intervals, as defined by the LFO rate. The S & H waveform steps between randomized values (rapid switches between values). The S & H Lag setting smooths the random waveform, resulting in fluid changes to values. The S & H from CtrlA setting is controlled by the CtrlA modulation source. For example, you could assign aftertouch as the CtrlA source to trigger S & H modulation of pitch. The term *Sample & Hold* refers to the procedure of taking samples from a noise signal at regular intervals. The values of these samples are then *held* until the next *sample* is taken. *Tip:* A random modulation of pitch leads to an effect commonly referred to as a *random pitch pattern generator* or *sample and hold*. Try using very high notes, at very high rates and high intensities—you’ll recognize this well-known effect from hundreds of science fiction movies.
Filtered Noise	Can be used for chaotic modulations, but it is principally of use in conjunction with the LFO envelope function, where you would introduce a brief modulation at some point in the note phase—for example, to introduce breath in a brass emulation, or to control an organ key click or piano hammer noise. The random nature of the noise waveform means that such modulations would vary slightly each time.

Modulate Sculpture LFOs in Logic Pro for iPad

Two modulation targets can be assigned per LFO. An optional via modulation can also be assigned.

The LFOs also feature a simple envelope generator (the EG slider in each LFO section), which is used to control the time it takes for the LFO modulation to fade in or fade out. When either LFO EG slider is at a centered position, the modulation intensity is static—in other words, no fade-in or fade-out occurs.



LFO target parameters

- *Target 1/2 On/Off buttons:* Turn each LFO on or off, independently.
- *Amount 1/2 knobs and fields:* Move to set the modulation amount (when the incoming via signal is 0)— for example, when the modulation wheel is at its minimum position.
- *Target 1/2 pop-up menus:* Choose the modulation targets.
- *Via Amount 1/2 knobs and fields:* Set the maximum via modulation amount, such as when the Modulation wheel is at the maximum position, for example.
- *Via 1/2 pop-up menus:* Choose (or turn off) the via sources that control the modulation scaling for each LFO.

Set the LFO modulation fade time in Sculpture

In Logic Pro, do the following in either Sculpture LFO:

- *To fade in the modulation:* Set the EG slider to a positive value (above the center position).

  The higher the value, the longer the delay time.
- *To fade out the modulation:* Set the EG slider to a negative value.

  The lower the slider position, the shorter the fade-out time.

Set up a delayed vibrato with an LFO in Sculpture

LFO envelopes are often used for delayed vibrato—many instrumentalists and singers intonate longer notes this way. Although Sculpture has a dedicated Vibrato LFO, only LFO 1 and LFO 2 provide a built-in envelope generator.

1. In Logic Pro, set the LFO EG slider toward the top (delay) and choose pitch as the target.
2. Set a slight modulation intensity.
3. Select an LFO Rate of 5 Hz.
4. Choose the triangular wave as the LFO waveform.

Tip: Chaotic and fast modulations of pitch by an LFO source—with a delayed Sample&Hold waveform, a high Rate, and short fade-out—are ideal for emulating the attack phase of brass instruments.

Sculpture Vibrato parameters in Logic Pro for iPad

A dedicated LFO is hard-wired to pitch for vibrato effects (periodic pitch modulations). You can adjust the strength of the vibrato effect with the MIDI controller you choose from the Vibrato Ctrl pop-up menu in the MIDI Controller Assignments section.



Vibrato parameters

- *Waveform pop-up menu:* Choose the waveform used for vibrato. See Sculpture LFO waveforms.

  Note: There are two special rectangular waves that are useful for vibrato: Rectangle unipolar and Rectangle bipolar—the former switches between values of 0.0 and 1.0, and the latter switches between values of –1.0 and +1.0.

- *Curve knob and field:* Change the shape of modulation waveforms. Such variations can result in subtle or drastic changes to your modulation waveforms.

- *Rate knob and field:* Set the rate of vibrato, which can be either synced to the host application tempo or set independently in Hz values.

- *Sync Mode buttons:* Choose either a free-running (Free) or synchronized (Sync) vibrato rate. These buttons interact with the Rate knob. The synchronized value is derived from the Logic Pro tempo and meter.

- *Phase Vari knob and field:* Choose between strictly monophonic or polyphonic vibrato with variable phase relationships. These can be similar phases, completely random phase relationships, key-synced phases—or any value in between. For more details, see Sculpture LFOs.

- *Min/Max Depth sliders and fields:* Drag to define the impact of the controller assigned to Vibrato Ctrl (see Define Sculpture MIDI controllers).

  - *Min slider:* Determine the minimum modulation amount.

  - *Max slider:* Determine the maximum modulation amount.

Sculpture Jitter generators in Logic Pro for iPad

Found in the Random Variations 1/2 sections of Sculpture are two jitter generators.

These special LFO sources are designed to produce continuous, random variations—such as those of smooth bow position changes. The jitter generators are equivalent to general purpose LFOs set to a noise waveform.

Many sounds can benefit from small, random modulations to parameters. These can emulate the subtle variations that occur when particular instruments are played.

Tip: Jitter modulation of pickup positions as the target produces great chorus-like effects.



Random Variations parameters

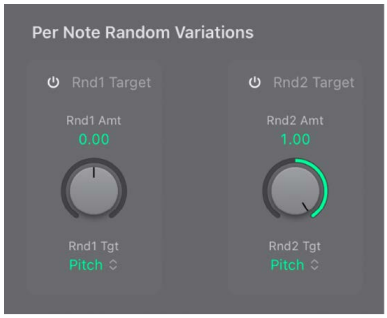
The two Random Variations sections provide two jitter generators, for a total of four potential modulators when fully utilized.

- *Jitter 1/2 Bandwidth knobs and fields:* Set the speed of the modulation (jitter) signal for each jitter generator.
- *Target 1/2 On/Off buttons:* Turn each jitter generator on or off, independently.
- *Jitter Amount 1/2 knobs and fields:* Determine the amount of modulation for each jitter source.
- *Target 1/2 pop-up menus:* Choose modulation targets for each jitter generator.

Sculpture per note random modulators in Logic Pro for iPad

The two Per Note Random Variations modulation sources are designed to introduce random variations between different notes or voices. Values are randomly generated for each note and remain constant until the voice is released.

Such randomizations are useful for adding interest or thickening the sound when you play polyphonically. Per note randomization is also useful for emulating the periodic fluctuations that a musician introduces when playing an instrument—even when repeating the same note.



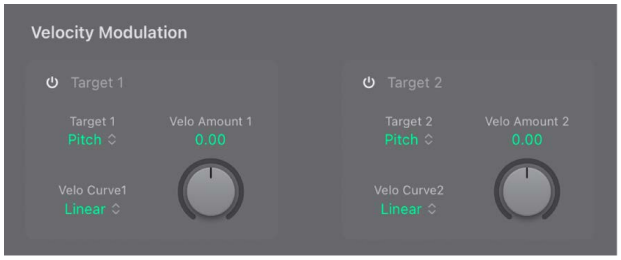
Per Note Random Variations parameters

- *Rnd1/2 Target On/Off buttons:* Turn per note random modulation on or off for each source.
- *Rnd1/2 Amt knobs and fields:* Set the amount, or strength, of modulation.
- *Rnd1/2 Tgt pop-up menus:* Choose the modulation target—the parameter that is randomly modulated when a note is played.

Sculpture velocity modulators in Logic Pro for iPad

The excite objects and the filter have dedicated velocity sensitivity controls. Many other modulation routings also allow you to select velocity as a via source.

In some cases, however, it may be useful to directly control other synthesis core parameters by velocity. This can be done in this section—where two independent target/amount/velocity curve slots are available.



Velocity Modulation parameters

- *Target 1/2 On/Off buttons:* Turn velocity modulation on or off.
- *Target 1/2 pop-up menus:* Choose the target parameter that you want to modulate with velocity.
- *Velo Curve 1/2 pop-up menus:* Choose from concave, linear, and convex velocity curves.
- *Velo Amount 1/2 knobs and fields:* Set the amount, or strength, of modulation.

MIDI Controller A and B in Sculpture in Logic Pro for iPad

These parameters each define two discrete modulation targets. The modulation intensity, or strength, is assigned to Controller A, Controller B, or both.



MIDI Controller A and B parameters

The two MIDI Controller sections provide two targets, for a total of four controllable parameters when both MIDI controllers are fully utilized.

- *Target 1/2 On/Off buttons:* Turn the controller A or B modulation sources on or off.
- *Ctrl Mode 1/2 pop-up menus:* Select either Continuous modulation, or a Sample&Hold at Note On modulation value that is updated only when a note-on message is received.
- *Ctrl Amount 1/2 knobs and fields:* Set the amount, or strength, of modulation.
- *Target 1/2 pop-up menus:* Choose the target parameter that you want to modulate with the specified controller.

Envelopes

Sculpture envelope overview in Logic Pro for iPad

Sculpture control sources include two envelopes. In traditional synthesizer designs, envelopes are used to control amplitude and filter levels over time. By comparison, Sculpture envelopes are somewhat special in that they can be used as:

- Traditional four-segment envelopes.
- MIDI controller modulations.
- A combination of both—as MIDI controller movement *recorders* with ADSR-like macro parameters, for polyphonic playback.







Control Envelope Mode parameters

The two Control Envelope sections provide two targets, for a total of four controllable parameters when both envelopes are fully utilized.

- *Ctrl/Env buttons:* Select either controller (run mode) or standard envelope behavior. If both buttons are turned on, the controller value is *added* to the envelope output, resulting in a modulation offset.

  Note: When the envelopes are used as polyphonic modulation recorders and playback units, each voice is handled independently, with a separate envelope being triggered as each note is played.

- *Record Enable button:* Start or stop envelope recording. Recording can also be stopped using the trigger mode function described below.

- *Record Trigger pop-up menu:* Choose different record trigger modes to start and stop recording when the Record Enable button is active.

  - *NoteOn:* Recording starts when a note is played.
  - *Note + Ctrl Movement:* Recording starts when MIDI control change messages arrive while a note is held (for information about assigned MIDI controllers, see Define Sculpture MIDI controllers.
  - *Note + Sustain Pedal:* Recording starts when the sustain pedal is depressed while a note is held.

Control Envelope Level, Time, and Curve parameters

The following parameters are active only if the envelope is engaged (either the Env or both the Ctrl and Env buttons are active).

The maximum time/length of the envelope is 48 bars/40 seconds.

You can create your own envelopes manually by manipulating the Level slider and Time knob values, or you can record an envelope, as discussed in Record Sculpture envelopes.

- *TimeScale knob and field:* Scale the duration of the entire envelope between 10% (ten times faster) and 1000% (ten times slower). This also affects the appearance of the envelope curve displayed as it is shortened (sped up) or lengthened (slowed down).

- *Attack Velosens knob and field:* Set velocity sensitivity for the attack phase of the envelope. Positive values reduce the attack time at lower velocities. Negative values reduce the attack time at higher velocities.

- *Time Mode buttons:* Select either a free-running envelope (Free) or a tempo-synced (Sync) envelope with note value options, such as 1/8 or 1/4.

  Note: Switching between values forces a recalculation of times to the nearest note value or ms time, respectively, based on the current project tempo.

- *Level 0-4 sliders and fields:* When an envelope is first engaged, a default envelope curve is automatically created, containing several control points and segments. You can use the Level sliders to set the amount of each envelope segment. Each segment has a corresponding time control, except the Start segment (Level 0 slider), which is always positioned at the envelope start point.

  - *Level 0 slider:* Set the envelope Start value.
  - *Level 1 slider:* Set the envelope Attack value.

- *Level 2 slider:* Set the envelope Loop value.
- *Level 3 slider:* Set the envelope Sustain value.
- *Level 4 slider:* Set the envelope End value.

- *Time 1-4 knobs and fields:* Set the duration of each envelope segment. As you change values, the overall length of the envelope changes—with all following control point times and segments being moved.

  Note: You cannot move a control point beyond the position of the preceding control point. You can, however, move control points beyond the position of the following one—effectively lengthening both the envelope segment and the overall envelope.

  - *Time 1 knob:* Set the envelope Attack time.
  - *Time 2 knob:* Set the envelope Loop time position.
  - *Time 3 knob:* Set the envelope Sustain time position.
  - *Time 4 knob:* Set the envelope End time position.
- *Curve 1-4 fields:* Drag vertically to create a curved shape between envelope control points for the corresponding segment, rather than straight lines.

Control Envelope Loop and Sustain parameters

- *Sustain Point knob and field:* Set one of the envelope control points as the sustain point.
- *Loop Point knob and field:* Set one of the envelope control points as the loop point.
- *Sustain Mode pop-up menu:* Choose the behavior of the envelope while a note is held. Choices are Sustain mode (default), Finish mode, and three loop modes—Loop Forward, Loop Backward, and Loop Alternate. See Loop Sculpture envelopes.

Control Envelope Target and Source parameters

- *Target 1/2 On/Off buttons:* Turn the control envelope 1 and 2 modulation sources on or off.
- *Amount 1/2 knobs and fields:* Set the modulation amount when the incoming via signal is 0, such as when the modulation wheel is at its minimum position, for example.
- *Target 1/2 pop-up menus:* Choose modulation targets 1 and 2. Two targets can be assigned per envelope, with an optional via modulation.
- *Via Amount 1/2 knobs and fields:* Set the modulation amount when the incoming via signal is at full level, such as when the modulation wheel is at its maximum position, for example.
- *Via 1/2 pop-up menus:* Choose the modulation source used to scale the amount of envelope modulation. Source options include Off, Velocity Concave, Velocity, Velocity Convex, KeyScale, Ctrl A, and Ctrl B.

Loop Sculpture envelopes in Logic Pro for iPad

The envelope can run in one-shot mode, like any envelope—the envelope stages run for as long as the note is held. It can also run through each phase several times or in an infinite cycle, much like an LFO. You can achieve this through the use of loops.

You can synchronize loops to the project tempo automatically by using the Sync and Free buttons.

When in any of the loop modes, the loop always cycles between the control point you have set as the Loop start point and the Sustain point.

Your selection in the Sustain Mode pop-up menu changes looping behavior in the following ways:

- When set to Finish, the envelope runs in one-shot mode from beginning to end—even if the note is released before all envelope stages have completed. The other loop parameters are unavailable.
- When set to Loop Forward, the envelope runs to the Sustain point, and begins to periodically repeat the section between the Loop and Sustain points—always in a forward direction.
- When set to Loop Backward, the envelope runs to the Sustain point, and begins to periodically repeat the section between the Sustain and Loop points—always in a backward direction.
- When set to Loop Alternate, the envelope runs to the Sustain point, then periodically returns to the Loop point and back to the Sustain point, alternating in both a backward and forward direction.

Note: If the control point you have set as the Loop point lies after the Sustain point time position, the loop starts after the key is released.

Record Sculpture envelopes in Logic Pro for iPad

It is important to note that you can only record the movements of the assigned MIDI controller. MIDI controller assignments for the envelopes must be set in the MIDI Controller Assignment section at the bottom of the Sculpture interface (see Define Sculpture MIDI controllers).

Record an envelope in Sculpture

1. In Logic Pro, choose a Record Trigger Mode, such as Note + Ctrl.
2. Tap the Record Enable button to start recording.
3. Play, and hold, a key—and start moving the controllers assigned to envelope controls 1 or 2 or both, such as the modulation wheel.

Stop an envelope recording in Sculpture

In Logic Pro, do one of the following:

- Tap the Record Enable button to disengage it.
- Release all *voices*.
- Play a new note after releasing all *keys*.

Note: When a controller movement has been recorded, the Record Enable button is automatically turned off and Record Trigger Mode is set to Env. This ensures that only the recorded movement is active, regardless of the stop position of the recorded controller.

Play a recorded envelope in Sculpture

- In Logic Pro, play a key to begin polyphonic playback of the recorded envelope.

Note: The Record Trigger Mode parameter must be set to Env and the Record Enable button must be off.

You can also turn on both the Env and Ctrl buttons, which lets you use controllers assigned to Ctrl Env1 or Ctrl Env2 to manipulate the envelope in real time, alongside playback of the recorded envelope.

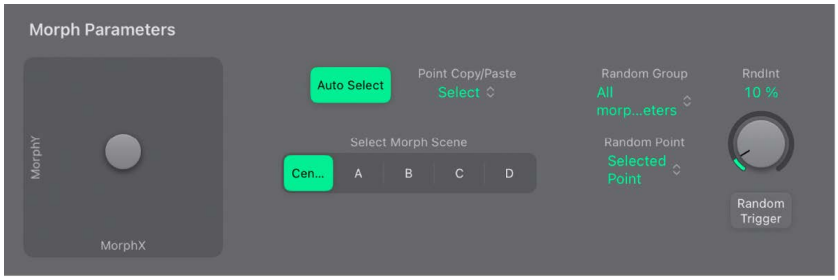
Note: When both Env and Ctrl are turned on, the controller value is added to the envelope output, resulting in a modulation offset.

Morph features

Sculpture morph overview in Logic Pro for iPad

Sculpture has a number of *morphable* parameters that can be independently adjusted and stored with a morph point. In essence, the values of all morphable parameters are captured at a particular moment in time, much like a photograph. You can smoothly change the sound—in a subtle or radical way—by transitioning between up to five morph points.

The Morph Parameters and Morph Envelope allow you to create, and precisely control, the movements and blending between morph points.



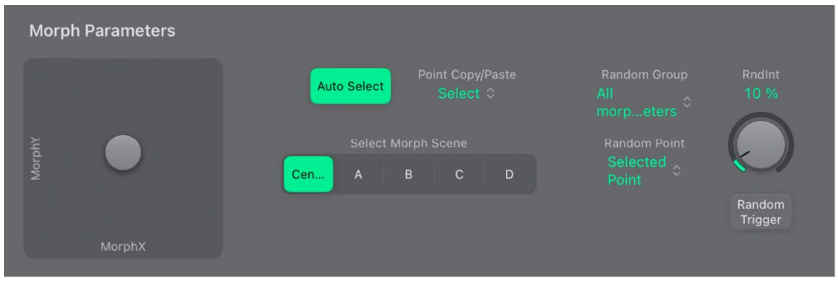
The morphing features of Sculpture are spread across two interface sections:

- *Morph Parameters:* There are five morph points, or “scenes”, that are assigned to the four corners—A,B,C,D—and the center of the Morph Pad. A number of menu options are also available for randomizing, copying, and pasting morph points or Morph Pad states.
- *Morph Envelope:* Use to edit morph points—either onscreen or with recorded MIDI controller movements. For example, you could use a vector stick (Morph X/Y controllers) or drag the gray dots on the Morph Envelope pads.

Morph Parameters in Logic Pro for iPad

One of the five Morph Pad points—Cen(ter), A, B, C, or D—is always selected for editing.

The current morph point position is indicated by the gray dot in the Morph Pad. This can be moved with MIDI controllers, such as a vector stick, or with your finger. Movements can be recorded and played back independently—with each voice being morphed in a different way.



Morph Parameters

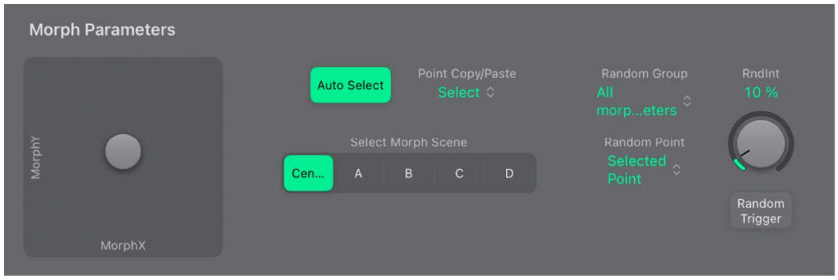
- *Morph Pad:* Indicates the current morph position. Drag the gray dot to change.
- *Auto Select button:* Turn on to automatically select the nearest morph point—Cen(ter), A, B, C, or D—when you move the gray dot in the Morph Pad.
- *Point Copy/Paste pop-up menu:* Choose a menu command to copy, paste, or exchange morph points between morph positions (scenes).
  - *Copy selected Point:* Copies the current morph point into the Clipboard.
  - *Copy current Pad Position:* Copies the current morph state into the Clipboard.
  - *Paste to selected Point:* Pastes the Clipboard content to the selected point.
  - *Exchange selected Point:* Swaps previously copied data with the selected point.
  - *Paste to all Points:* Pastes the Clipboard content to all selected points.
- *Select Morph Scene buttons:* Tap the Cen(ter), A, B, C, or D buttons to manually select a Morph Pad point.

Randomize Sculpture morphs in Logic Pro for iPad

The randomize feature creates random variations of selected morph points. When combined with the copy/paste functions, randomizing lends itself to using the Morph Pad as an automatic sound generator.

Use of the Morph Pad can yield interesting composite sounds—hybrids of the original and morphed sound. You can copy this hybrid sound to a corner of the Morph Pad, or to multiple corners, and randomize it by a definable amount. The morphed sound then becomes a new timbral element that can, in turn, be moved to the corners, randomized, and so on.

In effect, you're "breeding" a sound, while maintaining some control by selecting parent and child sounds. This approach can result in new, complex sounds—even if your sound programming knowledge is limited.



Morph Randomize parameters

- *Random Group pop-up menu:* Limit the type of morphable parameters that are affected by randomization.
  - *All morphable parameters:* Randomizes all parameters in the following groups, which can lead to unusual sounds. This can lead to some interesting results, but it is uncontrolled, making it unsuitable for the “sound breeding” idea.
  - *All except TensMod:* Identical to All morphable parameters, but excludes the TensionMod parameter from randomization.
  - *String Material/Media:* Includes the Material Pad position, Stiffness, Inner Loss, Media Loss, Resolution, and Tension Modulation parameters for randomization.
  - *Objects&Pickups:* Alters the positions of objects and pickups, plus various object parameters, when randomization is used.
  - *Waveshaper&Filter:* Alters the positions of all Waveshaper and filter parameters when randomization is used.
- *Random Point pop-up menu:* Choose the morph points (or edges) you want to randomize.
- *RndInt knob and field:* Set the amount of randomization from 1% (slight deviation) to 100% (completely random values).
- *Random Trigger button:* Create randomized values for all parameters of the chosen morph points.

Randomize morph points in Sculpture

This example provides a general approach you can follow for morph point randomization.

1. In Logic Pro, tap a Morph Scene button (Cen(ter), A, B, C, or D).
2. Tap the Auto Select button.
3. Set the RndInt (Random Intensity) knob to a value of 25%.
4. Tap the Random Trigger button.
5. Drag the gray dot to each corner in the Morph Pad. Do this along the edges and through the center of the Morph Pad.

   Note how this affects the morph.
6. Strike a few notes on your MIDI keyboard while dragging the gray dot.

Note that positions on the Morph Pad that fall in between the various morph points cause the randomized parameters to interpolate between values. You can use the Copy and Paste commands to make use of these in-between values.

Sculpture Morph Envelope in Logic Pro for iPad

The Morph Envelope contains nine control points and eight time segments. Its recording behavior is similar to the controller envelopes.

- The maximum time/length of the Morph Envelope is 48 bars/40 seconds.
- You can create your own envelopes manually by changing Morph Envelope parameter values, or you can record an envelope. See Record Morph Envelopes.
- You can run the Morph Envelope as you would with any envelope while the note is sustained. You can also run it several times, or in an infinite cycle, much like an LFO. See Morph Envelope sustain and loop.



Morph Envelope parameters

- *Morph Control Pad/Env buttons:* Turn on the Morph Envelope.
  - *Both buttons off:* Morph function is turned off.
  - *Only Morph Control Pad button on:* Morphing is controlled by the gray dot in the Morph Pad or X/Y MIDI controllers only.
  - *Only Morph Control Env button on:* Morph envelope is running, but the gray dot in the Morph Pad and X/Y MIDI controllers are deactivated.
  - *Both Morph Control Env + Pad buttons on:* Morph envelope is running, and the position of the gray dot in the Morph Pad or X/Y MIDI controllers is used as an offset for any envelope movements.
- *Morph Pad Mode pop-up menu:* Choose a Morph Envelope mode when both Morph Control Env + Pad buttons are active.
  - *Offset:* The default mode. Envelope is running, and the position of the gray dot in the Morph Pad or X/Y MIDI controllers is used as an offset for any envelope movements.

    - *Point Set:* Envelope is running. The selected envelope point can be edited by moving the gray dot in the Morph Pad or with a MIDI controller (MorphX and MorphY Controller Assignments).
    - *Point Solo:* Envelope is in a kind of *snapshot* mode. The selected envelope point can be edited by moving the gray dot in the Morph Pad.
- *Morph Record Enable button:* Arm the morph envelope for recording. See Record Morph Envelopes.
- *MrReT pop-up menu:* Choose the event type that triggers recording.
    - *NoteOn:* Recording starts when a note is played.
    - *Note + Move Morph Point:* Recording starts when MIDI control change messages (as assigned in the Morph X and Y parameters of the MIDI controller section) arrive while a note is held.
    - *Note + Sustain Pedal:* Recording starts when the sustain pedal is depressed while a note is held.
- *Time Mode buttons:* Select either a free-running (Free) envelope or a tempo-synced envelope (Sync) with note value options, such as 1/8 or 1/4.

  Note: Switching between values forces a recalculation of times to the nearest note value or time value (shown in msec), based on the current project tempo.
- *TimeScale knob and field:* Scale the duration of the entire envelope between 10% (ten times faster) and 1000% (ten times slower).
- *Time 1-8 knobs and fields:* Set the duration of each morph envelope segment. As you change values, the overall length of the envelope changes—with all following control point times and segments being moved.

  Note: You cannot move a control point beyond the position of the preceding control point. You can, however, move control points beyond the position of the following one—effectively lengthening both the envelope segment and the overall envelope.
- *Morph Envelope XY pads 0-8:* Drag the gray dot to set the morph envelope level at the corresponding morph envelope time. Morph Envelope XY pad 0 represents the starting level at the beginning of the morph envelope, so has no corresponding Time knob parameter.
- *Depth knob and field:* Scale the amount of morph movement caused by the Morph Envelope. As you increase or decrease the value, the morph trajectory is also scaled.
- *DM Amount knob and field:* Set the intensity of Morph Envelope movements within the scaled range set with the Depth knob.
- *Depth Mod source pop-up menu:* Choose a modulation source that is used to control the intensity of Morph Envelope movements.
- *Trans Shape knob and field:* Control transitions between morph control points (gray dot positions in Morph Envelope XY pads 0-8). This can be the original (possibly recorded) movement, linear, or stepped transitions. The latter remains at one morph state and then abruptly switches to another morph state at the following envelope control point. This parameter (and the Morph Envelope itself) can lead to interesting, evolving sounds, or even rhythmic patches.

Sculpture Morph Envelope sustain and loop in Logic Pro for iPad

The Sustain Mode pop-up menu lets you choose one of the following modes: Sustain, Finish, Loop Forward, Loop Backward, Loop Alternate, and Scan via CtrlB.

When in any of the loop modes, the loop cycles between the Loop and Sustain points that you set with the Sustain Point and Loop Point controls. The Morph Envelope can, like any envelope, run in one-shot mode—it runs normally, for as long as the note is sustained. It can also run several times, or in an infinite cycle, much like an LFO. You can achieve the latter through the use of loops.



Morph Envelope Sustain and Loop parameters

- *Sustain Point knob and field:* Set one of the morph envelope control points (gray dot positions in Morph Envelope XY pads 0-8) as the Sustain point.
- *Loop Point knob and field:* Set one of the morph envelope control points (gray dot positions in Morph Envelope XY pads 0-8) as the Loop point.
- *Sustain Mode pop-up menu:* Choose the behavior of the Morph Envelope while a note is held. See Morph Envelope Sustain and loop.
  - *Finish:* The Morph Envelope runs in one-shot mode from its beginning to its end—even if the note is released before the envelope has completed. The other loop parameters are unavailable.
  - *Loop Forward:* The Morph Envelope runs to the Sustain point (set with the Sustain Point knob) and begins to repeat the section between the Loop point (set with the Loop Point knob) and Sustain point periodically—always in a forward direction.
  - *Loop Backward:* The Morph Envelope runs to the Sustain point and begins to repeat the section between the Sustain point and Loop point periodically—always in a backward direction.

- *Loop Alternate:* The Morph Envelope runs to the Sustain point and returns to the Loop point and back to the Sustain point periodically, alternating in both a backward and forward direction.
- *Scan via CtrlB:* The timeline position within the Morph Envelope is disconnected from normal, real-time operation, enabling you to manually scan the overall time range with the MIDI controller assigned to Ctrl B (in the MIDI controllers section).

  Note: If one of the three loop modes is selected, and the Loop point is positioned *before* the Sustain point, the loop remains active until the key is released. Following key release, the envelope then continues beyond the Sustain point, as usual. If the Loop point is positioned *after* the Sustain point, the loop begins as soon as the key is released, and cycles continuously until the complete voice has finished the amplitude envelope release phase.

Record Morph Envelopes in Sculpture in Logic Pro for iPad

This section outlines the steps needed to record a Morph Envelope.

Choose a record trigger mode in the Sculpture Morph Envelope

- In Logic Pro, tap the MrReT pop-up menu to choose one of the following trigger modes to start recording when the Morph Record Enable button is turned on:
  - *NoteOn:* Recording starts when a note is played.
  - *Note + Move Morph Point:* Recording starts when MIDI control change messages (as assigned in the Morph X and Y parameters of the MIDI controller section) arrive while a note is held.
  - *Note + Sustain Pedal:* Recording starts when the sustain pedal is depressed while a note is held.

Record a Morph Envelope in Sculpture

1. In Logic Pro, choose a trigger mode from the MrReT pop-up menu if you don't want to use the Morph Pad.

   Skip this step if using the Morph Pad.
2. Tap the Morph Record Enable button to activate the morph envelope record function.
3. Play a note on your MIDI keyboard, and do either of the following:
   - Drag the gray dot in the Morph Pad.
   - Move an external controller (see Define Sculpture MIDI controllers).

Following the recording of a controller movement, the Morph Record Enable button is automatically turned off and the Morph Control Env button is activated. This ensures that only the recorded movement is active, regardless of the controller position or further movements after you finish recording.

Note: The mode defaults to Morph Control Pad as soon as you tap the Record Enable button. See Morph Envelope parameters.

Stop a morph envelope recording in Sculpture

In Logic Pro, do one of the following:

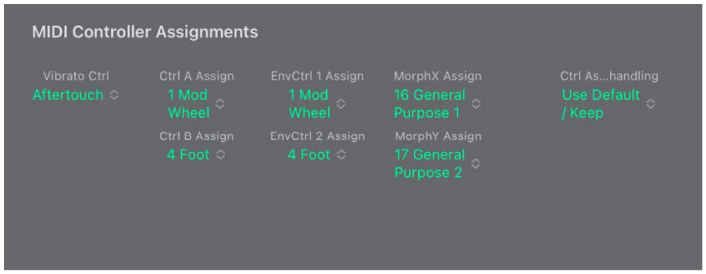
- Tap the Morph Record Enable button (or trigger) a second time.
- Release all keys, and allow all voices to complete their decay phase. This automatically ends the recording.

Note: You can stop recording early, before the decay phase completes, by releasing all keys and then pressing a single key.

Sculpture MIDI controllers in Logic Pro for iPad

Parameters at the bottom of the Sculpture interface let you define MIDI controllers—for vibrato depth control or Morph Pad movements, for example. You can use any MIDI controller shown in the menus for these control sources.

These parameters are saved with each setting. They are updated only if the default setting that is loaded on instantiating the plug-in is used, or if the setting was saved with a project. This approach helps you to adapt all MIDI controllers to the keyboard without having to edit and save each setting separately.



MIDI controller parameters

- *Vibrato Ctrl pop-up menu:* Choose the MIDI controller used for vibrato depth control.
- *Ctrl A/B Assign pop-up menus:* Choose two controllers that can be used for side chain modulations or as via modulation sources, as set in the CtrlA and CtrlB modulation routing panes.
- *EnvCtrl 1/2 Assign pop-up menus:* Choose controller assignments for the two control envelopes, which can be used as a modulation signal or an offset. Offsets occur in cases where the control envelope is set to Ctrl only or Ctrl+Env modes. These assignment pop-up menus also define the source for recording controller movements.
- *Morph X/Y Assign pop-up menus:* Choose controller assignments for the x and y coordinates of the Morph Pad. After they are assigned, the controller can be used to manually move the morph point, program single Morph Envelope points, shift the entire Morph Envelope, and serve as a source for recording morph movements.
- *Ctrl Ass(ignment) handling menu:* Choose either the default MIDI controller assignments or controller assignments loaded from the setting. If you choose Use Default, assignments remain unchanged. If you choose Load From Setting, you use the controller assignments you saved with the setting. (The default assignments are taken from the #default.pst setting, if it exists, which is loaded when Sculpture is inserted into an instrument channel strip.)

MIDI Mono Mode (MPE) parameters

- *MIDI Mono Mode pop-up menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16).

  In either mode, each voice receives on a different MIDI channel. Per-voice channels support pitchbend, aftertouch, mod wheel, Vibrato Depth Ctrl, and Ctrl A and Ctrl B assignment messages. Controllers and MIDI messages sent on the base channel affect all voices.

- *Pitch Bend Ran(ge) knob and field:* Set a value from 0 to 96.

  The chosen pitch bend range affects individual note pitch bend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar to MIDI converters use this range by default.

  In certain situations, such as when sliding over a wider range in Mono Mode or applying pitch bend upwards after already dynamically modulating string stiffness to higher values, the resulting pitch may not precisely track the incoming pitch bend beyond a specific threshold. This behavior is intentional, aimed at maintaining model stability while still permitting extreme adjustments of model parameters for innovative sound design purposes. Unlike the Mono Mode PB Range, the standard Bend Range Up is actually used to determine an appropriate safety margin so that notes can still be precisely pitched up by the corresponding amount. As a result, the standard Bend Range Up setting can be used to ensure a specific upward bend range even when operating in MIDI Mono Mode.

Learn a MIDI controller assignment in Sculpture

1. In Logic Pro, open a controller assignment pop-up menu, and choose the -Learn- item.
2. Move the controller on your MIDI keyboard or MIDI controller.

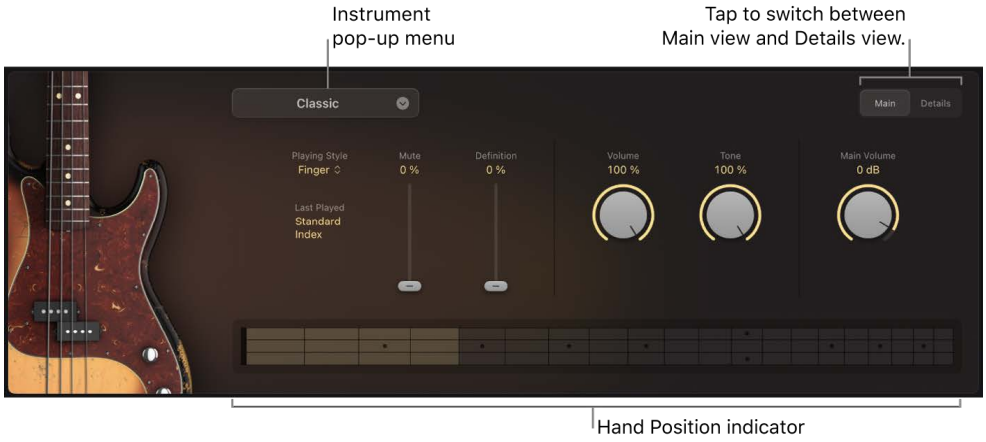
   Note: If no suitable MIDI message is received within 20 seconds, the selected control reverts to the previous value/assignment.

Studio Bass

Studio Bass in Logic Pro for iPad

The studio instruments are high-quality multisampled players that offer a collection of solo and grouped instrument presets. See Studio Piano, Studio Strings, and Studio Horns.

Studio Bass is a highly expressive sample-based software instrument that emulates the sound of several electric basses and an upright acoustic bass, each with their own sonic characteristics. It's optimized for use with the Bass Player, but it also works with MIDI and pattern regions. You can also use a MIDI keyboard to play and record with Studio Bass.



If you're new to using plug-ins in Logic Pro for iPad, see Add, replace, reorder, and remove plug-ins in the Plug-ins area.

Studio Bass contains parameters for volume, tone, pickup controls, and other sonic characteristics typical of the selected bass instrument. See Studio Bass Main view and Studio Bass Details view.

As with a real bass instrument, notes played with Studio Bass can have different tonal qualities depending on their neck position. When a note is played, Studio Bass provides visual feedback by indicating the positions of the hand and notes in the area resembling a fretboard at the bottom of the plug-in window. You can influence these positions through the use of MIDI Out channels. See Studio Bass string and position MIDI channels.

You can use articulations with Studio Bass to create expressive, nuanced performances and recordings. When you load a Studio Bass instrument patch from the browser, an articulation set is automatically loaded. There are separate articulation sets for each playing style of the electric bass instruments, and one for the American Upright instrument. You can access them in the Articulation pop-up menu in the plug-in header and in the Piano Roll Editor. See Patches overview and Set the articulation IDs in the Piano Roll Editor.

When performing or recording with Studio Bass, you can use a keyswitch map for the current articulation set to change articulations as you play. See Studio Bass keyswitch mapping.

Choose a bass instrument

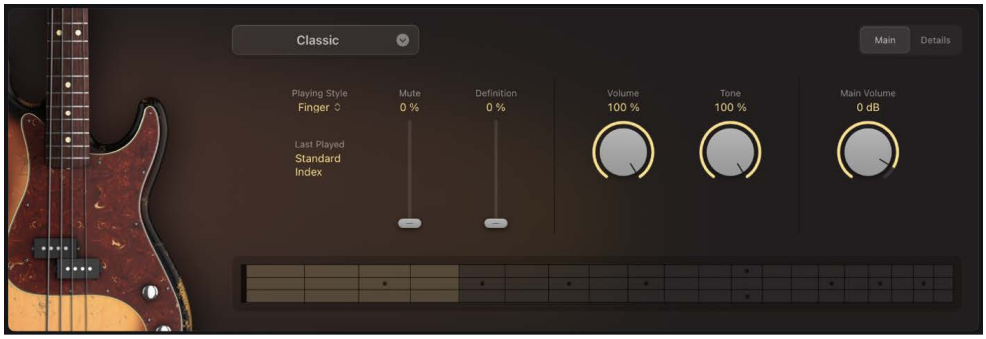
- Tap the Instrument pop-up menu in Studio Bass and choose one of the following:
  - *Classic:* A vintage electric bass heard on some of the earliest country and rock recordings.
  - *Sixties:* A hollow-bodied bass with flat-wound strings and rich, round tone.
  - *Rock:* A solid bass with a punchy and aggressive sound with rich overtones.
  - *Session:* A studio workhorse with a wide variety of tones thanks to its ability to blend both pickups.
  - *Modern:* A combination of a humbucker pickup and a two-band EQ providing a tight and versatile sound.
  - *American Upright:* A timeless acoustic sound full of rich and natural tones.

Switch between the Main and Details view

- In the upper-right corner of the Studio Bass plug-in window, tap Main or Details.

Studio Bass Main view in Logic Pro for iPad

The Main view for Studio Bass in Logic Pro for iPad contains parameters for the playing style and various controls for tone and volume. With the exception of the American Upright, each bass instrument has its own set of pickup controls.



Common parameters

- *Playing Style pop-up menu:* Choose the hand playing style for the bass instrument.
  - *Finger:* Play the bass with fingers.
  - *Pick:* Play the bass with a pick.
  - *Slap:* Play the bass in a funky slap style. The Slap playing style is available only for the Classic and Modern bass instruments.

  The Playing Style parameter is not available for the American Upright bass.
- *Mute slider:* Control the degree to which the bass strings are muted.

  The Mute slider is not available for the American Upright bass.
- *Definition slider:* Control level of transient attacks on the strings.

- The Definition slider is not available for the American Upright bass.
- *Last Played field:* Displays the most recently used articulation. This may be different from the articulation shown in the plug-in header. See Set the articulation IDs in the Piano Roll Editor.
- *Main Volume:* Set the output level of the instrument.

Classic bass parameters

- *Volume knob:* Set the pickup volume.
- *Tone knob:* Set the tone of the pickup.

Sixties bass parameters

- *Neck Volume knob:* Set the volume of the neck pickup.
- *Bridge Volume knob:* Set the volume of the bridge pickup.
- *Rhythm/Solo switch:* In the Rhythm position, lower frequencies are boosted. In the Solo position, higher frequencies are boosted.
- *Bass switch:* Turns the bridge pickup on or off.
- *Treble switch:* Turns the neck pickup on or off.

Rock bass parameters

- *Neck Volume knob:* Set the volume of the neck pickup.
- *Bridge Volume knob:* Set the volume of the bridge pickup.
- *Neck Tone knob:* Set the tone of the neck pickup.
- *Bridge Tone knob:* Set the tone of the bridge pickup.
- *Pickup pop-up menu:* Choose a pickup configuration.
  - *Neck:* Only the output of the neck pickup is heard.
  - *Both:* The outputs of the bridge and neck pickups are blended together.
  - *Bridge:* Only the output of the bridge pickup is heard.
  - *Stereo:* The output of the bridge pickup is in the right channel, and the output of the neck pickup is in the left channel. You can use plug-ins in dual mono mode to apply different effect settings to each channel.

Session bass parameters

- *Neck Volume knob:* Set the volume of the neck pickup.
- *Bridge Volume knob:* Set the volume of the bridge pickup.
- *Tone knob:* Set the tone of the pickups.

Modern bass parameters

- *Volume knob:* Set the pickup volume.
- *Bass knob:* Raise or lower the bass frequencies in the tone.
- *Treble knob:* Raise or lower the treble frequencies in the tone.

American Upright bass parameters

- *Growl:* Controls the volume of upper harmonics created by the string resonating against the fingerboard.
- *Growl Attack:* Controls the time it takes for the growl to become audible. Longer notes have longer growl attacks, higher notes have faster growl attacks.
- *Noises:* Increases the probability of various instrument noises such rattles, buzzes, and crackles, based on velocity and on what note you play. This parameter is a submix of the Rattles, Releases, and Handling levels in the Studio Bass details parameters.

Studio Bass Details view in Logic Pro for iPad

In Logic Pro for iPad, the Studio Bass details parameters let you add portamento slides between notes and adjust sonic qualities of the bass such as the noise of fingers, strings, and electric circuits. You can also choose between mono and polyphonic voice settings and set the prevalence of open string tones in your performance.



Portamento parameters

- *Portamento knob:* Set the time it takes to slide from one note to another.
- *Tempo Sync button:* When turned on, the portamento time is set to note values instead of milliseconds.

Noise Parameters

- Electric basses:
  - *Scrapes slider:* Set the volume of the sound of the pick scraping on the strings. This control is only available when the Playing Style parameter in the Main view is set to Pick.
  - *String Noise slider:* Set the volume of the sound of the hand moving on the strings.
  - *Hum & Hiss slider:* Set volume of the electronic circuit that is characteristic of each bass instrument.
  - *Release Noise slider:* Set the volume of the sound that occurs when the finger dampens the note.

- American Upright bass:
  - *Rattles slider:* Set the volume of resonant vibrations characteristic of upright bass instruments.
  - *Releases slider:* Set the volume of the sound that occurs when the finger dampens the note.
  - *Handling slider:* Set the volume of hands moving and changing their position on the instrument.

Pitch, Voice Mode, and Open String parameters

- *PitchBend Up value:* Set the upward pitch bend range in semitone steps.
- *PitchBend Down value:* Set the downward pitch bend range in semitone steps.
- *Voice Mode pop-up menu:* Choose polyphonic or monophonic behaviors.
  - *Polyphonic:* Multiple notes can be played at the same time.
  - *Monophonic:* Only one note can play at a time.
  - *Mono per String:* Only one note per string can play at a time, limited to four notes.
- *Open Strings pop-up menu:* Choose how or if notes on open strings are played.
  - *Use:* Play notes on open strings if they are near the current playing position.
  - *Avoid:* If possible, don't play notes on open strings.
  - *Prefer:* Play notes on open strings if available.

Mute Controller

- *Mute Controller:* Choose a MIDI controller to adjust the Mute parameter in the Main view.

  The Mute Controller parameter is not available for the American Upright bass.

Studio Bass keyswitch mapping in Logic Pro for iPad

This section outlines the articulations of the Studio Bass instruments.

When you load a Studio Bass instrument patch from the browser, an articulation set is automatically loaded. There are separate articulation sets for each playing style of the electric bass instruments, and one for the American Upright instrument. Each articulation set contains keyswitches that let you switch articulations by triggering specific MIDI notes. This lets you add legato or slides, for example, to a bass line in realtime.

In order to use keyswitches, you need to turn on the MIDI Remote switch in the Articulation Switches MIDI settings.

The table shows the default keyswitch mapping, starting from C-1 (MIDI note number 12).

Note: Some articulation IDs differ for the American Upright. In such cases, use the second number in the Articulations ID field.

Key	MIDI Note #	Articulation ID	Finger	Pick	Slap	American Upright
C-1	12	1	All (Auto)	All (Auto)	All (Auto)	All (Auto)
C#-1	13	2	Index/Middle (Auto)	Down/Up (Auto)	Slap/Pop (Auto)	Standard
D-1	14	44/52	Index Only	Down Only	Slap Only	Pickup Note
Eb-1	15	3	Legato (HammerOn/ PullOff)	Legato (HammerOn/ PullOff)	Legato (HammerOn/ PullOff)	Legato (HammerOn/ PullOff)
E-1	16	45/57	Middle Only	Up Only	Pop Only	Slap
F-1	17	4	Dead Note	Dead Note	Dead Note	Dead Note
F#-1	18	6	Dead Note Harmonic	Dead Note Harmonic	Dead Note Harmonic	Dead Note Harmonic
G-1	19	5	Harmonic	Harmonic	Harmonic	Harmonic
G#-1	20	56/58	Pickup Hit Single	Pickup Hit Single	Pickup Hit Single	Left Hand Pat
A-1	21	12	Slide by Velocity	Slide by Velocity	Slide by Velocity	Slide by Velocity
Bb-1	22	57/59	Pickup Hit All	Pickup Hit All	Pickup Hit All	Body Tap
B-1	23	37	Slide In +2	Slide In +2	Slide In +2 Pop	Slide In +2

Studio Bass string and position MIDI Out channels in Logic Pro for iPad

Just like with a real bass instrument, notes you play with Studio Bass have different tonal qualities when played on different strings and at different positions on the neck. When playing the Studio Bass in Logic Pro for iPad, you can use different MIDI Out channels to influence the preferred neck position and string of the notes you play. You can set the MIDI Out channel in the Track inspector for the track where Studio Bass is loaded.

MIDI Out Channel	Function	Description
1	Auto	This chooses the most natural-sounding neck position for the played note.
2	Prefer the E string.	Notes are played on E-string if available. If a note is not playable on the preferred string, it is played on another one based on the current position.
3	Prefer the A string.	Notes are played on A-string if available. If a note is not playable on the preferred string, it is played on another one based on the current position.

MIDI Out Channel	Function	Description
4	Prefer the D string.	Notes are played on D-string if available. If a note is not playable on the preferred string, it is played on another one based on the current position.
5	Prefer the G string.	Notes are played on G-string if available. If a note is not playable on the preferred string, it is played on another one based on the current position.
7	Move the hand position to the bottom of the neck.	If a note is not playable in this position on any string, the position is moved to the closest alternative.
8	Move the hand position to the 3rd fret.	If a note is not playable in this position on any string, the position is moved to the closest alternative.
9	Move the hand position to the 5th fret.	If a note is not playable in this position on any string, the position is moved to the closest alternative.
10	Move the hand position to the 7th fret.	If a note is not playable in this position on any string, the position is moved to the closest alternative.
11	Move the hand position to the 9th fret.	If a note is not playable in this position on any string, the position is moved to the closest alternative.
12	Move the hand position to the 12th fret.	If a note is not playable in this position on any string, the position is moved to the closest alternative.
13	Prefer notes played on the E and A strings.	If a note is not playable on either of the preferred strings, the position is moved to the closest alternative.
14	Prefer notes played on the D and G strings.	If a note is not playable on either of the preferred strings, the position is moved to the closest alternative.

Studio Horns

Studio Horns in Logic Pro for iPad

The studio instruments are high-quality multisampled players that offer a collection of solo and grouped instrument presets. See Studio Bass, Studio Piano, and Studio Strings.

Studio Horns provides a collection of highly expressive single and section brass instruments. It provides controls that let you customize Studio Horns to match your preferences and to work best with your controllers. See Studio Horns details parameters.

Studio Horns instruments feature a large collection of samples that cover different playing styles, such as sustain, staccato, or falls. These playing styles, called articulations, are accessed from the Articulation pop-up menu in the plug-in menu bar. You can also switch articulations remotely with keyswitches.

Default section and single instrument keyswitches are covered in Studio Horns keyswitch mapping.

To add Studio Horns to your project, choose it from the Instrument > Studio Instruments submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Studio Horns Instrument parameters

The parameters shown in the plug-in change when a solo or section instrument is chosen.

- *Instrument pop-up menu:* Choose a solo or section instrument.

  You can use MIDI channel events to control section instruments. If you want to play specific instruments in a section, you can send MIDI messages on their respective channels, then add a list of channel assignments. See Studio Horns section MIDI channels.

- *Last Played field:* Displays the most recently used articulation.
- *Monophonic button:* Turn on monophonic mode for solo instruments.
- *Dynamics via Ctrl button:* Turn on to allow control of instrument dynamics (soft-loud) and timbre in real time. Additional dynamic control and mapping functions are available in the Details parameters.
- *Auto Vibrato knob and field:* Set the intensity of vibrato in the chosen sound. You can also assign manual vibrato control in the details parameters.

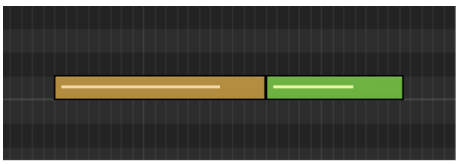
- *Humanize knob and field:* Set the amount of random variation in the chosen sound. This emulates changes in embouchure by introducing small pitch and level fluctuations.
- *Key Clicks knob and field:* Set the level of key and pad noise for sections that contain saxophones and solo saxophone instruments.

  Note: The Key Clicks knob isn't shown for trumpet or trombone instruments.
- *Attack knob and field:* Set the amount of time it takes for the instrument to fade in, following a MIDI note on message.
- *Release knob and field:* Set the amount of time it takes for the instrument to fade out, following a MIDI note off message.
- *Volume knob and field:* Set the output level of the instrument.

Use advanced articulation features

Studio Horns provides several articulations for falls and doits. These can be played on your keyboard like any other articulation. Horn players often attach a fall or doit directly to a note end, so the fall or doit happens with no gap after the previous note. Studio Horns features a special mode which allows you to smoothly connect a fall or doit articulation to the previous note at any position "on-the-fly", as a real musician would play it.

- In Logic Pro, to create a smooth fall or doit, add a second (Fall or Doit articulation) note of the same pitch directly following any note. There should be no, or a minimal, gap from the previous note.

  Note: Velocity of the Fall or Doit note can be different to the previous note. You can also vary the length of the Fall or Doit note. This allows you to create very subtle falls or doits at the end of any note.
- To perform falls and doits live on a keyboard, you can use the predefined keyswitches for Falls and Doits. These operate in Trigger mode, which automatically creates the Fall or Doit event and places it immediately after the previous note. Try this by holding a note with a Sustain articulation. While the note is playing, press the keyswitch for the Fall Long articulation. The sustained note is then stopped with a long fall.

Studio Horns details parameters in Logic Pro for iPad

The Details parameters provide advanced control of performance and controller functions.

Note: The parameters are different for solo and section instruments.



Studio Horns common details parameters

The following parameters apply to solo or section instruments.

- *Vibrato Ctrl pop-up menu:* Choose a MIDI controller to adjust vibrato.
- *Vibrato Mode pop-up menu:* Choose a vibrato response curve for incoming MIDI controller data. Choices are Off, Normal, Slow, Fast, Gentle, and Expressive.

  Note: This affects manually controlled vibrato only.
- *Dynamic Ctrl pop-up menu:* Choose the MIDI controller used to adjust an instrument's dynamics (soft-loud) while a note is playing. This function requires the Dynamics via CC button in the main interface to be turned on.
- *Dyn Ctrl Mode pop-up menu:* Choose a mode to determine assigned MIDI controller behavior and instrument response to incoming velocity data.
  - *Controller (Absolute):* Dynamics are controlled only by the absolute value of the assigned MIDI controller.
  - *Velocity & Controller (Catch):* Dynamics are controlled both by incoming velocity data and by the value of the assigned MIDI controller when it matches any existing controller value. For example, a MIDI control knob with a value of 15 has no impact on dynamic behavior until it reaches a velocity value of 47 in an existing region. Once this controller value is reached, the assigned MIDI control knob will have an impact on instrument dynamics.
  - *Velocity & Controller (Relative):* Dynamics are controlled by both incoming velocity data and by the value of the assigned MIDI controller, relative to any existing controller value. For example, a MIDI control knob with a value of 15 will immediately impact dynamic behavior, relative to the existing velocity value. Adjusting a knob with a value of 15 to a value of 18 will adjust an existing velocity value of 47 to a value of 50.
- *Legato Transitions button:* Turn on to allow legato transition samples for both monophonic and polyphonic modes, enhancing the realism of instruments played in a legato style.

- *Extended Keyrange button:* Turn on to allow the instrument (or instruments in a section) to play beyond its normal key range.
  - When off, the instrument (or instruments in a section) plays in the original key range. This is the default, and should be used if you're aiming for authentic-sounding performances.
  - When on, the instrument uses the full keyboard range, allowing you to create parts that extend beyond the realistic range of the instrument (or instruments in a section).
- *Release Samples knob and field:* Set the volume of release samples. Release samples, as the name suggests, are triggered when you release a key. These allow for a natural-sounding decay in sustained articulations, for example. If a low release sample value is set, the sound may cut off abruptly, which can sound unnatural.
- *Pitch Bend Range knob and field:* Determine the range for pitch bend modulation. This is bipolar, with a range of ±12 semitones.

Studio Horns voice split parameters

The following parameters apply only to section instruments.

- *Allow Unison button:* Turn on to allow unison mode for split voices.
  - When turned on, multiple instruments within a section can play the same note simultaneously when a single or multiple keys are pressed.
  - When turned off, one instrument within the section is played per key. To have all instruments of a seven piece section play, you need to press seven keys.
- *Inst via MIDI Channel button:* Turn off to play the full section on *any* incoming MIDI channel. Active Unison / Split settings apply. When on (default), the following applies:
  - MIDI Channel 1: Full section is played with the active Unison / Split settings.
  - MIDI Channels 2-16: Access individual instruments within the section. See Studio Horns section MIDI channels.
- *Split Voicing pop-up menu:* Turn on or turn off automatic voice splitting. When active, you can determine the octaves used by the respective voices/instrument(s) in the section. Results vary based on your Split Mode pop-up menu choice.

  When any value other than Off is chosen, chords played on the keyboard are automatically assigned to different instruments or instrument groups, or "voices" in the section. Depending on the size and type of section, a voice can consist of one or multiple instruments. This mimics the distribution of notes (voicings) among players, based on what instrument group is best suited to a particular note range, for example.
  - *Off:* Turn off voice splitting.

    Note: When Off is chosen, horn section instruments that share a key range are layered, with all horns assigned to a key range played simultaneously.
  - *8va:* Double the top part an octave up. This is a common technique used to make melody lines more prominent.
  - *Drop 2:* Transpose the second note from the top of the chord down an octave. This technique is used to make an arrangement sound thicker and richer.
  - *Drop 2+4:* Transpose the second and fourth note from the top of the chord down an octave. This technique is used to thicken an arrangement. It is more suitable for sections with five or more instrument "voices," but can be useful with smaller sections.

- *Split Mode pop-up menu:* Choose the mode used to split individual or grouped ensemble instruments.
  - *Start with Lead Voice:* The first incoming note is assigned to the Lead Voice, which is usually a higher-range instrument such as a trumpet. All subsequent notes are assigned, in descending order, to the Middle and Bass Voices.
  - *Start with Bass Voice:* The first incoming note is assigned to the Bass Voice. All subsequent notes are assigned, in ascending order, to the Middle and Lead Voices.
  - *Start by Key Split:* Incoming notes below the defined split key (set with the Split Key field) are assigned to the Bass Voice and the lower Middle Voices. Notes above the split key are assigned to the Lead Voice and the higher Middle Voices.
- *Split Key field:* Drag vertically to set the MIDI note number used as the split point for individual ensemble instruments.

  Note: This parameter applies only when *Start By Key Split* is chosen in the Split Mode pop-up menu.

Studio Horns keyswitch mapping in Logic Pro for iPad

This section outlines the default keyswitch mapping of the Studio Horns instruments.

Articulations are accessed from the Articulation pop-up menu in the plug-in menu bar. Articulations can be remotely switched while performing or recording, enabling you to add a fall or trill to a solo saxophone part, for example.

The table shows the default keyswitch mapping, starting from C0 (MIDI note number 24). You can, of course, transpose the octave of notes used as keyswitches.

X indicates available articulation.

* Trumpet 1, Trombone 1, Alto Sax 1, and Tenor Sax 1.

Key	MIDI Note #	Articulation ID	Articulation	Sections	Lead Instruments*
C0	24	1	Sustain	X	X
C#0	25	14	Growl		X
D0	26	6	Expressive Medium	X	X
Eb0	27	7	Expressive Long		X
E0	28	8	Expressive Short	X	X
F0	29	2	Staccato	X	X
F#0	30	4	Marcato Short		X
G0	31	10	Fall Long	X	X
G#0	32	5	Marcato Long		X
A0	33	11	Fall Medium	X	X
Bb0	34	9	Passionate		X
B0	35	12	Fall Short	X	X

Key	MIDI Note #	Articulation ID	Articulation	Sections	Lead Instruments*
C1	36	13	Doit	X	X
C#1	37	16	Scoop		X
D1	38	15	Shake (Horns) / Trill (Saxes)	X	X

Studio Horns section MIDI channels in Logic Pro for iPad

In Studio Horns section presets, each instrument uses a dedicated MIDI channel. This lets you play specific instruments in a section by sending MIDI messages on their respective channels. Similarly, if you create a region for a section instrument, you can assign each MIDI event a specific MIDI channel to ensure that it is played only by a particular instrument within the section.

- MIDI channel 1 is always the “section” channel, meaning that it is used to play the entire section, either via automatic voice splitting or as a layer/key split, depending on the plug-in setting.
- MIDI channel 2 and above are used to access the different instruments of a section directly.

Note: When the Inst via MIDI Channel button in the Details parameters is turned off, the full section is played on *any* incoming MIDI channel. Active Unison / Split settings apply. Full section playback is also triggered by incoming MIDI channel data that is not used in the section.

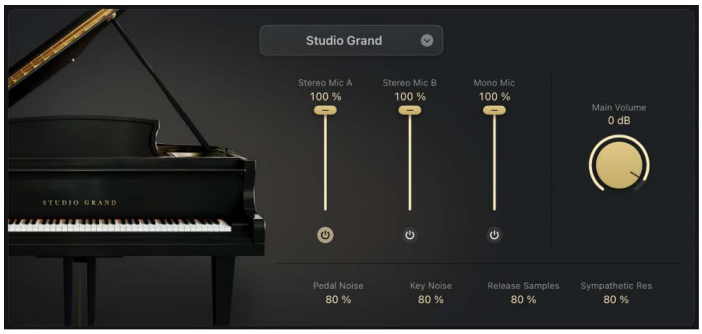
MIDI Channel	Horn Sections
1	Full Section
2	Alto Sax 1
3	Alto Sax 2
4	Tenor Sax 1
5	Tenor Sax 2
6	Baritone Sax
7	Trumpet 1
8	Trumpet 2
9	Trumpet 3
10	Trumpet 4
11	Trombone 1
12	Trombone 2
13	Trombone 3
14	Bass Trombone

Studio Piano

Studio Piano in Logic Pro for iPad

The studio instruments are high-quality multisampled players that offer a collection of solo and grouped instrument presets. See Studio Bass, Studio Strings, and Studio Horns.

Studio Piano is a sample-based software instrument that accurately reproduces the sounds of various pianos and simulates many of their physical characteristics, such as action movement, dampers, and resonance.



It's optimized for use with the Keyboard Player, but you can also use Studio Piano with a MIDI keyboard to play and record, and you can use it with MIDI and pattern regions.

If you're new to using plug-ins in Logic Pro for iPad, see Add, replace, reorder, and remove plug-ins in the Plug-ins area.

Studio Piano parameters

- *Instrument pop-up menu:* Choose a piano. You can choose from the following:
  - Studio Grand
  - Concert Grand
  - Vintage Upright
  - Studio Grand (Mono Mic)
- *Stereo Mic A slider:* Set the volume of a stereo pair of condenser microphones.
- *Stereo Mic B slider:* Set the volume of a stereo pair of ribbon microphones.
- *Mono Mic slider:* Set the volume of a ribbon microphone.
- *Stereo Mic A On/Off button:* Turn stereo microphone pair A on or off.
- *Stereo Mic B On/Off button:* Turn stereo microphone pair B on or off.
- *Mono Mic On/Off button:* Turn the mono microphone on or off.
- *Main Volume:* Set the output level of the instrument.
- *Pedal Noise value:* Set the volume of the sound of pressing and releasing the piano pedals.
- *Key Noise value:* Set the volume of the sound of pressing and releasing the keys.

- *Release Samples value:* Set the volume of the sound of the damper returning to the string when you release a key. Release samples allow for a natural-sounding decay. If a low release sample value is set, the sound may cut off abruptly, which can sound unnatural.
- *Sympathetic Resonance value:* Set the volume of the resonance of nondampened strings.

Studio Strings

Studio Strings in Logic Pro for iPad

The studio instruments are high-quality multisampled players that offer a collection of solo and grouped instrument presets. See Studio Bass, Studio Piano, and Studio Horns.

Studio Strings provides a collection of highly expressive single and section stringed instruments. It provides controls that let you customize Studio Strings to match your preferences and to work best with your controllers. See Studio Strings details parameters.

Studio Strings instruments feature a large collection of samples that cover different playing styles, such as sustain, staccato, or falls. These playing styles, called articulations, are accessed from the Articulation pop-up menu in the plug-in menu bar. You can also switch articulations remotely with keyswitches.

Default section and single instrument keyswitches are covered in Studio Strings keyswitch mapping.

To add Studio Strings to your project, choose it from the Instrument > Studio Instruments submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

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Studio Strings Instrument parameters

The parameters shown in the plug-in change when a solo or section instrument is chosen.

- *Instrument pop-up menu:* Choose a solo or section instrument.

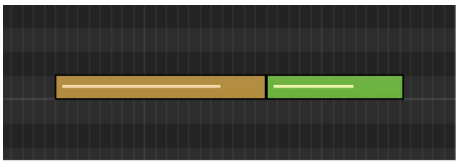
  You can use MIDI channel events to control section instruments. If you want to play specific instruments in a section, you can send MIDI messages on their respective channels, then add a list of channel assignments. See Studio Strings section MIDI channels.

- *Last Played field:* Displays the most recently used articulation.
- *Monophonic button:* Turn on monophonic mode for solo instruments.
- *Dynamics via Ctrl button:* Turn on to allow control of instrument dynamics (soft-loud) and timbre in real time. Additional dynamic control and mapping functions are available in the Details parameters.
- *Cutoff knob and field:* Set the cutoff frequency of the sound.
- *Resonance knob and field:* Set the amount of cut or boost of the frequency range surrounding the defined cutoff frequency.
- *Attack knob and field:* Set the amount of time it takes for the instrument to fade in, following a MIDI note on message.
- *Release knob and field:* Set the amount of time it takes for the instrument to fade out, following a MIDI note off message.
- *Volume knob and field:* Set the output level of the instrument.

Use advanced articulation features

Studio Strings provides several articulations for falls. These can be played on your keyboard like any other articulation. String players often attach a fall directly to a note end, so the fall happens with no gap after the previous note. Studio Strings features a special mode which allows you to smoothly connect a fall articulation to the previous note at any position “on-the-fly”, as a real musician would play it.

- In Logic Pro, to create a smooth fall, add a second (Fall articulation) note of the same pitch directly following any note. There should be no, or a minimal, gap from the previous note.

  Note: Velocity of the Fall note can be different to the previous note. You can also vary the length of the Fall note. This allows you to create very subtle falls at the end of any note.

- To perform falls live on a keyboard, you can use the predefined keyswitches for Falls. These operate in Trigger mode, which automatically creates the Fall event and places it immediately after the previous note. Try this by holding a note with a Sustain articulation. While the note is playing, press the keyswitch for the Fall Long articulation. The sustained note is then stopped with a long fall.

Studio Strings details parameters in Logic Pro for iPad

The Details parameters provide advanced control of performance and controller functions.

Note: The parameters are different for solo and section instruments.



Studio Strings common details parameters

The following parameters apply to solo or section instruments.

- *Vibrato Ctrl pop-up menu:* Choose a MIDI controller to adjust vibrato.
- *Dynamic Ctrl pop-up menu:* Choose the MIDI controller used to adjust an instrument's dynamics (soft-loud) while a note is playing. This function requires the Dynamics via CC button in the main interface to be turned on.
- *Dyn Ctrl Mode pop-up menu:* Choose a mode that determines assigned MIDI controller behavior and instrument response to incoming velocity data.
  - *Controller (Absolute):* Dynamics are controlled only by the absolute value of the assigned MIDI controller.
  - *Velocity & Controller (Catch):* Dynamics are controlled by both incoming velocity data and by the value of the assigned MIDI controller when it matches any existing controller value. For example, a MIDI control knob with a value of 15 has no impact on dynamic behavior until it reaches a velocity value of 47 in an existing region. Once this controller value is reached, the assigned MIDI control knob will have an impact on instrument dynamics.
  - *Velocity & Controller (Relative):* Dynamics are controlled by both incoming velocity data and by the value of the assigned MIDI controller, relative to any existing controller value. For example, a MIDI control knob with a value of 15 will immediately impact dynamic behavior, relative to the existing velocity value. Adjusting a knob with a value of 15 to a value of 18 will adjust an existing velocity value of 47 to a value of 50.
- *Legato Transitions button:* Turn on to use legato transition samples for both monophonic and polyphonic modes, enhancing the realism of instruments played in a legato style.
- *Extended Keyrange button:* Turn on to allow the instrument (or instruments in a section) to play beyond its normal key range.
  - When off, the instrument (or instruments in a section) plays in the original key range. This is the default, and should be used if you're aiming for authentic-sounding performances.
  - When on, the instrument uses the full keyboard range, allowing you to create parts that extend beyond the realistic range of the instrument (or instruments in a section).

- *Release Samples knob and field:* Set the volume of release samples. Release samples, as the name suggests, are triggered when you release a key. These allow for a natural-sounding decay in sustained articulations, for example. If a low release sample value is set the sound may cut off abruptly, which can sound unnatural.
- *Pitch Bend Range knob and field:* Determine the range for pitch bend modulation. This is bipolar, with a range of ±12 semitones.

Studio Strings voice split parameters

The following parameters apply only to section instruments.

- *Allow Unison button:* Turn on to use unison mode for split voices.
  - When turned on, multiple instruments within a section can play the same note simultaneously when a single or multiple keys are pressed.
  - When turned off, one instrument within the section is played per key. To have all instruments of a seven piece section play, you need to press seven keys.
- *Inst via MIDI Channel button:* Turn off to play the full section on *any* incoming MIDI channel. Active Unison / Split settings apply. When on (default), the following applies:
  - MIDI Channel 1: Full section is played with the active Unison / Split settings.
  - MIDI Channels 2-16: Access individual instruments within the section. See Studio Strings section MIDI channels.
- *Split Voicing pop-up menu:* Turn on or turn off automatic voice splitting. When active, you can determine the octaves used by the respective voices/instrument(s) in the section. Results vary based on your Split Mode pop-up menu choice.

  When any value other than Off is chosen, chords played on the keyboard are automatically assigned to different instruments or instrument groups, or “voices” in the section. Depending on the size and type of section, a voice can consist of one or multiple instruments. This mimics the distribution of notes (voicings) among players, based on what instrument group is best suited to a particular note range, for example.
  - *Off:* Turns off voice splitting.

    Note: When Off is chosen, sections are split by key ranges, with each string instrument within the section spanning a specific key range, and no layered instruments.
  - *8va:* Double the top part an octave up. This is a common technique used to make melody lines more prominent.
  - *Drop 2:* Transpose the second note from the top of the chord down an octave. This technique is used to make an arrangement sound thicker and richer.
  - *Drop 2+4:* Transpose the second and fourth note from the top of the chord down an octave. This technique is used to thicken an arrangement. It is more suitable for sections with five or more instrument “voices,” but can be useful with smaller sections.
- *Split Mode pop-up menu:* Choose the mode used to split individual or grouped ensemble instruments.
  - *Start with Lead Voice:* The first incoming note is assigned to the Lead Voice, which is usually a higher-range instrument such as a violin. All subsequent notes are assigned, in descending order, to the Middle and Bass Voices.
  - *Start with Bass Voice:* The first incoming note is assigned to the Bass Voice. All subsequent notes are assigned, in ascending order, to the Middle and Lead Voices.

- *Start by Key Split:* Incoming notes below the defined split key (set with the Split Key field) are assigned to the Bass Voice and the lower Middle Voices. Notes above the split key are assigned to the Lead Voice and the higher Middle Voices.

- *Split Key field:* Drag vertically to set the MIDI note number used as the split point for individual ensemble instruments.

  Note: This parameter applies only when *Start By Key Split* is chosen in the Split Mode pop-up menu.

Studio Strings keyswitch mapping in Logic Pro for iPad

This section outlines the default keyswitch mapping of the Studio Strings instruments.

Articulations are accessed from the Articulation pop-up menu in the plug-in menu bar. Articulations can be remotely switched while performing or recording, enabling you to instantly switch between a bowed or staccato string section, for example.

The table shows the default keyswitch mapping, starting from C0 (MIDI note number 24). You can, of course, transpose the octave of notes used as keyswitches.

X indicates available articulation.

Key	MIDI Note #	Articulation ID	Articulation	Sections, Double Bass	Violins, Violas, Cellos
C0	24	1	Sustain	X	X
C#0	25	31	Tremolo	X	X
D0	26	19	Accented Sustain	X	X
Eb0	27	25	Fortepiano Slow	X	X
E0	28	23	Fortepiano Fast	X	X
F0	29	3	Spiccato	X	X
F#0	30	2	Staccato	X	X
G0	31	28	Pizzicato	X	X
G#0	32	29	Trill Semi	X	X
A0	33	30	Trill Whole	X	X
Bb0	34	10	Fall Long		X
B0	35	12	Fall Short		X
C1	36	17	Scoop Slow		X
C#1	37	16	Scoop Fast		X
D1	38	21	Crescendo Slow		X
Eb1	39	20	Crescendo Fast		X
E1	40	27	Glissando Up		X
F1	41	26	Glissando Down		X

Studio Strings section MIDI channels in Logic Pro for iPad

In Studio Strings section presets, each instrument uses a dedicated MIDI channel. This lets you play specific instruments in a section by sending MIDI messages on their respective channels. Similarly, if you create a region for a section instrument, you can assign each MIDI event a specific MIDI channel to ensure that it is played only by a particular instrument within the section.

- MIDI channel 1 is always the “section” channel, meaning that it is used to play the entire section, either via automatic voice splitting or as a layer/key split, depending on the plug-in setting.
- MIDI channel 2 and above are used to access the different instruments of a section directly.

Note: When the Inst via MIDI Channel button in the Details parameters is turned off, the full section is played on *any* incoming MIDI channel. Active Unison / Split settings apply. Full section playback is also triggered by incoming MIDI channel data that is not used in the section.

MIDI Channel	String Sections
1	Full Section
2	Violins 1
3	Violins 2
4	Violas
5	Cellos
6	Double Basses

Utility instruments

Utility instruments in Logic Pro for iPad

The Utilities found in the instrument plug-in menu of Instrument channel strips include:

- External Instrument lets you route hardware MIDI sound generators through the Mixer, which you can then process with Logic Pro effects.
- Klopfgeist is an instrument that provides a metronome click.
- Test Oscillator can be used as an instrument or effect. It is used to calibrate tuning of studio equipment and instruments.

To add any of these plug-ins to your project, choose it from the Instrument > Utility submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

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External Instrument in Logic Pro for iPad

You can use External Instrument to route hardware MIDI sound generators through the Mixer, which you can then process with Logic Pro effects. The plug-in is inserted into instrument channel strips in place of a software instrument. External Instrument supports MIDI communication through the instrument channel strip, enabling you to control both MIDI and audio routing of an external sound module with a single plug-in.

To use the External Instrument plug-in, choose Utility > External Instrument in an Instrument channel strip Instrument plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

The track routed to an instrument channel strip that is being used for an external MIDI sound module behaves just like a standard software instrument track. This lets you record and play back MIDI regions on it, with the following benefits:

- You can use the sounds and synthesis engine of your MIDI module with no overhead on the computer CPU—apart from effects used in the channel strip (or destination channels).
- You can send MIDI bank and program change messages to your MIDI module.
- You can use insert and send effects. To use send effects, route the instrument channel strip to aux channel strips.
- You can bounce external MIDI instrument parts, with or without effects, to an audio file in real time (bouncing cannot happen faster because MIDI hardware is involved). This makes the creation of a mix, including all internal and external devices and tracks, a one-step process.

Tip: To avoid constant repatching of devices, it is best to use an audio interface that supports multiple inputs and outputs.

Tip: When using multi-timbral MIDI sound sources, you can gain maximum flexibility with multiple External Instrument instances. In this situation, connect a separate audio output of the tone generator (if equipped with multiple outputs) to different inputs on your audio interface—each addressed by an individual External Instrument instance.



External Instrument parameters

- *MIDI Destination pop-up menu:* Choose the target MIDI port.
- *MIDI Channel pop-up menu:* Choose the target MIDI channel.
- *Audio Input pop-up menu:* Choose the inputs of your audio hardware that the MIDI sound generator is connected to.
- *Auto Compensate (Latency) button:* Turn on to automatically compensate for small timing differences (latency) that you may hear between MIDI and audio playback.

  Logic pre-buffers playback of audio and MIDI data when this feature is turned on, aligning audio and MIDI playback timing anomalies that can potentially occur with some audio and MIDI hardware combinations. Latency figures reported by connected audio and MIDI hardware are used to determine the buffer amount. In general, you should not need to turn on this feature.
- *In Vol knob and field:* Set the incoming signal level.
- *Program pop-up menu:* Choose a MIDI program change number.
- *Bank pop-up menu:* Choose a MIDI bank select number.
- *Send Program Change button:* Send the MIDI program change (and bank select, if applicable) message.

  Note: Program/bank change messages are stored when you save a plug-in setting and are automatically sent when you load the setting.

Process external MIDI instruments with effects

1. Connect the output (or output pair) of your MIDI module with an input (or input pair) on your audio interface.

   Note: These can be either analog or digital connections if your audio interface and MIDI sound generator are equipped with either, or both.
2. Create an instrument channel strip.
3. Tap the Instrument slot, then choose Utility > External Instrument from the pop-up menu.
4. Choose the MIDI Destination from the pop-up menu in the External Instrument plug-in.
5. Choose a MIDI Channel from the pop-up menu, if required, when using a multi-timbral device.
6. Choose the input (of your audio interface) that the MIDI sound generator is connected to from the Audio Input pop-up menu.
7. Choose a MIDI program change number from the Program pop-up menu, and a bank select message if required.
8. Tap the Send Program Change button to send the program change (and bank select, if applicable) message.
9. Adjust the input level with the In Vol control, if necessary.
10. Insert any required effects into the effect slots of the channel strip (or channel strips, if using multiple External Instrument instances with a multi-timbral sound source).

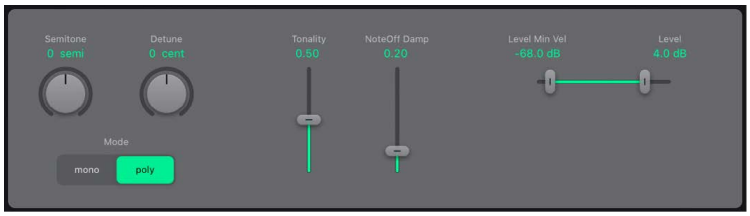
    You can also route the instrument channel strip to aux channel strips, if you want to use send effects.

Klopfgeist in Logic Pro for iPad

Klopfgeist is an instrument that provides a metronome click. It is inserted in the channel strip adjacent to the highest numbered channel strip by default.

Klopfgeist has a number of synthesizer parameters that you can use to quickly create metronome click or other sounds. It can be inserted in any instrument channel strip for use as an instrument.

To use Klopfgeist, choose Utility > Klopfgeist in an Instrument channel strip Instrument plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.



Klopfgeist parameters

- *Semitone knob and field:* Tune Klopfgeist in semitone steps.
- *Detune knob and field:* Rotate to fine-tune in cents (one cent equals 1/100th of a semitone).
- *Mode buttons:* Turn on poly to use Klopfgeist as a four-voice polyphonic instrument. Turn on mono to use it as a monophonic instrument.
- *Tonality slider and field:* Change the sound from a short click to a pitched percussion sound, similar to a wood block or claves.
- *NoteOff Damp slider and field:* Set the release time. The shortest release time is attained when set to the maximum value.
- *Level Min Vel/Level sliders and fields:* Set velocity sensitivity. The left slider sets the volume at minimum velocity. The right slider sets the volume at maximum velocity. Drag the area between the two sliders to move both simultaneously.

Test Oscillator in Logic Pro for iPad

Test Oscillator is useful for tuning studio equipment and instruments. It can be inserted as an instrument or effect plug-in. It operates in two modes, generating either a static frequency or a sine sweep.

- In Test Tone mode, a test signal is generated immediately when the plug-in is inserted. You can switch off the test tone by bypassing the plug-in or by activating Sine Sweep mode.
- In Sine Sweep mode, a user-defined frequency spectrum tone sweep is generated when you tap the Sweep Trigger button.

To use Test Oscillator, choose Utility > Test Oscillator in an Instrument channel strip Instrument plug-in menu or the Plug-ins area. See Intro to plug-ins. Also see Add, replace, reorder, and remove plug-ins in the Plug-ins area and Work with plug-ins in the Mixer.

Test Tone mode parameters



- *Frequency knob and field:* Set the frequency of the oscillator (the default is 1 kHz). You can also double-tap this field and enter a value ranging from 1 Hz to 22 kHz, exceeding the possible values that can be set with the knob. If you enter “1,” a 1 Hz test tone is the result.
- *Waveform buttons:* Select the waveform to use for test tone generation. The Square Wave and Needle Pulse (Dirac) waveforms are available as either aliased or anti-aliased versions. The Sine and Square waveforms are bipolar. The Needle Pulse waveform is a unipolar impulse waveform that is always positive, which makes it a useful tool for analyzing polarity or phase issues. The noise waveforms are useful for “tuning” the room and speakers.
- *Anti Aliased button:* Turn on to use anti-aliased versions of the Square or Needle Pulse (Dirac) waves.
- *Decorrelated Noise button:* Turn on to change the phase when either White or Pink Noise is active. This alters the spatial characteristics of the noise signal.
- *Level knob and field:* Set the overall output level. This parameter is common to both test tone generator modes.
- *Dim button:* Reduce the output level by 50%. This parameter is common to both test tone generator modes.

Sine Sweep mode parameters



- *On/off button:* Activate sine sweep mode and deactivate test tone mode.
- *Time knob and field:* Set the duration of the sine wave sweep.
- *Mode buttons:* Choose a sweep curve—Linear or Log(arithmic).
- *Start/End Freq sliders and fields:* Set the oscillator frequency for the beginning and end of the sine sweep.
- *Trigger button:* Start the sine sweep of the spectrum set with the Start and End Frequency parameters.
- *Repeat buttons:* Tap Single to play the sine sweep once or tap the infinity button to play the sine sweep indefinitely when you tap the Trigger button.

Vintage B3 Organ

Vintage B3 Organ in Logic Pro for iPad

Vintage B3 Organ (abbreviated to Vintage B3 in the guide) emulates the sound and features of the Hammond B3 organ with two manuals (keyboards) and a pedalboard, each of which can have its own registration (sound setting). You can play all registers with a single-manual master keyboard, or you can use two manuals and a MIDI pedalboard. The Vintage B3 component modeling synthesis engine faithfully replicates the tonewheel generators of an electromechanical Hammond organ, down to the smallest detail. This includes charming flaws, such as the enormous level of crosstalk and the scratchiness of the key contacts. You can adjust the intensity of these characteristics, enabling tones that range from flawlessly clean through to dirty and raucous—or anything in between.

Vintage B3 also simulates various types of Leslie sound cabinets—with rotating speakers, with and without deflectors. A flexible integrated effects section provides tube overdrive, an equalizer, a wah wah, and a reverberation effect.

To add Vintage B3 Organ to your project, choose it from the Instrument > Vintage Keys submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

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Main sound controls

Vintage B3 sound controls in Logic Pro for iPad

Vintage B3 is divided into multiple areas. The draw bars at the top change the basic organ sound in real time. See Vintage B3 draw bar controls.



- The Scanner Vibrato and Percussion controls add a vibrato or chorus-like effect or percussive element to your organ sound. See Vintage B3 Vibrato and Chorus and Vintage B3 Percussion effect.
- Vintage B3 incorporates a number of flexible effects processing units, that include Reverb, EQ, Wah, and Distortion.
- Advanced modeling controls let you precisely adjust a number of characteristics such as key clicks, aging of components, enhanced bass response, and more.
- Vintage B3 also includes detailed models of the Hammond cabinets used with the B3, again with extensive control options.
- The Preset (registration) and Morph controls allow remote switching and interesting real time changes. See Use Vintage B3 preset keys and Use Vintage B3 Morph controls.
- MIDI keyboard controls can be assigned to specific drawbar controllers. See Vintage B3 MIDI setup and Set a Vintage B3 MIDI control mode.

Vintage B3 draw bar controls in Logic Pro for iPad



Vintage B3 provides 20 draw bars, nine each for the upper and lower manuals, and two for the pedalboard.

Drag down the draw bars to make the selected sine choirs louder. You should note that MIDI control of the draw bars is also reversed when using a standard MIDI fader unit.

Each sine choir is a sine wave that is mixed in at a particular level, determined by the draw bar position. You add sine choirs in this way to build up the overall organ sound for the upper or lower manual. This is a basic form of additive synthesis; for more information, see Additive synthesis with draw bars. You can intuitively pick up the fundamental principles of additive synthesis by playing a little with the draw bars.

Two draw bars are available for the bass pedals. The waveform used for the bass pedal sound is not a pure sine wave, like the waveforms used for the upper and lower manuals. The pedalboard sound uses a mixed waveform, which accurately emulates B3 bass tones. The two registers differ in pitch, with the left, 16-foot register containing more octave harmonics. The right, 8-foot register has a more prominent fifth portion (fifth harmonics are enhanced). The term *foot* is derived from pipe organ lengths.

You can simulate the behavior of the Model A, the first Hammond organ ever made. This model had no foldback for the 16′ draw bar in the lowest octave, with the bottom 12 tone generator outputs available on the first draw bar of the manuals′ bottom octave. Without foldback, the sound is more strident and similar to the pedal sound. Tap the Ultra Bass button in the Model Parameters to simulate the Model A.

Vintage B3 Vibrato and Chorus in Logic Pro for iPad

Vintage B3 emulates the Scanner Vibrato of the original B3. Few organ players use the Scanner Vibrato, preferring to work with a Leslie in isolation. Others, like B3 virtuoso Brian Auger, prefer the integrated organ vibrato over the Leslie. Compare the chorus and vibrato effects with the sound of the rotor cabinet simulation to see which you prefer.

The Scanner Vibrato is based on an analog delay line, consisting of several lowpass filters. The delay line is scanned by a multipole capacitor that has a rotating pickup. It is a unique effect that cannot be simulated with low frequency oscillators (LFOs). The vibrato of the organ itself should not be confused with the Leslie effect, which is based on rotating speaker horns. Vintage B3 simulates both.

The (Scanner Vibrato) Chorus effect is derived from mixing the vibrato signal with the original, statically pitched signal. The organ chorus sounds different from modern chorus effects.



Scanner Vibrato and Chorus parameters

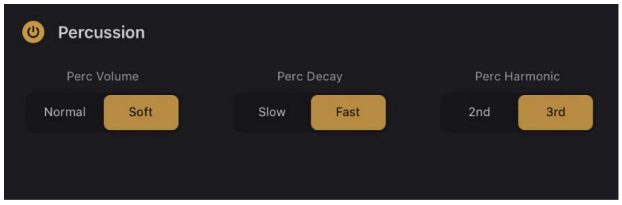
- *Vibrato Lower/Upper buttons:* Turn the scanner vibrato on or off, independently, for the lower and upper manuals. The treble portion of the organ is boosted slightly when any vibrato setting is used. Because the original B3 mixes the bass register (pedal) signal with the lower manual signal, the pedal register is also affected by the lower manual scanner vibrato settings.
- *Scanner Mode switch:* Set to Model to approximate the sound of the scanner vibrato. Set to Real to simulate the original circuitry, comprised of a delay line and a multipole capacitor, which blends between delay line taps.
- *Vibrato knob and field:* Choose from three Vibrato positions (V1, V2, and V3) or three Chorus positions (C1, C2, and C3). In the Vibrato positions, only the delay line signal is heard, and like the Hammond B3, Vintage B3 vibrato types have different intensities. The three Chorus positions (C1, C2, and C3) mix the signal of the delay line with the original signal.
- *Vibrato Rate knob and field:* Set the vibrato or chorus speed.
- *Chorus Int knob and field:* Mix the dry signal with the chorus signal. This parameter is active only when a chorus setting is engaged (C1, C2, or C3).

Vintage B3 Percussion effect in Logic Pro for iPad

Vintage B3 emulates the (Key) Percussion features of the original B3. The Percussion function is available only for the upper manual. The effect adds the second or third harmonics to the attack envelope of a note. These harmonics quickly fade out, leaving the chosen draw bar tones.

The Percussion effect is polyphonic, but is only (re)triggered after all keys have been released. If you release all keys, new notes or chords sound with percussion. If you play legato, or sustain other notes on the upper manual, no percussion is heard.

Important: Percussion controls are spread across two interface sections: Percussion and Percussion Options.



Percussion parameters

- *Percussion On/Off button:* Turn percussion on or off for the upper manual.
- *Perc Volume switch:* Switch between a low (Soft) or high (Normal) decay level. The level is set with the Volume knobs in the Percussion Options parameters.
- *Perc Decay switch:* Switch between a Slow or Fast decay. The time is set with the Time knobs in the Percussion Options parameters.
- *Perc Harmonic switch:* Determine which harmonic is heard (the switch toggles between the 2nd and 3rd harmonic).

Vintage B3 Global controls in Logic Pro for iPad



Global parameters

- *Pitchbend Up/Down knobs and fields:* Independently set the upward/downward pitch bend sensitivity in semitone steps. The maximum sensitivity for upward bends is one octave. The Hammond B3 has no pitch bend facilities. Therefore, use of pitch bend is not suitable for realistic organ simulations, but it does provide a number of creative options.

  Note: If you drag the Pitchbend Down slider to the far right, the tonewheels gradually slow down until they totally stop—when your keyboard pitch bend control is at the minimum position. This setting re-creates an effect heard at the end of “Knife Edge” by Emerson, Lake, and Palmer. Keith Emerson’s virtuoso Hammond work was recorded on a reel-to-reel tape recorder that was gently slowed to a total stop.

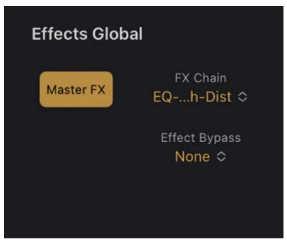
- *Volume knob and field:* Set the overall output level. The Volume knob must be lowered whenever crackling or other digital distortion occurs. Volume levels over 0 dB can occur if you maximize the levels of all registers, play numerous notes, and make use of the Distortion effect.
- *Expression knob and field:* Set the sensitivity for a connected expression pedal (on a MIDI keyboard with an Expression or assignable controller input). Extensive, often rhythmic, use of the expression (volume) pedal forms part of the style of many organ players. The expression control also emulates the tonal changes of the B3 pre-amplifier, where bass and treble frequencies are not attenuated as much as the mid frequencies. Your master keyboard should transmit MIDI control change #11 when the pedal is moved. Vintage B3 defaults to the use of CC #11 for Expression.
- *MIDI Mode pop-up menu:* Choose a supported MIDI controller device. Choose Off if you do not own a supported device and don't want to use a special assignment mode. See Set a Vintage B3 MIDI control mode.

Effects

Vintage B3 global effect controls in Logic Pro for iPad

Vintage B3 features a reverb effect, a three-band EQ, a pedal-controllable wah effect, and a distortion effect that simulates the sound of an overdriven tube amplifier. In addition, the signal can be routed through the Leslie rotor speaker emulation.

The default effect signal flow is as follows: the organ signal runs through the Equalizer, Wah, and Distortion effects. This treated signal is then fed into the Reverb and finally passed to the Leslie Rotor Cabinet.



Effects global parameters

- *Master FX button:* Turn on or turn off the entire Vintage B3 effects section.

  Tip: You can also use the On/Off buttons to independently turn on or turn off the Reverb, EQ, Wah, and Distortion effects.
- *FX Chain pop-up menu:* Choose the signal flow you require in the Vintage B3 effects section.
  - *EQ-Wah-Dist:* This routing is perfect for a classic B3 patch—an equalized organ, plugged into a wah pedal, amplified by an overdriven Leslie.
  - *EQ-Dist-Wah:* The sound of the overdrive changes if the input signal is being filtered, either by the EQ or the Wah. Placing the EQ before the Distortion provides further sonic flexibility. Although the output signal of the Distortion effect always contains high frequency content, this content can be suppressed by positioning the Wah as the final effect in the chain.

- *Wah-Dist-EQ:* If you want to create a screaming sound (achieved by distorting the Wah effect output), you can minimize any harshness by choosing this routing.
- *Dist-EQ-Wah:* Choose this routing to suppress the harsh overtones of extreme distortions with two filters.
- *Dist-Wah-EQ:* Choose this routing to control extreme distortions with two filters.
- *Bypass:* Choose to bypass effects.

- *Effect Bypass pop-up menu:* Choose *Pedal* to bypass effects for the pedal register. If you choose *None*, the entire output of the organ is processed.

  Bypassing the Distortion, Wah, and EQ effects separately for the pedal register avoids suppression of the bass portion of your organ sound by the Wah effect. It also avoids intermodulation artifacts when the Distortion effect is used.

Vintage B3 Reverb effect in Logic Pro for iPad

Vintage B3 features a simple reverberation effect that emulates several room types and a spring reverb.



Vintage B3 Reverb parameters

- *Reverb On/Off button:* Turn on or bypass the reverb effect.
- *Reverb Mode pop-up menu:* Choose a reverb algorithm: Air, Box, Small, Medium, Large, Big, and Spring.
- *Reverb (Pre/Post) pop-up menu:* Patch the reverb effect before (Pre) or after (Post) the rotor effect. The reverb is always patched after the EQ, Wah, and Distortion effects, but before the Leslie rotor cabinet. Choose Post if you don't want the reverb to sound like it is played back through the rotor speaker.
- *Reverb knob and field:* Set the balance between the reverb and original signal levels.

Vintage B3 Equalizer controls in Logic Pro for iPad

Vintage B3 features a simple, effective EQ section.



Vintage B3 EQ parameters

- *EQ On/Off button:* Turn on or bypass the equalizer.
- *EQ Low knob and field:* Adjust the level of the low frequency range.
- *EQ Mid knob and field:* Adjust the level of the mid frequency range.
- *EQ High knob and field:* Adjust the level of the high frequency range.
- *EQ Level slider and field:* Adjust the overall EQ level.

Vintage B3 Wah effect in Logic Pro for iPad

The name wah wah comes from the sound it produces. It has been a popular effect with electric guitarists since the days of Jimi Hendrix. The pedal controls the cutoff frequency of a bandpass, lowpass, or—less commonly—highpass filter. The wah pedal is also used extensively with the Hammond organ.

For the most dynamic and musical performance of the Wah effect, consider attaching an expression pedal to your MIDI master keyboard. Your master keyboard should transmit MIDI control change #11, which would normally be used to control Vintage B3 volume while playing.



Vintage B3 Wah parameters

- *Wah On/Off button:* Turn on or bypass the Wah effect.
- *Wah Range knob and field:* Determine the sensitivity of the Wah effect to incoming MIDI controller data.
- *Wah Mode pop-up menu:* Choose one of several Wah effect types.
  - *Classic Wah:* This setting mimics the sound of a popular wah pedal with a slight peak characteristic.
  - *Retro Wah:* This setting mimics the sound of a popular vintage wah pedal.
  - *Modern Wah:* This setting mimics the sound of a distortion wah pedal with a constant Q(uality) Factor setting. The Q determines the resonant characteristics. Low Q values affect a wider frequency range, resulting in softer resonances. High Q values affect a narrower frequency range, resulting in more pronounced emphasis.
  - *Opto Wah 1:* This setting mimics the sound of a distortion wah pedal with a constant Q(uality) Factor setting.
  - *Opto Wah 2:* This setting mimics the sound of a distortion wah pedal with a constant Q(uality) Factor setting.
  - *Resonant LP:* In this mode, the Wah works as a resonance-capable lowpass filter. At the minimum pedal position, only low frequencies can pass.

- *Resonant HP:* In this mode, the Wah works as a resonance-capable highpass filter. At the maximum pedal position, only high frequencies can pass.
- *Peak:* In this mode, the Wah works as a peak (bell) filter. Frequencies close to the cutoff frequency are emphasized.

- *Bite knob and field:* Boost the levels of signals surrounding the cutoff frequency. Bite is effectively a filter resonance parameter, where high values make the Wah effect sound more aggressive.
- *Wah Controller pop-up menu:* Assign a MIDI controller to the Wah effect.
- *Wah Pedal slider and field:* Control the pedal position of the Wah effect. When a MIDI controller is used, the slider and field reflect the current incoming MIDI CC value.

Use an expression pedal to control the Wah effect

1. In the Logic Pro Vintage B3 Global parameters, set the Expression knob to a value of 0.
2. Choose controller 11 from the from the Wah Controller pop-up menu in the Wah parameters.

   This allows control of Wah cutoff frequency with the expression pedal and requires no further setup of your master keyboard. If step 1 is overlooked, the expression pedal is used to control *both* Vintage B3 main volume and the Wah effect.

   Note: Consult the user manual for your keyboard to learn more about use of an expression pedal.
3. Adjust the Wah Range knob to set the sensitivity of the Wah to incoming expression pedal controller data.

Learn a MIDI controller to control the Wah effect

1. In the Logic Pro Vintage B3 Wah parameters, choose -Learn MIDI- from the Wah Controller pop-up menu.

   When Learn mode is active, the parameter is assigned to the first appropriate incoming MIDI data message.
2. Move the MIDI controller on your MIDI device.

   Learn mode has a 20-second time-out facility: if Vintage B3 does not receive a MIDI message within 20 seconds, the parameter reverts to its original MIDI controller assignment.

Vintage B3 Distortion effect in Logic Pro for iPad

The Distortion effect simulates an overdriven two-stage tube amplifier. Its primary role is to simulate the Leslie amplifier or another amplifier used to feed the Leslie speaker cabinet.



Vintage B3 Distortion parameters

- *Distortion On/Off button:* Turn on or bypass the Distortion effect.
- *Dist Drive knob and field:* Set the amount of overdrive distortion. The output level is automatically compensated for, so there's no need for a distortion output volume control. A level of 0 effectively turns off the Distortion circuit.
- *Dist Tone knob and field:* Change the distorted portion of the sound. This has no effect on the dry signal portion. Limiting changes to the distorted signal allows for very warm overdriven sounds that do not become scratchy if you try to get more treble out of Vintage B3.
- *Dist Type pop-up menu:* Choose a tube amplifier model.
  - *Growl:* Simulates a two-stage tube amplifier. It closely resembles the Leslie 122 model, the classic partner for the Hammond B3 organ.
  - *Bity:* Reminiscent of a bluesy guitar amp.
  - *Nasty:* Delivers hard distortions and is suitable for very aggressive sounds.
  - *Class AB Soft:* Tube distortion sound modeled on a class AB amp head with a subtle distortion.
  - *Class AB Hard:* Tube distortion sound modeled on a class AB amp head with a more pronounced distortion.

Leslie Rotor Cabinet controls

Vintage B3 basic Leslie controls in Logic Pro for iPad

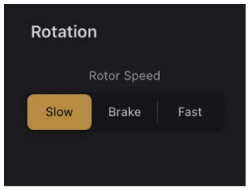
The Hammond story can't be fully told without discussing the rotor cabinets manufactured by Leslie. In fact, playing the B3 organ without a rotor cabinet is viewed as something of a special effect these days. Vintage B3 not only simulates the speaker cabinet itself, but also allows you to change the listening position by placing virtual microphones in different locations.

Some of the speaker cabinet models are mathematically simulated, and others use a recording of the spatial characteristics of the speaker. The latter is known as an impulse response. If you're unfamiliar with the concepts of the Leslie rotating speaker cabinets, see The Leslie cabinet.

The Leslie rotation speed control is shown in the Rotation section. Advanced speed and other controls are shown in the Rotor Cabinet section.

The advanced Leslie rotating speaker cabinet controls are useful for specialized sounds, or when you're creating realistic emulations. See Vintage B3 Cabinet parameters, Vintage B3 Motor parameters, and Vintage B3 Brake parameters.

For information about microphone parameters, see Vintage B3 Microphone parameters.



Basic Leslie rotor speaker parameter

This parameter is shown in the Rotation section.

- *Rotation switch:* Switch the rotor speed between Slow, Brake, and Fast modes.
  - *Slow:* Slow rotor movement.
  - *Brake:* Stops the rotor.
  - *Fast:* Fast rotor movement.

  Note: When using a pedal to control rotor speed, you can hold down the pedal for a second or so, then release it to activate braking. Repeat to switch to the previously active speed mode: Fast or Slow.

Vintage B3 advanced Leslie controls in Logic Pro for iPad

The advanced Leslie cabinet parameters shown in the Rotor Cabinet section are divided into three groups: Cabinet, Motor, and Brake. See Vintage B3 Motor parameters and Vintage B3 Brake parameters.

The microphone parameters are described in Vintage B3 Microphone parameters.



Rotor Cabinet parameters

- *Rotor Cabinet button:* Turn the Leslie cabinet emulation on or off.
- *Cabinet pop-up menu:* Choose a cabinet model.
  - *Real Cabinet:* Uses an impulse response recording of a Leslie cabinet.
  - *Wood:* Mimics a Leslie with a wooden enclosure, and sounds like the Leslie 122 or 147 model.
  - *Proline:* Mimics a Leslie with a more open enclosure, similar to a Leslie 760 model.
  - *Single:* Simulates the sound of a Leslie with a single, full-range rotor. The sound resembles the Leslie 825 model.
  - *Split:* The bass rotor signal is routed slightly to the left, and the treble rotor signal is routed more toward the right.
  - *Wood & Horn IR:* Uses an impulse response of a Leslie with a wooden enclosure.
  - *Proline & Horn IR:* Uses an impulse response of a Leslie with a more open enclosure.
  - *Split & Horn IR:* Uses an impulse response of a Leslie with the bass rotor signal routed slightly to the left, and the treble rotor signal routed more to the right.

- *Horn Deflector button:* Emulate a Leslie cabinet with the horn deflectors removed or attached. A Leslie cabinet contains a double horn, with a deflector at the horn mouth. This deflector makes the Leslie sound. You can remove the deflector to increase amplitude modulation and decrease frequency modulation.

Vintage B3 Leslie Motor controls in Logic Pro for iPad

The advanced Leslie cabinet parameters shown in the Rotor Cabinet section are divided into three groups: Cabinet, Motor, and Brake. See Vintage B3 Cabinet parameters and Vintage B3 Brake parameters.

The microphone parameters are described in Vintage B3 Microphone parameters.



Leslie Motor parameters

- *Acc/Dec Scale knob and field:* Set the time required for the rotors to attain the speed set with the Max Rate knob and also the time required for them to slow down. The Leslie motors need to physically accelerate and decelerate the speaker horns in the cabinets, and their power to do so is limited. Turn Acceleration to the far left position to switch to the preset speed immediately. As you rotate the knob to the right, it takes more time to hear the speed changes. At the default, centered, position the behavior is Leslie-like.
- *Rotor Fast Rate knob and field:* Set the maximum possible rotor speed.
- *Motor Control pop-up menu:* Choose different speeds for the bass and treble rotors. Use the Rotation switch to choose slow, brake, or fast mode. See Rotor Cabinet controls.
  - *Normal:* Both rotors use the speed determined by the Rotation switch position.
  - *Inv (inverse):* In fast mode, the bass compartment rotates at a fast speed, while the horn compartment rotates slowly. This is reversed in slow mode. In brake mode, both rotors stop.
  - *910:* The 910 (also known as “Memphis”), stops the bass drum rotation at slow speed, while the speed of the horn compartment can be switched. This is useful when you’re after a solid bass sound but still want treble movement.
  - *Sync:* The acceleration and deceleration of the horn and bass drums are roughly the same. This sounds as if the two drums are locked, but the effect is clearly audible only during acceleration or deceleration.

  Note: If you choose *Single Cabinet* from the Cabinet pop-up menu, the Motor Control setting is not relevant because there are no separate bass and treble rotors in a single cabinet.

- *Speed Control pop-up menu:* Choose a MIDI controller that is used to remotely switch the rotor speed. All items (except ModWheel) in the pop-up menu switch between Fast and the speed set with the Rotor Speed switch positions—either switching between Slow and Fast, or switching between Brake and Fast. If Fast is chosen, the rotor speaker switches between Fast and Slow.

  Note: When using a pedal to control rotor speed, you can hold down the pedal for a second or so, then release it to activate braking. Repeat to switch to the previously active speed mode: Fast or Slow.

  - *Mod Wheel:* Assigns the modulation wheel to switch between all three speed settings. Brake is selected around the modulation wheel center position, slow is selected in the lower third, and fast in the upper third of the modulation wheel range.
  - *Mod Wheel Toggle:* Switches as soon as the modulation wheel moves away from the centered position. If the modulation wheel passes the center position when moved from a high to low position, no switching occurs. This caters to Roland keyboards with combined pitch bend and modulation controls.
  - *Mod Wheel Temp:* Switches as soon as the modulation wheel passes the center position, regardless of whether you have moved the modulation wheel from high to low or from low to high positions. This caters to Roland keyboards with combined pitch bend and modulation controls.
  - *Touch:* Switches with aftertouch on messages. No switching occurs on aftertouch release.
  - *Touch Temp:* Switches with aftertouch on messages. A second switch occurs with aftertouch release messages.
  - *Sustain Pedal Toggle:* Switches when you press the sustain pedal. No switching occurs when the sustain pedal is released.
  - *Sustain Pedal Temp:* Switches when you press the sustain pedal. A second switch occurs when you release the sustain pedal.
  - *CC #18 and CC #19 Toggle:* Switches when you press controller 18 or 19. No switching occurs when either controller is released.
  - *CC #18 and CC #19 Temp:* Switches when you press controller 18 or 19. A second switch occurs when you release controller 18 or 19.
  - *Sostenuto Toggle:* Switches when you play sustained notes. No switching occurs when you don't play sostenuto.
  - *Sostenuto Temp:* Switches when you play sustained notes. A second switch occurs when you release played notes.
  - *Una Corda Toggle:* Switches when you press the soft pedal. No switching occurs when the soft pedal is released.
  - *Una Corda Temp:* Switches when you press the soft pedal. A second switch occurs when you release the soft pedal.

Vintage B3 Leslie Brake parameters in Logic Pro for iPad

The advanced Leslie cabinet parameters shown in the Rotor Cabinet section are divided into three groups: Cabinet, Motor, and Brake. See Vintage B3 Cabinet parameters and Vintage B3 Motor parameters.

The microphone parameters are described in Vintage B3 Microphone parameters.



Leslie Brake parameters

- *Dry Level knob and field:* Set the level of the dry signal. This can also be useful if Dry is active for the Output switch.
- *Drum/Horn Brake Pos knobs and fields:* Set an exact stop position for the Leslie horn or drum (bass) rotator. The original Leslie did not provide this type of control. This occasionally resulted in a horn aimed at the back of the cabinet when it came to a halt, leading to a muffled sound.
- *Brake switch:* Choose either switch position to modify the Vintage B3 brake mode.
  - *Dry:* The rotor cabinet is bypassed when stopped, with a delay time of one second. This is useful when using the modulation wheel to switch between fast and slow rotor speeds. If you then switch to brake mode, the rotors are slowed down during the transition to the dry sound.
  - *Rotor:* The movement of the rotor is gradually slowed down to a total stop.

Vintage B3 Microphone settings in Logic Pro for iPad

Vintage B3 provides modeled microphones that pick up the sound of the Leslie cabinet. You can set the listening position with these parameters. See Vintage B3 basic Leslie controls for an overview of the Leslie rotator cabinets commonly paired with the B3.



Microphone parameters

- *Horn/Drum Mic pop-up menus:* Choose a microphone type for the horn and drum speakers when *Real Cabinet* is chosen in the Cabinet pop-up menu in the Rotor Cabinet section.
  - *Dynamic:* Emulates the sound of a dynamic cardioid microphone. This microphone type sounds brighter and more cutting than the Condenser mic.
  - *Condenser:* Emulates the sound of a studio condenser microphone. The sound of condenser microphones is fine, transparent, and well-balanced.
  - *Mid-Side Mic:* A Middle and Side (MS) configuration where two microphones are positioned closely together. One is a cardioid (or omnidirectional) microphone that directly faces the cabinet—in a straight alignment. The other is a bidirectional microphone, with its axes pointing to the left and right of the cabinet at 90° angles. The cardioid microphone captures the middle signal to one stereo side. The bidirectional microphone captures the side signal to the other stereo side.
- *Mic Position switch:* Choose either the Front or Rear position for the virtual microphone.
- *When Real Cabinet is chosen in the Cabinet pop-up menu in the Rotor Cabinet section:*
  - *Horn Width knob and field:* Define the stereo width of the Horn deflector microphone.
  - *Drum Width knob and field:* Define the stereo width of the Drum deflector microphone.
- *When other cabinets are chosen in the Cabinet pop-up menu in the Rotor Cabinet section:*
  - *Mic Distance knob and field:* Determine the distance of the virtual microphones (the listening position) from the emulated speaker cabinet. Turn to the right for a darker and less defined sound.
  - *Mic Angle knob and field:* Define the stereo image by changing the angle of the simulated microphones between 0 and 180 degrees.
- *Balance slider and field:* Set the balance between the horn and drum microphone signals.

Modeling controls

Vintage B3 modeling controls in Logic Pro for iPad

The modeling parameters provide precise control over your organ sound. These include not only basic level and tonal balance controls, but a number of parameters that emulate the sonic characteristics—and technical “flaws” or limitations—of the original Hammond B3. You can even emulate the quirks of the B3 by aging the virtual components. See the Click options, Percussion optionsPitch options, Sustain options, Model parameters, and Organ condition sections.

For more information about the technical aspects of the Hammond B3 and the concepts behind tonewheel sound generation, see A brief Hammond history and Tonewheel sound generation.

Vintage B3 Click options in Logic Pro for iPad

The key contacts of electromechanical tonewheel organs tend to saw a little on the busbar, thus introducing a short click sound. Corrosion of the key contacts or busbar increases the length and level of this click. This aspect of the B3 design causes irregular scratching noises (commonly referred to as *key click*) when striking and releasing keys. Hammond fans like these clicking noises because they introduce a transient, percussive quality to the note.

Vintage B3 allows you to adjust the volume and sound of the key click. The tonal color and volume of clicks are altered randomly, and independently, from the click on and click off (release) volume settings.



Click Options parameters

- *Click Min/Max knobs and fields:* Combined, these knobs determine a range for click duration, which can vary between a short “tick” and a longer “scratch.” A random click duration (that falls within the defined range) is used as you play.

  Note: Even if both parameters have identical values, there is a random variation in sound that makes some clicks seem shorter than the value set with Click Minimum.

- *Click Color knob and field:* Set the tonal color of the click. This acts as a global control for the treble portion of the click sound, which overrides (but works alongside) random click color variations.

- *Click On/Off knobs and fields:* Set the level of the key click sound heard during note on or note off messages.

- *Pedal Click knob and field:* Set the level of the key click sound heard during note on and note off messages for the pedal register.

- *Velo to Click knob and field:* Set the velocity sensitivity of the click parameters.

Vintage B3 Percussion options in Logic Pro for iPad

Vintage B3 emulates the (Key) Percussion features of the original B3. The Percussion function is available only for the upper manual. The effect adds the second or third harmonics to the attack envelope of a note. These harmonics quickly fade out, leaving the chosen draw bar tones.

The Percussion effect is polyphonic, but is only (re)triggered after all keys have been released. If you release all keys, new notes or chords sound with percussion. If you play legato, or sustain other notes on the upper manual, no percussion is heard.

Important: Percussion controls are spread across two interface sections: Percussion and Percussion Options.



Percussion Options parameters

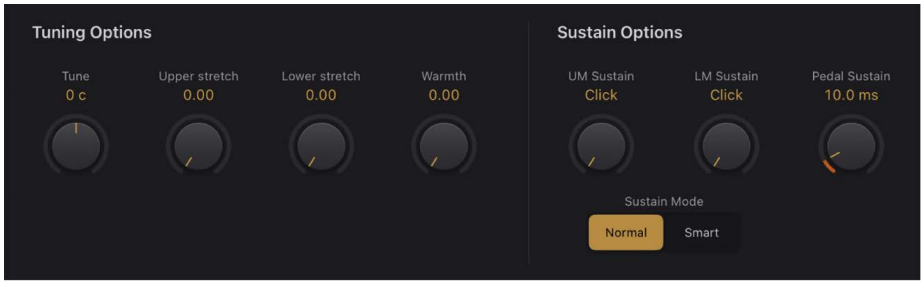
- *Percussion Polyphonic buttons:* Determine the percussion effect behavior.
  - *Mono:* Turn on to trigger a mono percussion effect with each key press.
  - *Para:* Turn on to trigger a polyphonic percussion effect. Each played note in a chord triggers the effect.
  - *Poly:* Turn on to engage a polyphonic percussion effect that only (re)triggers after all keys are released. If you release all keys, new notes or chords sound with percussion. If you play legato or sustain other notes on the upper manual, no percussion is heard.
- *Percussion Mode switch:* Set to Only B to simulate the B preset key restriction. Choose Always if you want percussion to always be available. See Use Vintage B3 preset keys.
- *Perc Slow/Fast knobs and fields:* Set independent percussion decay times for the slow and fast Time switch settings. No percussion decay occurs when Perc Slow is set to maximum.
- *Perc Time knob and field:* Set an overall decay time that scales the Perc Slow/Fast knob values.
- *Perc Soft/Normal knobs and fields:* Set independent low (Soft) and high (Normal) levels for the low and high Perc Volume switch settings. This is an improvement from the B3, where Time and Volume could only be turned on or off.
- *Perc Level knob and field:* Set an overall percussion level that scales the Perc Soft/Normal knob values.
- *Upper Level knob and field:* Set the balance between the upper (percussive) manual and the lower manual/pedals. On the B3, percussion is available only if the B preset key is selected. See Use Vintage B3 preset keys.
- *Perc Velocity knob and field:* Set the percussion velocity sensitivity (unlike the original B3, which is not velocity sensitive). Engaging percussion on a B3 slightly reduces the volume of the normal, nonpercussive registers.

Vintage B3 Tuning options in Logic Pro for iPad

Vintage B3 provides several parameters that change its pitch behavior, adding flexibility that isn't possible with the original instrument.

Vintage B3 is tuned to an equal-tempered scale. As a deviation from this standard tuning, you can stretch the tuning in the bass and treble ranges, much like acoustic pianos (especially upright pianos). The tones of clavinets, harpsichords, and pianos have inharmonicities in their harmonic structure. The frequencies of these overtones (harmonics) are not exact, whole-number multiples of the base frequency. This means that the overtones of lower (tuned) notes are more closely related to the main frequencies of the upper notes. Due to the lack of strings, this inharmonic relationship is not true of organs. The stretch feature was principally included for situations in which you want to use Vintage B3 in an arrangement alongside a recording of an acoustic piano.

You can also randomly detune the sound using the Warmth parameter, and you can even use the pitch bend wheel of your keyboard to bend the sound. The latter isn't true to the original, but it's a nice creative option.



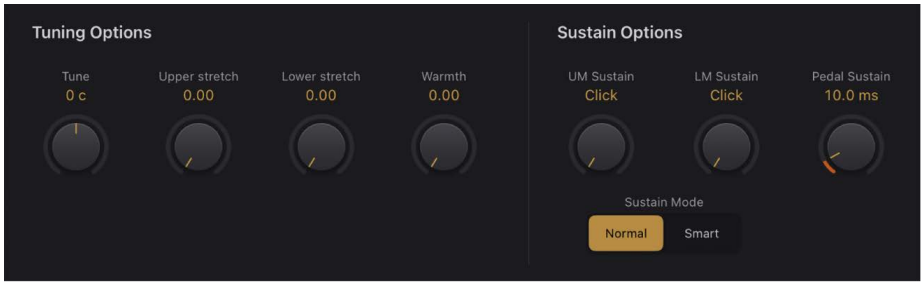
Tuning Options parameters

- *Tune knob and field:* Change Vintage B3 tuning in cents. A cent is 1/100th of a semitone. At a value of 0 c (zero cents), the central A key is tuned to 440 Hz, or concert pitch.
- *Upper Stretch knob and field:* Set the amount of deviation from the equal-tempered scale in the treble end of the sound. The higher the value, the further up the high notes are tuned. At a setting of 0, Vintage B3 is tuned to an equal-tempered scale, with each octave up exactly doubling the frequency.
- *Lower Stretch knob and field:* Set the amount of deviation from the equal-tempered scale in the bass frequencies. The higher the value, the further down the low notes are tuned. At a setting of 0, Vintage B3 is tuned to an equal-tempered scale, with each octave below exactly halving the frequency.
- *Warmth knob and field:* Set the amount of random deviation from an equal-tempered scale.

  Note: Use of both Warmth and Stretch controls may result in a detuned sound, which is similar to a heavy chorus effect. Set Warmth to 0 if you're after a purer sound.

Vintage B3 Sustain options in Logic Pro for iPad

The time it takes for a note to fade out to silence, after the key has been released, is called the release time in synthesizers. Vintage B3 provides control of this parameter, known as *sustain* in organ terminology.



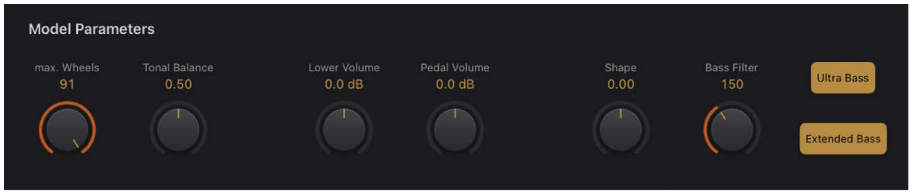
Sustain Options parameters

- *UM Sustain knob and field:* Control the sustain (release) phase of the upper register.
- *LM Sustain knob and field:* Control the sustain (release) phase of the lower register.
- *Pedal Sustain knob and field:* Control the sustain (release) phase of the pedal register.
- *Sustain Mode buttons:* Choose one of two sustain behaviors:
  - *Normal:* Allows polyphonic sustain phases. All released notes continue to sustain, even if new notes are played.
  - *Smart:* Cuts the sustain phase of released notes when you play new notes.

  Note: Smart mode allows for long sustain times, even in the bass register, which would cause rumbling dissonances if you used Normal mode.

Vintage B3 Model parameters in Logic Pro for iPad

The Model parameters change the basic tonal quality.



Model parameters

- *Max Wheels knob and field:* Set the number of tonewheels that are emulated. Reduce the value to minimize processing load. Reducing the value diminishes some overtones, so keep the number high if you're after an ultra-realistic simulation.
- *Tonal Balance knob and field:* Change the mix relationship of the higher and lower tonewheels. Use positive values for a lighter and brighter sound. Experiment with different tonal balance and equalizer settings. See Vintage B3 EQ controls, for further information.
- *Lower Volume knob and field:* Set the relative level between the upper and lower manuals (and the pedalboard).
- *Pedal Volume knob and field:* Set the relative level between the upper (and lower) manual and the pedalboard.

- *Shape knob and field:* Alter the waveforms of the tonewheel generator to produce sounds that resemble the tones of Farfisa, Solina, or Yamaha organs. The Hammond tone generators produce pure sine waves (albeit with a few artifacts), whereas some other organs deliver distorted waveforms. The Shape parameter is placed after the filters that follow the sine generators.
  - Move the Shape knob to the right to make the tone brighter (and louder).
  - Move the Shape knob to the left to make the tone duller (and softer).
- *Bass Filter knob and field:* Adjust to suppress the treble of the pedal draw bars which can sound bright within the context of the combined upper/lower/pedal sound. At the maximum position you hear only a solid bass organ fundamental in the bass register.
- *Ultra Bass button:* Turn on to prevent duplication of the 16″ drawbar in the lowest octave. Turn off to mirror the original B3 behavior. The on position results in a sound that resembles that of early tone wheel organs like the B, BV, and BCV, which had no dedicated tone wheels with a complex waveform for the pedal. This is also known as “Bass all the way down”. See Use multiple or multichannel controllers with Vintage B3.

  Note: Ultra Bass and Extended Bass can be combined, but Ultra Bass has no effect on the added lowest octave. This octave always has a duplication of the 16″ drawbar tone.
- *Extended Bass button:* Add another low octave to the playable range of both the upper and lower manuals.These additional low octaves, and the ability to independently transpose both manuals, are not available on the original B3.

Vintage B3 Condition controls in Logic Pro for iPad

Technical limitations of electromechanical draw bar organs, with tonewheels, can cause some strange tonal artifacts, such as crosstalk. These quirks form an integral part of the B3’s charm. You can adjust a number of parameters to define the age and condition of your Vintage B3.



Organ Condition parameters

- *Filter Age knob and field:* Set the center frequencies of the filters to emulate aging capacitors. The high frequency output signals of B3 tonewheel generators are passed through bandpass filters. The center frequency of these filters changes as the capacitors (used for filtering) get older.

  Note: This colors the sound of the jitter applied by Random FM and the background noise resulting from leakage. Filter Age also influences the intonation of the organ, if you use a pitch bend.
- *Leakage knob and field:* Add a “breathy” quality to your sound—the result of crosstalk between all tonewheels—including the tonewheels of notes that you don’t play.

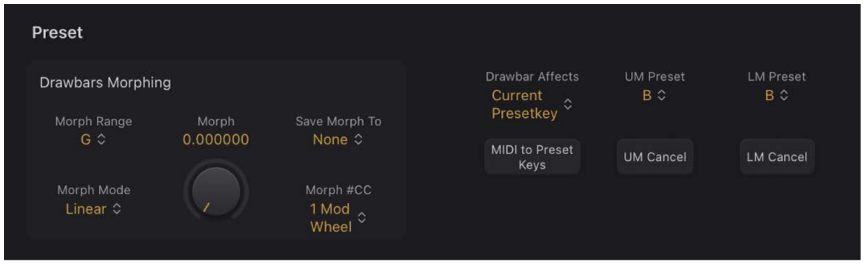
- *Drawbar Leak knob and field:* Set the minimum output level of the draw bars when they are at their minimum positions. The B3 tonewheel generators aren't completely quiet, even if all draw bars are at their minimum positions. This is due to leakage of the tonewheels, causing crosstalk at the output.
  - Use the minimum setting to completely eliminate draw bar leakage.
  - Use the maximum setting to make draw bar leakage clearly audible.
- *Crosstalk knob and field:* Set the crosstalk level. There are two tonewheels that are four octaves apart for each key (pitch), on each rotating shaft. The signal of the lower wheel has a small amount of audible crosstalk, induced by the higher wheel, and vice versa. For more information, see Tonewheel sound generation. Because crosstalk is audible only on certain B3 tonewheels, any "rumble" when chords are played is avoided.
- *RandomFM knob and field:* Simulate irregular rotation of tonewheels in an old B3. If the tonewheel generator of a B3 is clean, all frequencies are even and in tune. The three-fold decoupling of the tonewheels—via springs, flexible couplings, and flywheels—is effective, but it can't compensate for irregularities that come with dirt and grease in the driving gears. A gradual build-up of grime in the mechanism makes the tonewheel assembly turn unevenly on its axis. This irregular rotation is transmitted to the tonewheels, and therefore, the higher frequency ranges of the sound.

Preset and Morph

Vintage B3 Preset and Morph controls in Logic Pro for iPad

The Hammond B3 is equipped with 12 buttons, located below the draw bars. These preset keys are laid out like a keyboard octave, but with black keys and white sharps. They are used to recall draw bar registrations (draw bar positions). Vintage B3 replicates these features. See Use Vintage B3 preset keys.

You can also switch—or smoothly crossfade (morph)—between the presets of the upper manual. See Use Vintage B3 Morph controls.



Preset Drawbars Morphing parameters

Preset and Morph parameter use is covered in Use Vintage B3 preset keys and Use Vintage B3 Morph controls.

- *Morph Range pop-up menu:* Choose a range of keys for morph presets. Choose Off to bypass the morph range that is set up.
- *Morph Mode pop-up menu:* Choose Step to abruptly switch between presets. Choose Linear to smoothly morph (crossfade drawbar positions), between presets.
- *Morph knob and field:* Control the switching or morphing between presets. You can also assign and use a MIDI controller such as your keyboard modulation wheel to control the Morph parameter.
- *Save Morph To pop-up menu:* Choose Preset keys for the morph.
- *Morph #CC pop-up menu:* Assign a MIDI controller to the Morph knob. You can choose any MIDI controller number shown (or channel aftertouch). You can also tap -Learn- to teach the Morph knob to respond to any incoming MIDI message.

Preset parameters

- *Drawbar Affects pop-up menu:* Choose *Current Presetkey* to always change the registration of the currently active preset registration key. Choose *B and Bb Key* to mirror the behavior of a real Hammond organ, where the draw bars affect only the Bb (upper manual) and B (lower manual) preset registrations.
- *MIDI to Preset Keys button:* Turn on or turn off preset switching with MIDI notes 24 to 35.
- *UM Preset pop-up menu:* Choose a preset key for the upper manual. The current upper manual drawbar settings are immediately stored to the chosen key (unless the Drawbar Affects pop-up menu is set to *B and Bb Key*.)
- *UM Cancel button:* Tap to clear the registration of the preset key shown in the UM Preset pop-up menu.
- *LM Preset pop-up menu:* Choose a preset key for the lower manual. The current lower manual drawbar settings are immediately stored to the chosen key (unless the Drawbar Affects pop-up menu is set to *only B and Bb Key*.)
- *LM Cancel button:* Tap to clear the registration of the preset key shown in the LM Preset pop-up menu.

Use Vintage B3 preset keys in Logic Pro for iPad

The Hammond B3 is equipped with 12 buttons, located below the draw bars. These preset keys are laid out like a keyboard octave, but with black keys and white sharps. They are used to recall draw bar registrations (draw bar positions). Vintage B3 replicates these features.

You can edit the draw bars of recalled presets immediately, with changes to draw bar positions being automatically memorized as you make them. You can, however, use the Save Morph To function to save a registration to a specific preset key. See Use Vintage B3 Morph controls.

Important: The presets relate only to the registration (draw bar) settings of a single manual. They do not store vibrato or other parameter settings. If you want to save and recall the overall instrument settings (including effects), use the Settings pop-up menu.

On keys C# to A#, the percussion works only if the Percussion Mode is set to Always. See Percussion options.

The default range for preset (registration) keys spans MIDI note numbers 24 to 35 (C0 to B0). This means that the lowest playable MIDI note number is 36 (C1). You can transpose the keyboard range in Logic Pro or Vintage B3 itself. A 61-note keyboard—which spans notes C to C—can be played across the entire range when Logic Pro Transpose values are set to 0. The preset (registration) keys are positioned one octave below this transposed or non-transposed range. See Use a single-channel controller with Vintage B3.

Choose a registration

1. In Logic Pro, do any of the following:
   - Choose a preset key from the UM Preset pop-up menu (upper manual).
   - Choose a preset key from the LM Preset pop-up menu (lower manual).
   - Play *one* of the preset key MIDI notes (MIDI note numbers 24 to 35).

     Note: MIDI note 24 (C0) is assigned as a "clear" key that initializes the current registration.

Initialize a registration

1. In Logic Pro, do any of the following:
   - Choose None from the UM Preset pop-up menu (upper manual).
   - Choose None from the LM Preset pop-up menu (lower manual).
   - Play MIDI note number 24 (C0). The MIDI to Preset Keys button must be turned on if you want to use MIDI note 24.
   - Tap the UM Cancel or LM Cancel button.

Switch Vintage B3 registrations while playing (organ gate effect)

1. In Logic Pro, hold the Clear key (C0) on your master keyboard with the small finger of your left hand, while sustaining a chord with your right hand.
2. Press the preset keys with the other fingers of your left hand.

   The chord being played with your right hand is retriggered (with the new registration) each time you play one of the preset keys. This two-handed technique results in an organ-specific gate-type effect. Each time you switch to a new registration, the chord is retriggered.

   Note: The MIDI to Preset Keys button must be turned on for this feature to work.

Turn off MIDI preset key switching

Turn off preset switching with MIDI notes 24 to 35, thus eliminating problems that may arise from transpositions.

1. In Logic Pro, tap MIDI to Preset Keys to turn it off.

Switch Vintage B3 registrations with a two-draw bar controller

When you use a two-draw bar hardware controller, there is an additional mode that allows Hammond-like switching between two registrations. By default, moving draw bars always changes the registration of the currently active preset registration key. This works differently in a real Hammond organ, where the draw bars affect only the Bb (upper manual) and B (lower manual) preset registrations. You can use the “Drawbar Affects” feature to prepare a new registration while playing, then switch to the new registration later.

1. In Logic Pro, choose the *B and Bb Key* item from the Drawbar Affects pop-up menu in the Preset section.

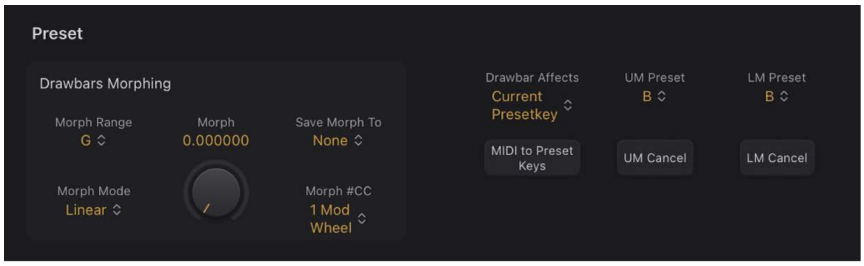
   The upper manual drawbars can now change the registration of the Bb preset key, and the drawbars of the lower manual affect the B preset key.

2. Change the drawbars of the Bb preset key. You can play the keyboard while doing so, without changing the currently chosen registration.

3. Switch to the prepared registration with the Bb preset key.

Use Vintage B3 Morph controls in Logic Pro for iPad

You can switch—or smoothly crossfade (morph)—between the presets of the upper manual. See Use Vintage B3 preset keys.



Learn a MIDI controller for morphing

1. In Logic Pro, choose -Learn MIDI- from the Morph #CC pop-up menu in the Preset Drawbars Morphing section.

   When Learn is active, the parameter is assigned to the first appropriate incoming MIDI data message.

2. Move the MIDI controller on your MIDI device.

   Learn mode has a 20-second time-out function: if Vintage B3 does not receive a MIDI message within 20 seconds, the parameter reverts to its original MIDI controller assignment.

Set the Vintage B3 morph range

Once you have chosen a controller to use for switching or morphing between upper manual registrations, you can determine the number of preset keys that are affected. You can morph between two and eleven presets for the upper manual.

Morphing always begins with the top preset key, the B.

1. In Logic Pro, choose a Morph Range pop-up menu value in the Preset Drawbars Morphing section.
    - When Morph Range pop-up menu value = A#, you morph between two presets.
    - When Morph Range pop-up menu value = G#, you morph between four presets (B, A#, A, and G).
    - When Morph Range pop-up menu value = F#, you morph between six presets (and so on).

Save a registration while morphing

In Linear mode (morphing), the seamless crossfades result in a variety of new drawbar registrations that you might want to save to preset keys. You can change drawbar positions manually, before saving.

- In Logic Pro, choose a preset key from the “Save Morph To” pop-up menu in the Preset Drawbars Morphing section.

Keyboard parameters

Vintage B3 MIDI setup overview in Logic Pro for iPad

Vintage B3 is unique among the included instruments in that it can be played with three simultaneous controllers—namely, a MIDI bass pedal unit and two 73-key MIDI keyboards. This mirrors the two 73-key manuals (organ terminology for keyboards) and the 2-octave pedalboard configuration of the original B3. See Use multiple or multichannel controllers with Vintage B3 for more information.

Vintage B3 can also be played with a standard 61-key (5 octaves C to C) MIDI keyboard. See Use a single-channel controller with Vintage B3 for more information.

Vintage B3 also emulates B3 preset keys—the lowest octave of attached MIDI keyboards can switch between Vintage B3 registrations. This matches the behavior of the original B3, which features a number of inverted (black) keys in the lowest octave of each manual. These inverted keys are used as buttons that recall preset registrations (a preset of your draw bar settings). See Use Vintage B3 preset keys.

For information about setup and use of dedicated MIDI draw bar controllers, see Set a Vintage B3 MIDI control mode.

Use multiple or multichannel controllers with Vintage B3 in Logic Pro for iPad

By default, Vintage B3 receives the notes for the upper and lower manuals, and for the pedalboard, on three consecutive MIDI channels, mapped as follows:

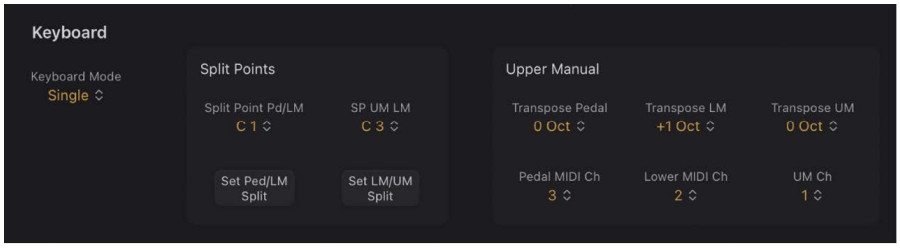
- MIDI channel 1: You play the upper manual sound.
- MIDI channel 2: You play the lower manual sound.
- MIDI channel 3: You play the pedalboard sound.

This allows you to simultaneously play Vintage B3 with up to three MIDI controllers. You can also use a single-manual master keyboard—with different keyboard zones, or a keyboard split feature—that sends data on different MIDI channels to address all three Vintage B3 sounds simultaneously. Each keyboard zone can be transposed independently. You can use any of your MIDI interface inputs for your master keyboard or pedalboard. Regardless of the input devices used, the only relevant factor is the MIDI send channel.

Note: See the user manual for your master keyboard to learn how to set up splits and zones or how to set its MIDI transmission channel (often called *TX Channel*).

Set the keyboard mode

There are three keyboard modes: single, split, and multi.



1. In Logic Pro, choose an option from the Keyboard Mode pop-up menu.
    - *Single:* Uses the entire keyboard. You can only play the upper sound.
    - *Split:* Divides the keyboard into two. You can play the upper and lower sounds in different keyboard zones.
    - *Multi:* Divides the keyboard into three. You can play the upper, lower, and pedalboard sounds in different keyboard zones.

Change the default MIDI channels

Changing MIDI channels can be useful when you perform live and require quick access to another sound module.

1. In Logic Pro, choose *Multi* from the Keyboard Mode pop-up menu.
2. Change the channel numbers for the upper, lower, and pedal manuals with the Pedal, Lower, and UM MIDI Ch pop-up menus.

Set keyboard zones

1. In Logic Pro, choose *Split* from the Keyboard Mode pop-up menu.
2. Tap the StLMSP and/or the StUMSP button.
3. Choose a note name/number in the Split Point Pd/LM pop-up menu and/or the SP LM/UM pop-up menu.

   Note: If you select the same value for both split points, the lower manual is turned off. If the lower/pedal split is moved above the upper/lower split, the other split point is moved (and vice versa).

Transpose keyboard zones by octaves

You can make transpositions that are independent of the global Vintage B3 Tune parameter or transposition features of Logic Pro. These have no impact on the preset keys which is particularly important when you want to use preset switching. See Use Vintage B3 preset keys when split keyboard mode is active.

1. In Logic Pro, choose *Split* from the Keyboard Mode pop-up menu.
2. Choose an octave value (+/– 2 octaves) in one or more of the Transpose Pedal, Transpose LM, or Transpose UM pop-up menus.

Use a single-channel controller with Vintage B3 in Logic Pro for iPad

If you don't have a master keyboard that allows multichannel transmission, you can use a MIDI keyboard that is capable of transmitting on only one MIDI channel. You can use Vintage B3 Split parameters to split the keyboard in order to play upper, lower, and pedal sounds in different keyboard zones. Each keyboard zone can be transposed independently.

Set the keyboard mode

1. In Logic Pro, choose an option from the Keyboard Mode pop-up menu in the Keyboard parameter section.



- *Single:* Uses the entire keyboard. You can only play the upper sound.
- *Split:* Divides the keyboard into two. You can play the upper and lower sounds in different keyboard zones.
- *Multi:* Divides the keyboard into three. You can play the upper, lower, and pedalboard sounds in different keyboard zones.

  Note: Technically, Vintage B3 remaps the incoming single-channel MIDI data into two or three MIDI channels when either split or multi keyboard mode is active.

Change the default MIDI channels

Changing MIDI channels can be useful when you perform live and require quick access to another sound module.

1. In Logic Pro, choose *Multi* from the Keyboard Mode pop-up menu in the Keyboard parameter section.
2. Change the channel numbers for the upper, lower, and pedal manuals with the Pedal, Lower, and UM MIDI Ch pop-up menus.

Set keyboard zones

1. In Logic Pro, choose *Split* from the Keyboard Mode pop-up menu in the Keyboard parameter section.
2. Tap the StLMSP and/or the StUMSP button.
3. Choose a note name/number in the Split Point Pd/LM pop-up menu and/or the SP LM/UM pop-up menu.

   Note: If you select the same value for both split points, the lower manual is turned off. If the lower/pedal split is moved above the upper/lower split, the other split point is moved (and vice versa).

Transpose keyboard zones by octaves

You can make transpositions that are independent of the global Vintage B3 Tune parameter or transposition features of Logic Pro. These have no impact on the preset keys which is particularly important when you want to use preset switching. See Use Vintage B3 preset keys when split keyboard mode is active.

1. In Logic Pro, choose *Split* from the Keyboard Mode pop-up menu in the Keyboard parameter section.
2. Choose an octave value (+/– 2 octaves) in one or more of the Transpose Pedal, Transpose LM, or Transpose UM pop-up menus.

Use a MIDI draw bar controller

Set a Vintage B3 MIDI control mode in Logic Pro for iPad

You can choose a supported external MIDI controller to use with Vintage B3.

The MIDI Mode pop-up menu in the Global section determines the way Vintage B3 draw bars respond to remote MIDI control change messages. Most users won't need to change anything here.

If you own a MIDI draw bar organ, you'll want to use its hardware draw bars to control Vintage B3. Most hardware draw bar organs use an independent MIDI control change number for each draw bar.

Choose a MIDI hardware controller

1. In the Logic Pro Vintage B3 Global section, choose a device (mode) from the MIDI Mode pop-up menu. Choose Off if you do not own a supported device and don't want to use a special assignment mode.
   - Choose Roland VK or Korg CX mode if you use a Roland VK series or Korg CX-3 draw bar organ as a remote controller for Vintage B3.
   - Choose Hammond Suzuki mode if you use a Hammond XB series organ as a remote controller for Vintage B3.
   - Choose Native Instruments B4D mode if you use a Native Instruments B4D remote controller for Vintage B3.
   - Choose Nord Electro mode if you use a Clavia Nord Electro 2 as a remote controller for Vintage B3.
   - Choose a Crumar mode if you use a Crumar Mojo Classic or another controller that supports Crumar mode as a remote controller for Vintage B3.

Vintage B3 Roland VK or Korg CX mode in Logic Pro for iPad

The table outlines MIDI controller assignments when MIDI mode is set to Roland VK or Korg CX. Choose either setting if you use a Roland VK series or Korg CX-3 draw bar organ as a remote controller for Vintage B3.

Controller number	MIDI mode VK or CX: assigned parameter
70	draw bar 16′
71	draw bar 5 1/3′
72	draw bar 8′
73	draw bar 4′
74	draw bar 2 2/3′
75	draw bar 2′
76	draw bar 1 3/5′
77	draw bar 1 1/3′
78	draw bar 1′
Rotor Cabinet	
80, 92	Slow/Brake/Fast
81	Slow/Brake
Reverb	
82	Reverb Level
Vibrato	
85	Upper Vibrato on/off
86	Lower Vibrato on/off

Controller number	MIDI mode VK or CX: assigned parameter
87	Chorus Vibrato Type
Percussion	
94	on/off
95	2nd/3rd
102	Percussion Volume
103	Percussion Time
Equalizer	
104	EQ Low
105	EQ Mid
106	EQ Hi
107	EQ Level
Wah	
108	Wah Mode
109	Wah Bite
Distortion	
110	Distortion Type
111	Distortion Drive
112	Distortion Tone
Click Levels	
113	Click On Level
114	Click Off Level
Balance	
115	Main Volume
116	Lower Volume
117	Pedal Volume
Rotor Fast Rate	
118	Rotor Fast Rate

Vintage B3 Hammond Suzuki modes in Logic Pro for iPad

The table outlines MIDI controller assignments when MIDI mode is set to Hammond Suzuki models. The SK and XK settings match the controller mapping of Hammond XB-series organs.

Controller number	MIDI mode Hammond Suzuki: assigned parameter
80	All upper draw bars
81	All lower draw bars
82	Pedal draw bars, Scanner Vibrato, Bass Filter
Rotor Cabinet	
Leslie On	Rotor Cabinet on/off
Leslie Fast	Slow/Brake
Leslie Brake	Controls Brake function of Rotor Cabinet
Vibrato	
Vibrato On	Upper Vibrato on/off (on XK-3 only)
Vibrato Mode	Vibrato type (V1-C3, XK-3 only)
87	Chorus Vibrato type
Drive	Distortion Drive
Reverb Level	Reverb Level
Perc 2nd and Perc 3rd	Percussion Harmonic, 3rd harmonic has priority over 2nd. Translation from XK buttons to Vintage B3 is as follows: • 2nd off, 3rd off x Vintage B3 Percussion off • 2nd on, 3rd off x Vintage B3 2nd Harmonic • 2nd off, 3rd on x Vintage B3 3rd Harmonic • 2nd on, 3rd on x Vintage B3 3rd Harmonic
Perc Fast	Selects a preset decay time for fast or slow decay
Perc Soft	Selects a preset level for either soft or normal percussion
Vibrato Mode	Selects either Vibrato Off, V1/V2/V3, or C1/C2/C3 (XK-2 only)
Vibrato VC	Switches between Vibrato or Chorus Vibrato (XK-2 only)

Vintage B3 Native Instruments B4D mode in Logic Pro for iPad

The table outlines MIDI controller assignments when MIDI mode is set to Native Instruments B4D. This setting matches the controller mapping of the Native Instruments B4D controller.

Controller number	MIDI mode Native Instruments B4D: assigned parameter
12	Upper draw bar 16′
13	Upper draw bar 5 1/3′
14	Upper draw bar 8′
15	Upper draw bar 4′
16	Upper draw bar 2 2/3′
17	Upper draw bar 2′
18	Upper draw bar 1 3/5′
19	Upper draw bar 1 1/3′
20	Upper draw bar 1′
21	Lower draw bar 16′
22	Lower draw bar 5 1/3′
23	Lower draw bar 8′
24	Lower draw bar 4′
25	Lower draw bar 2 2/3′
26	Lower draw bar 2′
27	Lower draw bar 1 3/5′
28	Lower draw bar 1 1/3′
29	Lower draw bar 1′
Vibrato	
31	Upper Vibrato on/off
30	Lower Vibrato on/off
Brightness	Vibrato
Attack Time	Chorus Intensity
Percussion	
Sostenuto	Percussion on/off
Release Time	Percussion Harmonic (2nd/3rd)
Sound Variation	Percussion Volume
Harmonic Content	Percussion Time
Equalizer	

Controller number	MIDI mode Native Instruments B4D: assigned parameter
90	EQ Low
70	EQ Mid
5	EQ High
Distortion/Click	
76	Distortion Drive
78	Distortion Tone
75	Click On Level
Leslie	
Pan MSB	Microphone Angle
3	Microphone Distance
GP 8	Leslie Accelerate/Decelerate
GP 7	Leslie Fast
ModWheel MSB	Leslie Speed
68	Controls Brake function: if Value = 0.0, switches Leslie to Brake. All other values switch Leslie to previous speed.

Vintage B3 Nord modes in Logic Pro for iPad

The table outlines MIDI Control Change Message number assignment when MIDI mode is set to Nord Electro or C2D. This setting matches the controller mapping of the Clavia Nord Electro and C2D.

Controller number	MIDI mode Nord Electro: assigned parameter
16	Upper draw bar 16′
17	Upper draw bar 5 1/3′
18	Upper draw bar 8′
19	Upper draw bar 4′
20	Upper draw bar 2 2/3′
21	Upper draw bar 2′
22	Upper draw bar 1 3/5′
23	Upper draw bar 1 1/3′
24	Upper draw bar 1′
70	Lower draw bar 16′
71	Lower draw bar 5 1/3′
72	Lower draw bar 8′

Controller number	MIDI mode Nord Electro: assigned parameter
73	Lower draw bar 4′
74	Lower draw bar 2 2/3′
75	Lower draw bar 2′
76	Lower draw bar 1 3/5′
77	Lower draw bar 1 1/3′
78	Lower draw bar 1′
Chorus/Vibrato	
85	Upper Vibrato on/off
86	Lower Vibrato on/off
84	Vibrato mode (selection goes from V1 to C3, C0 is excluded)
Percussion	
87	Percussion on/off
88	Percussion Volume (soft/normal) and Time (short/long)
95	Percussion Harmonic (2nd/3rd)
Equalizer	
113	EQ High
114	EQ Low
Distortion/Click	
111	Distortion Drive
Leslie	
GP 6	on/off
GP 7	Leslie Speed
GP 8	Controls Brake function

Vintage B3 Crumar modes in Logic Pro for iPad

The table outlines MIDI Control Change Message number assignment when MIDI mode is set to Crumar or Crumar Classic. This setting matches the controller mapping of the Crumar Mojo Classic.

Controller number	MIDI mode Crumar: assigned parameter
12 to 20	Upper draw bars 1 to 9
21 to 29	Lower draw bars 1 to 9
33 and 35	Pedal 1 and 2
55	Pedals to Lower
56	Pedalboard Release Time
Chorus/Vibrato	
31	Upper Vibrato on/off
30	Lower Vibrato on/off
73	Vibrato mode (selection goes from V1 to C3, C0 is excluded)
Percussion	
66	Percussion on/off
70 and 71	Percussion Volume (soft/normal) and Time (short/long)
89	Percussion Level
72	Percussion Harmonic (2nd/3rd)
Equalizer	
10	EQ High
9	EQ Mid
8	EQ Low
Reverb	
91	Reverb Amount
Distortion/Click	
76	Distortion Drive
75	Key Click
Leakage/Crosstalk	
86	Leakage
87	Crosstalk
88	Crosstalk Shape
Leslie	
85	on/off

Controller number	MIDI mode Crumar: assigned parameter
1	Leslie Speed
68	Controls Brake function
Speaker/Mic	
90	Balance
93	Mic. Distance
94	Horn EQ

B3 and Leslie information

Additive synthesis with draw bars

The Hammond B3 is *the* classic draw bar organ. As with an air-driven pipe organ, the registers (draw bars, or “stops” on a pipe organ) can be pulled out to engage them. In contrast to a pipe organ, however, the B3 allows seamless mixing of any draw bar registers. The closer toward you that the draw bars are dragged, the louder the corresponding tones.

Despite characteristics such as key clicks, variable intonation, distortions, and crosstalk (all of which Vintage B3 emulates), playing a single note, with a single register, results in a pure sine tone. Mixing sine tones results in more complex harmonic spectra; this is known as *additive synthesis*. Organs—even pipe organs—can be regarded as additive synthesizers. Several limitations should be considered before viewing the instrument in this way. These limitations, on the other hand, constitute the charm and character of any real musical instrument.

The naming of the draw bars is derived from the length of organ pipes, measured in feet (′). This naming convention is still used with electronic musical instruments.

- Halving the length of a pipe doubles its frequency.
- Doubling the frequency results in an upward transposition of one octave.

The lowest register—16′ (far left, brown draw bar)—and the higher octave registers—8′, 4′, 2′, and 1′ (white draw bars)—can be freely mixed, in any combination. 16′ is commonly described as the *sub-octave*. With the sub-octave regarded as the fundamental tone, or first harmonic, the octave above 8′ is the second harmonic, 4′ the fourth harmonic, 2′ the eighth harmonic, and 1′ the sixteenth harmonic.

With the 5 1/3′ register—the second brown draw bar—you can add the third harmonic. This is the fifth above the 8′. Basically, the draw bars are arranged by pitch, with one exception. The second draw bar (5 1/3′) sounds a fifth higher than the third draw bar. See the residual effect for an explanation.

The 2 2/3′ register generates the sixth harmonic, 1 3/5′ the tenth harmonic, and 1 1/3′ the twelfth harmonic.

An electromechanical tonewheel organ offers the choice of the following registers/harmonics: 1 (16′), 2 (8′), 3 (5 1/3′), 4 (4′), 6 (2 2/3′), 8 (2′), 10 (1 3/5′), 12 (1 1/3′), and 16 (1′). As you can see, the harmonic spectrum is nowhere near complete. This is one of the main reasons for the common practice of using overdrive and distortion effects with electromechanical tonewheel organs—they enrich the harmonic spectra by generating more harmonics.

Note: 2 2/3′ is the fifth over 4′. 1 3/5′ is the major third over 2′. 1 1/3′ is the fifth over 2′. In the bass range, this can lead to inharmonic tones, especially when playing bass lines in a minor key. This is because mixing 2′, 1 3/5′, and 1 1/3′ results in a major chord.

The residual effect

The residual effect is a psychoacoustic phenomenon. Humans can perceive the pitch of a note, even when the fundamental tone is completely missing. If you pull out all registers of a draw bar organ, except for the fundamental—16′—you'll still perceive the same pitch. The sound becomes thinner, with less bass and less warmth, but the pitch remains the same.

If human beings didn't hear this way, it would make listening to music on a small transistor radio impossible. The tiny speaker of a small radio can't accurately play back the fundamental tone of the bass line because this frequency is far below the range that the speaker can reproduce.

Setting draw bar registrations often involves this psychoacoustic phenomenon. In the lower octaves, mixing the 8′ and 5 1/3′ sine draw bars creates the illusion of a 16′ sound, although the lower frequency is missing.

Old pipe organs also make use of the residual effect, by combining two smaller pipes, thus eliminating the need for long, heavy, and expensive giant pipes. This tradition is continued in modern organs and is the reason for arranging the 5 1/3′ under 8′: the 5 1/3′ tends to create the illusion of a pitch that is one octave lower than 8′.

Tonewheel sound generation

Tonewheel sound generation resembles that of an air horn, or a siren. Of course, there's no air being blown through the holes of a revolving wheel. Rather, an electromagnetic pickup, much like a guitar pickup, is used to capture the sound.

A notched metal wheel, called a *tonewheel*, revolves at the end of a magnetized rod. The teeth of the wheel cause variations in the magnetic field, inducing an electrical voltage. This voltage/tone is then filtered, has vibrato and expression applied to it, and is then amplified.

An AC synchronous motor drives a long drive shaft. Twenty-four driving gears with 12 different gear sizes are attached to the shaft. These gears drive the tonewheels. The frequency depends on the gear ratios and the number of notches in the wheels. The Hammond is tuned to an (almost exact) equal-tempered scale.

As with pipe organs that feature multiplexed registers, the Hammond organ uses certain generators for more than one purpose. Some high frequency wheels serve as the fundamental for high notes and provide harmonics for lower notes. This has a positive impact on the overall organ sound, avoids detuning, and stabilizes levels between octaves.

A brief Hammond history

Three inventions inspired Laurens Hammond (1895–1973), a manufacturer of electric clocks, to construct and market a compact electromechanical organ with tonewheel sound generation. The Telharmonium by Thaddeus Cahill was the musical inspiration; Henry Ford's mass production methods and the domestic synchron clock motor were the other factors.

The Telharmonium (built around 1900) was the first musical instrument that made use of electromechanical sound generation techniques. Its immense tonewheel generators filled a two-story building in New York. For a short period around this time, subscribers could order Telharmonium music over the New York telephone network (the streaming audio system of the time). The only amplification tool was the telephone mechanical diaphragm because a proper tube amplifier and acceptable speakers had not yet been invented. The Telharmonium was a commercial flop, but its historical status as the predecessor of modern electronic musical instruments is undeniable. The Telharmonium also introduced the principles of electronic additive synthesis. See Additive synthesis with draw bars.

Laurens Hammond began producing organs in 1935 in Chicago, Illinois, making use of the same sound generation method. However, he used much smaller tone generators and fewer registers. The patent for his model A organ dates from 1934.

Hammond also holds the patent for the electromechanical spring reverb, still found in countless guitar amplifiers today.

The Hammond B3 was manufactured between 1955 and 1974. It is the Hammond model preferred by jazz and rock organ players, such as Fats Waller, Wild Bill Davis, Brother Jack McDuff, Jimmy Smith, Keith Emerson, Jon Lord, Brian Auger, Steve Winwood, Joey DeFrancesco, and Barbara Dennerlein.

In addition to the B3, there are a number of smaller Hammond instruments, known as the spinet series (M3, M100, L100, T100). Bigger console models, many of which were designed to suit the needs of American churches or theaters (H100, X66, X77, E100, R100, G-100), were also manufactured.

The production of electromechanical organs ceased in 1974. Thereafter, Hammond built fully electronic organs.

The Hammond name lives on in the Hammond-Suzuki range of electronic draw bar organs, starting with the 2002 release of a digital B3 model that mimics the design and functions of the classic B3 (without the weight). This model, as well as newer units, can be partnered with real, mechanical, rotor speaker cabinets, also from the company.

The Leslie cabinet

Don Leslie developed his rotor cabinets in 1937 and began marketing them in 1940. Laurens Hammond wasn't keen on the concept of rotating speakers at all.

Leslie's approach was to simulate a variety of locations in the pipes (as in pipe organs), resulting in a new spatial perception for every note. The rotor speaker cabinets could simulate this effect, and the sense of space that they impart is incomparable, when placed side-by-side with any fixed speaker. The periodic undulations in sound and volume and the vibrato caused by the Doppler effect (see below) aren't all there is to the Leslie sound—it's the spatial effect, too.

The "classic" Leslie speaker design features two drivers—a treble driver with horns (only one works; the other simply acts as a counter-weight) and a bass driver. The horns of the treble driver and the sound baffle of the bass driver are physically rotated by electric motors.

Because the speakers rotate toward the front of the cabinet (the listening position), then toward the back of the cabinet, you hear a "Doppler effect"—where sounds become louder and brighter as their position changes. To give you an idea of this effect, it is much like the sound of a train going past if you were standing on the platform. On approach, the sound is muffled, but then it becomes both louder and brighter as the train passes, and finally it becomes more muffled as it moves away from you.

The rotating driver/sound baffle can be switched between two speeds—fast/Tremolo or slow/Chorale (or stopped completely with a mechanical brake). The transition between the two speeds, or the use of a fixed speed, produces the characteristic "Leslie" vibrato, tremolo, and chorus effects.

The first Leslie, the model 30, had no Chorale—just tremolo and stop. The Chorale idea (which came much later) was born of a desire to add a vibrato to the organ. Chorale, which offers far more than a simple vibrato, was first introduced to the market with the 122/147 models. At this time, Leslie also added the "Voice of the pipe organ" label to his cabinets.

It wasn't until 1980 that the two companies and brand names came together, six years after the last tonewheel organ was built. Mechanical Leslie rotor cabinets are still being built today, by the Hammond-Suzuki company.

Vintage Clav

Vintage Clav in Logic Pro for iPad

Vintage Clav emulates the classic Hohner D6 Clavinet. The sound of the D6 is synonymous with funk, but it was also popularized in the rock, pop, and electric jazz of the 1970s by artists like Stevie Wonder, Herbie Hancock, Keith Emerson, Foreigner, and the Commodores. If you've heard "Superstition" or "Higher Ground" by Stevie Wonder, then you know the D6 sound. See D6 Clavinet history.



Vintage Clav uses a component modeling synthesis engine that not only simulates the basic sounds of the D6 but also the various string buzzes, key clicks, and the tone of the pickups found in the original instrument. Vintage Clav accurately emulates the pluck and bite of the attack phase as well as the sticking of the hammer pads. See D6 Clavinet mechanical details.

The Vintage Clav synthesis engine improves on the Hohner D6 Clavinet with a stereo, rather than mono, output. The 60-key range (F to E) of the original D6 has also been extended across the full 127 MIDI note range.

You can radically alter the tone of the instrument, enabling you to simulate an aging D6 or to create unique new timbres that have little in common with the sound of a clavinet. See Click and Excite controls and String parameters.

Vintage Clav also incorporates an effects section that emulates classic wah, distortion, and modulation processors—often used with the original instrument. The effects are modeled on vintage effect pedals and adapted for optimized use with Vintage Clav.

To add Vintage Clav to your project, choose it from the Instrument > Vintage Keys submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Vintage Clav models in Logic Pro for iPad

The Model pop-up menu lets you choose a basic type of tone, or model. Each model offers a unique tonal characteristic and different harmonic structure, designed to create very different sounds. See Vintage Clav models.

The individual models are fully realized instruments and are immediately playable, without further modification. You can shape the tonal character of any loaded model with the string, click, pitch and other model editing parameters.

In some respects, you can view the choice of model as being similar to selecting an oscillator waveform in a synthesizer. As with raw synthesizer waveforms, parameters can affect the model quite differently. For example, using identical parameter settings can make one model more nasal sounding and another model more noisy.

Note: When playing, you may notice some points on the keyboard where the sound changes significantly between adjacent keys. This is intentional and reflects the behavior of some of the clavinet models emulated by Vintage Clav. The original D6 has some strong key-to-key timbral differences, the most obvious being between the highest wound string, and the lowest, non-wound string. If you like the sound of the original instrument but not the mechanical timbre jumps, try the Mellotone model.

Vintage Clav model characteristics in Logic Pro for iPad

The table outlines the characteristics of each clavinet model.

Model name	Comments
Belltone	A bell-like model with strong inharmonic overtones (inharmonicities).
Classic I and II	Classic I is a near exact emulation of the original D6. It includes string noises on long decays and accurate behavior following the release of keys. Each D6 was unique in its way, so you can adjust the sound to match the tone of D6 clavinets you have heard. Classic II is brighter and more punchy.
Dulcitone	A dulcimer-like model.
Funktone	This model invites heavy, funk-style bass playing in the lower octaves, coupled with sustained chords in the mid-to-upper octaves. It works well with phaser and delay effects. In the lower bass-octave ranges, the string oscillations become increasingly resonant over time, until they finally collapse (after 20 to 30 seconds). Higher notes have a much shorter decay, which has a corresponding impact on the resonating behavior.
Harpsitone I and II	Harpsichord-like models.
Mellotone	This model is smooth and mellow sounding across the entire keyboard range.

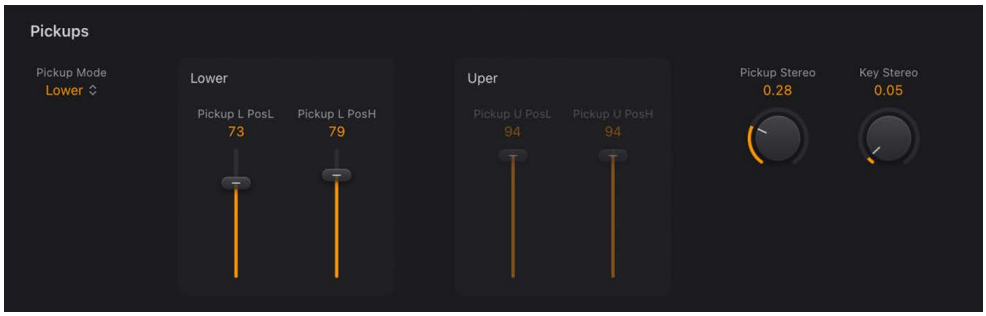
Model name	Comments
Plectratone I and II	These models emulate a picked string. Change the pickup positions to make the sound more guitar-like. For a harp-like sound, position the lower pickup near the mid point and increase String Release and (Excite) Shape knob values, while decreasing (Excite) Brilliance.
Sitartone	A sitar-like sound, rich in resonance.
Vintage I and II	These models emulate a D6 with aged and worn hammers and strings. The sound of the sticky hammer heads is modeled as well as the richer bass range.
Woodtone	This model sounds wooden, thin, and contains inharmonic overtones. It can sound slightly detuned in some contexts.

Vintage Clav pickups in Logic Pro for iPad

The original D6 is equipped with two electromagnetic pickups, much like those found in electric guitars—one below the strings (lower) and one above the strings (upper). In contrast to the fixed pickups of the original instrument, Vintage Clav pickups can be set to arbitrary positions *and* angles.

Unlike the original D6, Vintage Clav has a stereo output that you can configure with the Key Stereo and Pickup Stereo knobs.

Also central to the D6 sound are the color switches. The four tone controls of the D6 are switchable high or low pass filters that change the preamplifier EQ response in the original instrument.



Try moving pickup positions while repeatedly striking a note to hear the effect that the pickup position has on the overall tone. Interesting, phaser-like effects can be achieved by automating the pickup positions.

Settings with both pickups placed near the upper end of the strings and active Brilliant and Treble color switches result in a weak fundamental tone. Therefore, you mostly hear the overtones of the chosen model. These can be "out of tune," particularly for models such as Wood, which has strong inharmonic content. Move the pickups halfway along the strings with the lower and upper Pickup Position sliders, and deactivate all color switches to circumvent this detuned effect.

You can cross over the pickup positions. This may lead to a hole (silent or very quiet notes) in your keyboard range. This is due to phase cancelations between the pickups. If you encounter this phenomenon, adjust the position of one or both pickups—until the quiet or silent notes are playable.

Pickup parameters

- *Pickup Mode pop-up menu:* Choose to activate one or both pickups. Lower and Upper activate a single pickup. The Lower-Upper (out of phase) and Lower+Upper (in-phase) options activate both pickups, which run in parallel. Choose Lower+Upper for a richer sound. Choose Lower-Upper for a thinner sound.

  Tip: Experiment with different pop-up menu options and different color switch settings.

- *Pickup L PosL slider and field:* Use to move the lower pickup position for the low strings.
- *Pickup L PosH slider and field:* Use to move the lower pickup position for the high strings.
- *Pickup U PosL slider and field:* Use to move the upper pickup position for the low strings.
- *Pickup U PosH slider and field:* Use to move the upper pickup position for the high strings.
- *Pickup Stereo knob and field:* Use to spread the two pickup signals across the stereo spectrum when both pickups are active (Upper+Lower or Upper-Lower modes). Higher values move the signals of both pickups away from the center position—one further to the right and the other further to the left. Set this parameter to the maximum value for extreme left/right panning.
- *Key Stereo knob and field:* Set the range for key scale modulation of the panning position. In other words, the played keyboard note position determines the panning position. Set this parameter to the maximum value for extreme left/right panning which starts from MIDI note number 60 (C3). The higher or lower you play, the further away the sound is from the center pan position.

  Note: You can use both stereo spread types at the same time. They are automatically mixed.

- *Level knob and field:* Set the overall output level.

  Note: MIDI controller 11 (Expression) scales the output level—unless it is assigned to control Wah or Damper parameters.

- *Damper slider and field:* Mute the strings. The Damper parameter can also be controlled with a MIDI controller. See Vintage Clav misc parameters.

Adjust a pickup angle

In this example, only the Lower pickup is active.

- In Logic Pro, adjust the Pickup L PosL slider while leaving the Pickup L PosH slider value untouched.

  This changes the angle between the two ends of the pickup, which is similar to that used on an electric guitar.

Reposition a pickup

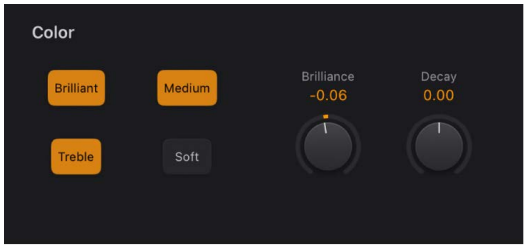
In this example, only the Lower pickup is active.

- In Logic Pro, adjust *both* the Pickup L PosL slider and the Pickup L PosH slider to the same value.

  This effectively moves the pickup to a new position along the strings.

Vintage Clav color controls in Logic Pro for iPad

Central to the D6 sound are the color switches. The four tone controls of the D6 are switchable high or low pass filters that change the preamplifier EQ response in the original instrument.



Color parameters

- *Filter switches:* The four filter switches emulate the original tone control switches of the D6. Brilliant and Treble are different high pass filters that create an edgy and punchy tone. The Medium and Soft switches act as a low pass filter for mellower, darker tones. Experiment with different switch combinations.
  - *Brilliant switch:* Make the sound nasal with a strong bass cut.
  - *Medium switch:* Make the sound thinner with a slight bass reduction.
  - *Treble switch:* Make the sound sharper with a gentle bass cut.
  - *Soft switch:* Make the sound softer or more muted.
- *Brilliance knob and field:* Set the level of the harmonic content caused by string excitation. Positive values—to the right—result in a sharper sound. Negative values result in a more muted sound.
- *Decay knob and field:* Set the decay time of the strings, following the attack phase of a played note. Positive values increase the decay time. Negative values reduce the decay time.

Effects

Vintage Clav effects in Logic Pro for iPad

No clavinet simulation would be complete without a selection of effect processors. Vintage Clav incorporates three “classic” foot-pedal effect emulations Wah, Distortion, and Modulation. Each effect is modeled on pedals that were available in the heyday of the Clavinet—the 1970s—adding an authentic sound to your performances. A simple compression circuit is also included.

Vintage Clav effects work in series—where the output of one effect is fed into the next in an effects chain. The FX Order pop-up menu lets you choose whether a distorted signal should be wah-filtered (for funkier sounds) or the wah-filtered sound should be distorted (for screaming sounds)—as an example.

Effects global parameters

- *FX Bypass button:* Turn the entire effects section on or off. Each effect in the effects chain can also be independently turned on or off.
- *FX Order pop-up menu:* Determine the order of the effects chain.

Vintage Clav Wah effect in Logic Pro for iPad

Vintage Clav provides simulations of several classic wah effects, as well as some basic filter types. The name *wah* comes from the sound it produces. It has been a popular effect (usually a pedal effect) with electric guitarists since the days of Jimi Hendrix. The pedal controls the cutoff frequency of a bandpass, lowpass, or—less commonly—highpass filter. Wah wah pedals are also used extensively with the D6.



Wah effect parameters

- *Wah On/Off button:* Turn the Wah effect on or off.
- *Range knob and field:* Set the cutoff frequency of the filter. At the extreme left position, Range limits cutoff modulation to a narrow frequency range. Turn the Range knob to the right to set a wider control range.
- *Env Depth knob and field:* Determine the sensitivity of the (filter) envelope to incoming note velocity messages. An *auto wah* effect is produced by using the integrated envelope follower function, which controls the depth of filter cutoff modulation. In practical terms, this means that the dynamics of your performance directly control the depth of the Wah effect.
- *Mode pop-up menu:* Choose a Wah effect type.
  - *Classic Wah:* This setting mimics the sound of a popular wah pedal with a slight peak characteristic.
  - *Retro Wah:* This setting mimics the sound of a popular vintage wah pedal.
  - *Modern Wah:* This setting mimics the sound of a distortion wah pedal with a constant Q(uality) Factor setting. The Q determines the resonant characteristics. Low Q values affect a wider frequency range, resulting in softer resonances. High Q values affect a narrower frequency range, resulting in more pronounced emphasis.
  - *Opto Wah 1:* This setting mimics the sound of a distortion wah pedal with a constant Q(uality) Factor setting.
  - *Opto Wah 2:* This setting mimics the sound of a distortion wah pedal with a constant Q(uality) Factor setting.
  - *Resonant LP:* In this mode, the Wah works as a resonance-capable lowpass filter. At the minimum pedal position, only low frequencies can pass.
  - *Resonant HP:* In this mode, the Wah works as a resonance-capable highpass filter. At the maximum pedal position, only high frequencies can pass.
  - *Peak:* In this mode, the Wah works as a peak (bell) filter. Frequencies close to the cutoff frequency are emphasized.
- *Pedal Pos slider and field:* The value of this parameter represents the current pedal position, ensuring that it is saved with the setting.

Vintage Clav Compressor effect in Logic Pro for iPad

The Compressor effect is normally used just before the Distortion effect. This allows you to increase or decrease the perceived gain, thus providing a suitable input level to the Distortion circuit. You can, however, place the Compressor at any position in the effects chain with the FX Order pop-up menu or can turn it off completely.

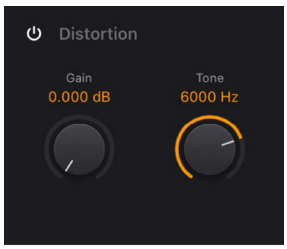


Compressor effect parameters

- *Compressor On/Off button:* Turn the Compressor effect on or off.
- *Ratio knob and field:* Adjust the compression slope. The additional gain offered by the compression circuit—when directly preceding the Distortion effect—lets you create crunchy distortions. The Compressor is also useful for enhancing the key click sound and for emphasizing harmonics in different clavinet models.

Vintage Clav Distortion effect in Logic Pro for iPad

The Distortion effect can provide warm overdrive or aggressive distortion.



Distortion effect parameters

- *Distortion On/Off button:* Turn the Distortion effect on or off.
- *Gain knob and field:* Set the level of the Distortion effect. If Gain is at the minimum value, no distortion is heard.
- *Tone knob and field:* Change the tonal color of the Distortion effect.
  - Use low Tone and Gain settings to create warm overdrive effects.
  - Use high Tone and Gain settings for bright, screaming distortion effects.

Vintage Clav Modulation FX in Logic Pro for iPad

Vintage Clav features a choice of three modulation effect types: Phaser, Flanger, or Chorus.



Modulation FX parameters

- *Modulation FX On/Off button:* Turn the Modulation FX section on or off.
- *Intensity knob and field:* Set the depth of the phasing, flanging, or chorus effect. Use of high Intensity values leads to ensemble-type effects when the Chorus effect is active.

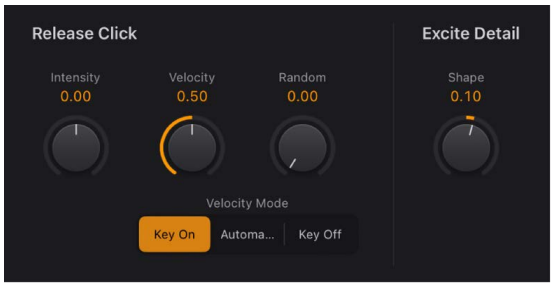
  WARNING: When the Phaser effect is active, high Rate and Intensity values lead to very deep, self-oscillating phase shifts that can damage ears and speakers.
- *Mode buttons:* Choose Phaser, Flanger, or Chorus as the modulation effect.
- *Rate knob and field:* Set the speed of the phasing, flanging, or chorus effect. The rate is set in hertz values, or bar/beat values when the Sync button is turned on.
- *Sync button:* Synchronize the Phaser or Flanger effect to the host application tempo. The Rate knob sets bar and beat values, including triplets.

Modeling controls

Vintage Clav click and excite in Logic Pro for iPad

The Release Click and Excite Detail parameters determine the string excitation, emulating the characteristics and power of the hammers striking the string and other elements that form part of the initial key strike.

Also emulated are string excitations that occur on key release. To explain, the rubber hammers of the original D6 age and decay, just like piano hammer felts. Worn out D6 units produce a distinctive “click” when a key is released. This is due to the string sticking to the rubber hammer before being released. The characteristics of this release click are part of each model and can be precisely adjusted.



Release Click parameters

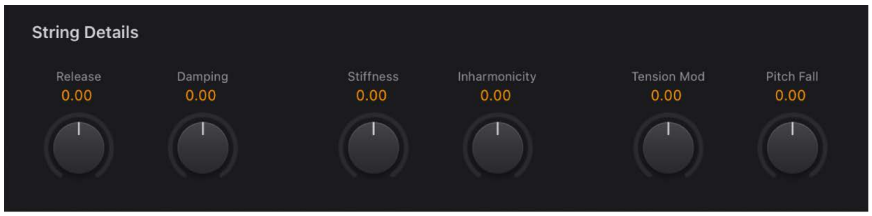
- *Intensity knob and field:* Set the level of the release click. A negative value of –1.00 eliminates the release click. To simulate an old D6, increase the value.
- *Velocity knob and field:* Set the velocity sensitivity for the key click sound. The maximum key click level is set with the Intensity slider and the velocity mode is determined with the Velocity mode switch.
- *Random knob and field:* Control the amount of release click level variance across the keyboard. This slider simulates the wearing of some hammers, but not others, emulating the "wear and tear" of a D6. The farther to the right the slider is moved, the greater the variation between release clicks on some keys. At the leftmost position, all keys have an identical release click level.
- *Velocity Mode buttons:* Turn attack (Key On) or release (Key Off) velocity on or off. Turn on the Automa(tic) button to automatically detect incoming release velocity values. Received release velocity data is used to shape the sound. If no release velocity data is detected, it acts as if it is turned off.

Excite Detail parameter

- *Shape knob and field:* Contour the attack shape, simulating the hardness of the rubber hammers in a D6. As the instrument ages, hammers wear and split, changing brightness and tone. Negative values—to the left—provide a softer attack, and positive values result in a harder attack.

Vintage Clav string parameters in Logic Pro for iPad

The selected model determines the basic qualities of the strings and has a significant bearing on the behavior, and impact, of each String Details parameter. This is primarily due to the different harmonic content present in each model.



String Details parameters

- *Release knob and field:* Set the release time of the strings, following the decay phase of a played note. Positive Release values provide a longer release time—after you have released a key.
- *Damping knob and field:* Change the damping behavior of the strings. Damping is essentially a faster decay for the higher harmonics in a sound. Damping is directly related to the string material properties—high damping for catgut strings, medium damping for nylon strings, and low damping for steel strings. Depending on the model, damping results in a more mellow and rounded, or woody, sound. A positive Damping value makes the sound more mellow. A negative Damping value allows more high harmonics through, making the sound brighter.

- *Stiffness/Inharmonicity knobs and fields:* Intensify or reduce inharmonic overtones. Different values let you create metallic, bell-like sounds or DX-style electric pianos. The controls can also be useful for attaining wood bass sounds.
  - *Stiffness knob:* Control the intensity of the stretching or spectral spreading set by the Inharmonicity control.

    Note: The fundamental note pitch is not affected by the Stiffness and Inharmonicity parameters.
  - *Inharmonicity knob:* Determine the lowest harmonic—the harmonic threshold. Inharmonic content above this threshold is stretched or spread across the frequency spectrum.
- *Tension Mod knob and field:* Add a slight upward pitch bend effect immediately after being plucked, struck, or strummed. This type of modulation is common to stringed instruments like the D6, guitars, and so on. A predefined Tension Modulation characteristic is built into each model, but this can be altered with the Tension Mod parameter. The impact of this parameter can be significant, enabling you to generate strange sound effects with Vintage Clav. You can also use it to simulate an out-of-tune clavinet, or a sitar-like sound.
- *Pitch Fall knob and field:* Set the intensity of a D6 characteristic where the pitch of each note falls immediately after you release the key. This sonic quirk is due to the physical construction of the D6. The intensity of this effect varies with each model, but it can be completely deactivated by setting Pitch Fall to the leftmost position.

Vintage Clav pitch parameters in Logic Pro for iPad

The Pitch Details parameters affect the tuning of the selected model.



Pitch Details parameters

- *Tune knob and field:* Adjust tuning in one-cent intervals. At a value of 0 c (zero cents), the central A key is tuned to 440 Hz, or concert pitch.
- *Stretch Tune knob and field:* Use to deviate from the default equal-tempered scale by altering the bass and treble ends of the sound. This simulates the way stringed keyboard instruments such as pianos are tuned (see information below).

  Note: Use of both Warmth and Stretch Tune may result in a detuned sound that is quite similar to a heavy chorus effect. In some instances, this effect may be so extreme that Vintage Clav sounds out of tune with your project or concert.
- *Warmth knob and field:* Set the amount of random deviation from an equal-tempered scale. High values add life to sounds. The Warmth parameter can be useful when you're emulating an instrument that hasn't been tuned for a while, or for slightly thickening the sound. When you're playing chords, Warmth creates a slight detuning or beating effect between notes.

- *Pres->Freq knob and field:* Adjust aftertouch sensitivity. On an original D6, applying pressure to a depressed key raises the pitch slightly. Pres->Freq emulates this behavior. Values to the left of the center position lower the pitch slightly with aftertouch messages. Values to the right raise the pitch when aftertouch is applied on your MIDI controller.

  Tip: Not all MIDI keyboard controllers generate aftertouch information. Many MIDI keyboard controllers do, however, offer drum pads that send aftertouch information. You can use aftertouch capable drum pads to trigger note and/or aftertouch events.

Stretch tuning in acoustic instruments

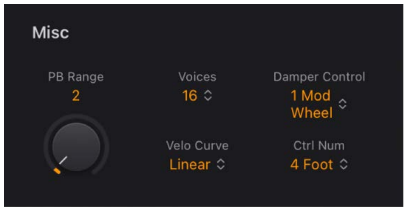
The tones of upright pianos, and to a lesser extent grand pianos (due to their longer strings), have inharmonicities in their harmonic structure. This also applies to other stringed instruments, but it particularly affects pianos due to the length, density, and tension of the strings. If a piano is perfectly tuned to equal temperament across the keyboard range, the overtones of the low strings and the fundamentals of the high strings sound out of tune with each other.

To circumvent this problem, piano tuners use a technique known as *stretch tuning*, where the high and low registers of the piano are tuned higher and lower, respectively. This results in the harmonics of the low strings being in tune with the fundamental tones of the upper strings. In essence, pianos are intentionally “out of tune” (from equal temperament), so that the lower and upper registers sound in tune.

Because the original D6 is a stringed instrument, this inharmonic relationship also applies to Vintage Clav and the instruments it emulates. The stretch feature, however, was primarily included for situations where you want to use Vintage Clav alongside an acoustic piano recording or performance.

Vintage Clav misc parameters in Logic Pro for iPad

The Misc parameters affect the polyphony, keyboard response, and other core aspects of Vintage Clav.



Misc parameters

- *PB Range knob and field:* Determine the pitch bend range in semitone steps. Use your MIDI keyboard pitch bend wheel to control pitch bends.
- *Voices pop-up menu:* Choose the maximum number of voices that can be played simultaneously. Lowering the value of this parameter limits the polyphony and processing requirements of Vintage Clav. There are two monophonic settings: mono and legato. Each setting provides a single voice when playing Vintage Clav.
  - *Mono:* Vintage Clav voice is triggered each time a key is pressed.
  - *Legato:* Vintage Clav sound-shaping processes are not triggered if the notes are played legato—only the pitch changes. If the notes are played staccato, a Vintage Clav voice with all sound-shaping processes is triggered.

- *Velo Curve pop-up menu:* Choose one of nine preset velocity curves to suit your playing style or the selected model. The nine curves available are: Fix 25%, Fix 50%, Fix 75%, Fix 100%, Convex 1, Convex 2, Linear (the default), Concave 1, and Concave 2.
  - *Fixed curves:* These are linear curves with a fixed dynamic range of 25%, 50%, 75%, and 100%.
  - *Convex curves:* These curves are more dynamically responsive in the center octaves of the keyboard range.
  - *Concave curves:* These curves are less dynamically responsive in the center octaves of the keyboard range.
- *Damper Control pop-up menu:* Choose the MIDI controller (or MIDI velocity or aftertouch) you want to use to control the Damper parameter. Off prevents MIDI control of damping.
- *Ctrl Num pop-up menu:* Choose the MIDI controller you want to use as a manual Wah effect control. MIDI foot controllers such as Expression pedals are commonly used for this type of task, but any controller can be assigned. You can also use MIDI velocity or aftertouch messages to control the Wah effect. Off prevents MIDI control.

  Choose the -Learn MIDI- menu item to automatically assign the parameter to the first appropriate incoming MIDI data message, then move the controller on your MIDI keyboard. Learn mode has a 20 second time-out feature. If Vintage Clav does not receive a MIDI message within 20 seconds, the parameter reverts to its original MIDI controller assignment.

  Note: You can simultaneously control the Wah effect with both the integrated envelope follower function (“auto-wah”) and a manual controller. In this situation, the controller events of the envelope follower and manual controls are mixed.

Vintage Clav MIDI parameters in Logic Pro for iPad

Vintage Clav provides two parameters that control response to incoming MIDI messages.

MIDI Mono Mode (MPE) parameters

- *MIDI Mono Mode pop-up menu:* Choose Off, On (Common Base Channel 1), or On (Common Base Channel 16).

  In either Mono mode, each voice receives on a different MIDI channel. Controllers and MIDI messages sent on the base channel affect all voices.
- *Pitch Bend Range knob:* Set a value from 0 to 96.

  The chosen pitch bend range affects individual note pitch bend messages received on all but the assigned Common Base Channel. The default is 48 semitones, which is compatible with the GarageBand for iOS keyboard in pitch mode. When using a MIDI guitar, 24 semitones is the preferable setting because most guitar to MIDI converters use this range by default.

D6 Clavinet information

D6 Clavinet history

The German company Hohner, manufacturer of the D6 Clavinet, was known mainly for its reed instruments (harmonicas, accordions, melodicas, and so on) but had made several classic keyboards prior to the first incarnation of the Clavinet, known as the Cembalet.

Musician and inventor Ernst Zacharias designed the Cembalet in the 1950s. It was intended to be a portable version of the cembalo, or harpsichord—which could be amplified. Its mechanism worked by plucking the end of a flat reed with the key, which was then picked up and amplified, in much the same way as an electric guitar.

A year or two after the Cembalet release, two Pianet models appeared. Both the CH and N models used flat reeds for tone generation but employed a very different plucking/striking action. When a key was depressed, it engaged a sticky pad with a foam backing, which actually stuck to the reed. When the key was released, the weight of the key caused the pad adhesive to free itself from the reed. This made the reed vibrate, and this vibration was then amplified.

The model T Pianet was released several years later and utilized a soft rubber suction pad on the reeds, rather than the adhesive of the CH and N models. This method resulted in limited keyboard dynamics and also damped all reeds on release, thus negating any possibility of sustaining the sound via a foot pedal. Despite these problems, the sound of the model T Pianet was popularized by bands such as The Zombies and Small Faces in the 1960s.

In the years between the releases of the Pianet N and T models, Zacharias invented what was to become Hohner's most successful, and certainly funkiest, keyboard—the Clavinet. The Clavinet was designed to replicate the sound of a clavichord, but with an altogether fuller sound (the clavichord was notoriously thin sounding).

The early models—Clavinet I with a built-in amp, Clavinet II with tonal filters, Clavinet L with its bizarre triangular shape—all led to the Clavinet model C. This, in turn, was refined into the more portable D6. The D6 uses a hammer action, which strikes a string against a metal surface to produce a tone. It has a fully dynamic keyboard because the striker is directly beneath the key—the harder you hit, the louder and more vibrant the tone.

Mention the Clavinet today and most people automatically think of Stevie Wonder's "Superstition"—a recording that owes as much to the D6 as it does to the artist who wrote and performed it. The D6 was later superseded by the E7 and the Clavinet/Pianet Duo. These were basically the same as the D6 but more roadworthy, quieter, and better protected against proximity hums than previous models.

D6 Clavinet mechanical details

Each D6 keyboard key forms a single arm lever. When a key is depressed, a plunger below the key strikes the string and presses it onto an anvil. The string hits the anvil with a strength determined by key velocity, thus affecting both the dynamics and harmonics of the sounding string.

The mechanical vibrations of the action are captured by magnetic pickups and converted into electrical signals, which are amplified and reproduced through speakers.

As the key is released, contact between the plunger/striker and the anvil is immediately broken, leaving the wool-wound part of the string free. This immediately suppresses the string vibration.

When experimenting with Vintage Clav, or auditioning some of the included settings, you may encounter sounds that seem to be triggered on both the note on *and* the note off.

This is actually a feature that emulates the original D6. The real D6 has the “problem” of strings sticking to worn-out hammers, producing a second trigger when the key is released. You can adjust the amount of this release click with the Intensity knob. See Vintage Clav Excite controls.

Vintage Electric Piano

Vintage Electric Piano in Logic Pro for iPad

Vintage Electric Piano simulates the sound of various Rhodes and Wurlitzer pianos as well as the sound of the Hohner Electra Piano. See Rhodes models and Hohner and Wurlitzer models.

The unmistakable tones of Fender Rhodes pianos are some of the best-known keyboard instrument sounds used in the second half of the 20th century. Various Rhodes models have been popularized in a wide range of musical styles, encompassing pop, rock, jazz, and soul, as well as more recent genres such as house and hip-hop. Nearly as popular was the Wurlitzer piano, which enjoyed most of its success in the 1970s.

The Vintage Electric Piano sound engine uses component modeling synthesis techniques to generate ultra-realistic electric piano sounds, with smooth dynamics and scaling over the entire 88-key range. Component modeling has no abrupt changes between samples, sample looping, or filtering effects during the decay phase of notes.

Vintage Electric Piano also simulates the physical characteristics of the original instruments, including the movement of the electric piano reeds, tines, and tone bars in the (electric and magnetic) fields of the pickups. It also emulates the ringing, smacking, and bell-like transients of the attack phase as well as the hammer action and damper noises of the original instruments.

The integrated effects include classic equalizer, overdrive, stereo phaser, stereo tremolo, and stereo chorus effects that are commonly used with electric piano sounds.

To add Vintage Electric Piano to your project, choose it from the Instrument > Vintage Keys submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by  .

Vintage Electric Piano main controls in Logic Pro for iPad

The Vintage Electric Piano main controls let you choose the piano model and provide overall level and bass boost controls.



Main controls

- *Model pop-up menu:* Choose an electric piano model. Several Rhodes models are available, plus Hohner Electra Piano and Wurlitzer models. See Rhodes models and Hohner and Wurlitzer models.

  Note: When you choose a new model, all currently sounding voices are muted and all parameters are reset to default values.

- *Bass Boost knob and field:* Enhance the low end of the sound. This parameter emulates the behavior of the control found on the original Rhodes piano.

- *Volume knob and field:* Set the overall output level of Vintage Electric Piano.

Effects

Vintage Electric Piano effects in Logic Pro for iPad

Vintage Electric Piano integrated effects units include classic equalizer, overdrive, stereo chorus, stereo phaser, and stereo tremolo that are commonly used with electric piano sounds.

- *EQ:* The EQ allows you to boost or cut the high and low frequency ranges of your Vintage Electric Piano sound. The EQ is positioned after the Drive circuit in the Vintage Electric Piano effects chain.

- *Drive:* Electric pianos sound best when played through tube amplifiers. Tube amplifiers offer a wide range of tones—from the subtle warmth or crunch of guitar amplifiers to psychedelic, screaming rock distortions. The Drive effect simulates the saturation characteristics of a tube amplifier stage. The Drive effect is the first signal processing circuit in the Vintage Electric Piano effects chain.

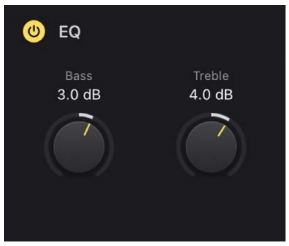
- *Chorus:* The most commonly used effect on electric piano sounds, the Vintage Electric Piano Chorus effect is based on a delay circuit. The delay time is modulated by an LFO. The delayed effect signal is mixed with the original signal.
- *Phaser:* The Phaser effect is based on analog phaser pedals used by electric guitarists in the 1960s and 1970s, including the subtle analog-style distortion typical of these units. These phaser pedals were also popular among electric pianists—especially in the electric jazz, jazz-rock, and pop styles of the 1970s.

  The Phaser effect runs the original signal through a series of four filters that enhance particular aspects of the Vintage Electric Piano frequency spectrum. This filtered signal is slightly phase delayed and mixed with the original signal, resulting in notches in the frequency spectrum. The notches in the phase-delayed signal are moved up and down through the frequency spectrum by an LFO (low frequency oscillator) modulation. This results in the amplitudes of the two signals reaching their highest and lowest points at slightly different times.

  Note: Logic Pro offers a sophisticated Phaser effect (and other modulation plug-ins) that can be used alongside, or to replace, the integrated Vintage Electric Piano Phaser effect.
- *Tremolo:* A periodic modulation of the amplitude (level) of the sound is known as a tremolo. This modulation is controlled with an LFO in the Vintage Electric Piano Tremolo effect. The Fender Rhodes suitcase piano features a stereo tremolo. Other electric pianos have a simple, often obtrusive, mono tremolo that can introduce an unusual polyrhythmic feel to performances.

Vintage Electric Piano EQ controls in Logic Pro for iPad

The Vintage Electric Piano EQ lets you boost or cut the high and low frequency ranges of your Vintage Electric Piano sound.



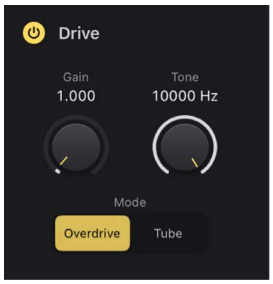
EQ parameters

- *On/Off button:* Turn the equalizer on or off.
- *Bass knob and field:* Control the low frequency range. Either shelving or peak-type filters are used—depending on the piano model selected. Optimized frequency ranges are preselected for each model.
- *Treble knob and field:* Control the high frequency range. Either shelving or peak-type filters are used, depending on the piano model selected. Optimized frequency ranges are preselected for each model.

  Tip: You can achieve a sound with a more dominant mid-range by suppressing the treble and bass frequency ranges. If you require more precise equalization, you can insert any of the equalizer plug-ins in the instrument channel strip. You can also use the Tone control of the Drive effect to contour the harshness of your sound.

Vintage Electric Piano Drive effect in Logic Pro for iPad

The Vintage Electric Piano Drive effect simulates the saturation characteristics of a tube amplifier stage.



Drive effect parameters

- *On/Off button:* Turn the Drive effect on or off.
- *Gain knob and field:* Set the amount of harmonic distortion.
- *Tone knob and field:* Equalize the sound before amplification or distortion by the virtual tube amplifier circuit.
  - Use low Tone values to set a mellow tonal color. If the sound becomes too soft, boost the treble portion of your sound with the EQ Treble control.
  - Use higher Tone values for harsh distortion characteristics, typical of overdriven transistor stages. If the sound is too aggressive, suppress the treble portion of your sound with the EQ Treble control.
- *Mode buttons:* Switch between two types of distortion effect.

Vintage Electric Piano Chorus effect in Logic Pro for iPad

The Vintage Electric Piano Chorus effect is an LFO-modulated delay circuit that mixes the delayed effect signal with the original signal.

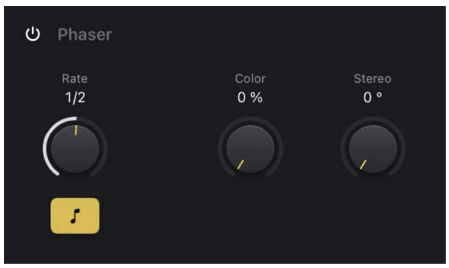


Chorus parameters

- *On/Off button:* Turn the Chorus effect on or off.
- *Rate knob and field:* Set the speed of the Chorus effect, in Hz. High values may result in the piano sounding detuned.
- *Intensity knob and field:* Set the intensity of the Chorus effect. Technically, this sets the amount of delay time deviation.

Vintage Electric Piano Phaser effect in Logic Pro for iPad

The Vintage Electric Piano Phaser effect is based on analog phaser pedals used by electric guitarists in the 1960s and 1970s, including the subtle analog-style distortion typical of these units.

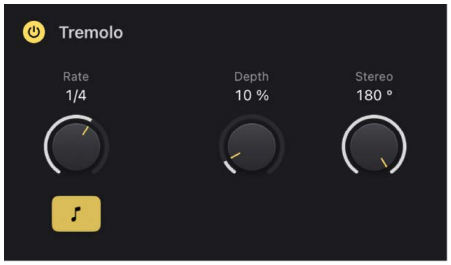


Phaser effect parameters

- *On/Off button:* Turn the Phaser effect on or off.
- *Rate knob and field:* Set the speed of the phasing effect. The rate is set in Hz values, or bar/beat values when the Sync button is turned on.
- *Sync button:* Synchronize the Phaser effect to the host application tempo. The Rate knob sets bar and beat values, including triplets.
- *Color knob and field:* Set the amount of Phaser output signal that is fed back to the effect input. This changes the tonal color of the phasing effect.
- *Stereo knob and field:* Determine the relative phase shift between the left and right channels.
  - At a value of 0 the effect is most intense, but not stereophonic.
  - At a value of 180 the effect symmetrically rises in the left channel while falling in the right channel, and vice versa.

Vintage Electric Piano Tremolo effect in Logic Pro for iPad

The Vintage Electric Piano Tremolo effect uses an LFO to periodically modulate the amplitude of the sound.



Tremolo effect parameters

- *On/Off button:* Turn the Tremolo effect on or off.
- *Rate knob and field:* Set the speed of the tremolo effect (LFO frequency). The rate is set in Hz values, or bar/beat values when the Sync button is turned on.
- *Sync button:* Synchronize the Tremolo effect to the host application tempo. The Rate knob sets bar and beat values, including triplets.

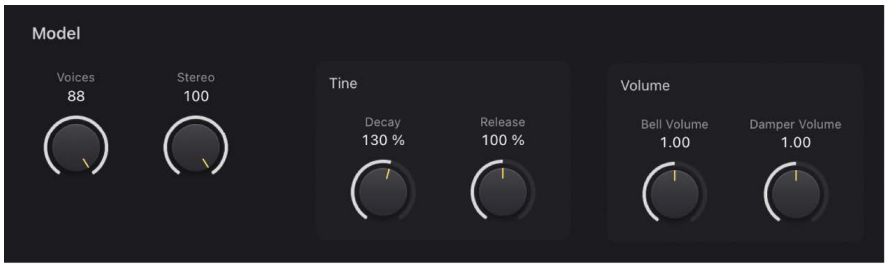
- *Depth knob and field:* Set the amount of amplitude modulation.
- *Stereo knob and field:* Determine the relative phase shift between the left and right channels.
  - A value of 0 changes the level of both channels—in phase.
  - A value of 180 (out-of-phase modulation), results in a stereo tremolo effect that is also known as *auto panning*. This is similar to manually turning the pan pot from side to side.

  Tip: The original Wurlitzer Piano has a mono tremolo with a fixed modulation rate of 5.5 Hz. For an authentic Wurlitzer sound, select a Tremolo Stereo value of 0 degrees. For Rhodes sounds, set the Tremolo Stereo value to 180 degrees. The settings in between result in spacious effects—especially when low Tremolo Rate knob values are used.

Modeling controls

Vintage Electric Piano model controls in Logic Pro for iPad

The model parameters affect the instrument chosen in the Model pop-up menu.



Model parameters

- *Voices knob and field:* Set the maximum number of voices that can sound simultaneously. Lower the value to limit polyphony. When Voices is set to 1, Vintage Electric Piano is monophonic. The maximum value is 88, allowing for glissandi over the entire keyboard range when the sustain pedal is depressed.
- *Stereo knob and field:* Adjust the stereo field. At high values, bass notes are heard in the left channel and treble notes are heard in the right channel.

  Tip: Avoid using this parameter if you're trying to faithfully recreate a vintage electric piano because these instruments were not equipped with stereo outputs.

Tine and volume parameters

- *Decay knob and field:* Set the decay time of the piano sound. The lower the value, the less the sound sustains and the higher the level of damping applied to the vibration of the tines. When short values are set, the main tone is more pronounced and is heard for a longer period than the transient harmonics. Sonically, the effect is reminiscent of an electric guitar string being damped with the palm of the picking hand. Electric pianos can be modified in a similar way. Higher values (longer settings) result in more sustain and a less dynamic feel.
- *Release knob and field:* Set the amount of damping applied after the keys are released. Extremely long settings (high Release values) let you play the piano like a vibraphone.

- *Bell Volume knob and field:* Set the level of the (inharmonic) treble portion of the tone. This is useful for emulating classic electric piano sounds.
- *Damper Volume knob and field:* Set the level of damper noise. This emulates the damping felt hitting the vibrating tine in the original instruments.

Vintage Electric Piano pitch controls in Logic Pro for iPad

Vintage Electric Piano is tuned to an equal-tempered scale. You can deviate from this scale and can stretch the tuning in the bass and treble ranges, much as you can do with acoustic pianos (especially upright pianos). You can also modulate the tuning of each note randomly.



Pitch and pitch bend parameters

- *Tune knob and field:* Tune Vintage Electric Piano in one-cent increments. At a value of 0 c (zero cents), the central A key is tuned to 440 Hz, or concert pitch. The range is plus or minus half a semitone.
- *Warmth knob and field:* Set the amount of (random) deviation from the equal-tempered scale. Each note is slightly detuned from the next, adding life and richness to the sound.

  Note: Use of both Warmth and Upper or Lower stretch can result in a detuned sound that is similar to a heavy chorus effect. In some instances, this effect may be so extreme that Vintage Electric Piano sounds out of tune with the rest of your project.
- *BndDwn/Bend Range Up knobs and fields:* Set the pitch bend range in semitone steps.

Stretch tuning controls

The tones of upright pianos, and to a lesser extent grand pianos (due to their longer strings), have inharmonicities in their harmonic structure. This also applies to other stringed instruments, but it particularly affects pianos due to the length, density, and tension of the strings. If a piano is perfectly tuned to equal temperament across the keyboard range, the overtones of the low strings and the fundamentals of the high strings sound out of tune with each other.

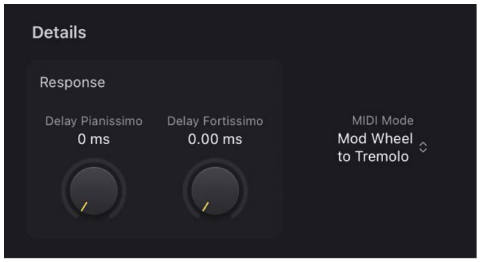
To circumvent this problem, piano tuners use a technique known as *stretch tuning*, in which the high and low registers of the piano are tuned higher and lower, respectively. This results in the harmonics of the low strings being in tune with the fundamental tones of the upper strings. In essence, pianos are intentionally “out of tune” (from equal temperament), so that the lower and upper registers sound in tune.

Electric pianos don’t have strings, so this inharmonic relationship doesn’t apply to Vintage Electric Piano nor to the original instruments it emulates. The stretch feature was primarily included for situations where you want to use Vintage Electric Piano alongside an acoustic piano recording or performance.

- *Lower Stretch knob and field:* Set the amount of deviation from the equal-tempered scale in the bass end of the sound. The higher the value, the farther *down* the low notes are tuned. At a setting of 0, Vintage Electric Piano is tuned to an equal-tempered scale, with each octave down halving the frequency.
- *Upper Stretch knob and field:* Set the amount of deviation from the equal-tempered scale in the treble end of the sound. The higher the value, the farther *up* the high notes are tuned. At a setting of 0, Vintage Electric Piano is tuned to an equal-tempered scale, with each octave above (up) doubling the frequency.

Vintage Electric Piano details controls in Logic Pro for iPad

The Vintage Electric Piano details parameters allow you to define a delay response to incoming MIDI velocities and to set the way the instrument handles MIDI controllers.



Details response parameters

- *Delay Pianissimo knob and field:* Set the delay time (in milliseconds) when the keys are struck pianissimo (PP-soft).
- *Delay Fortissimo knob and field:* Set the delay time (in milliseconds) when the keys are struck forte (FF-hard).
- *MIDI Mode pop-up menu:* Determine how Vintage Electric Piano responds to MIDI controllers. Choose from: Off, Modwheel to Tremolo, and Full Remote.

Emulated models

Rhodes models

Harold Rhodes (born 1910) constructed what is arguably the best known and most widely used electric piano. Designed in 1946—as a piano surrogate for practice, education, and army entertainment—the Rhodes piano was marketed by guitar manufacturer Fender from 1956. The Fender Rhodes is one of the most popular musical instruments in jazz, especially electric jazz. CBS took over production of the Rhodes in 1965, enhancing its popularity in pop and rock music. There are also a number of Rhodes synthesizers, developed by former manufacturer ARP. Roland Corporation owned the Rhodes name for a while and released several digital pianos under the Rhodes moniker. From 1997 until his death in December 2000, Harold Rhodes again owned the name.

The Rhodes piano was also made available as a suitcase piano (with a pre-amplifier and two-channel combo amplifier) and as a stage piano, without an amplifier. Both of these 73-key “portable” versions have a vinyl-covered wooden frame and a rounded plastic top. In 1973, an 88-key model was introduced. Smaller Celeste and bass versions were less popular. The MkII (1978) had a flat top that allowed keyboardists to place extra keyboards on top. The Mark V, introduced in 1984, had a MIDI output.

The mid-1980s saw a decrease in Rhodes production as most keyboard players invested in the lighter and more versatile digital synthesizers that became available around this time. These keyboards could easily emulate the Rhodes sound and also offered a range of new piano sounds.

The Rhodes piano bases its method of sound generation on metal reeds, which function much like a tuning fork. These reeds are struck with a velocity sensitive hammer action that works in a similar fashion to that of a grand piano. The asymmetrical tuning fork consists of a thin tine and a large tone bar that are bolted together. Due to construction considerations, some of the tone bars are rotated by 90 degrees. The piano is kept in tune by the mass of a spring, which can be moved along the tine. The tine oscillates in front of an electric pickup, similar to that of an electric guitar. This oscillation functions along inductive principles, with permanent magnets placed around the tine that have a damping effect on tine movement and therefore, the sound.

The Rhodes output signal is like that of an electric guitar and requires pre-amplification. The Rhodes sound is not harmonically rich. This is why so many performers use a treble boost or an overdrive effect when playing the Rhodes piano. The Rhodes sounds best when played through tube amplifiers.

The characteristic sound of each Rhodes piano depends more on the adjustment and maintenance of the individual instrument than on the model. Early models had hammers covered with felt, resulting in a smoother sound than later models with neoprene-covered hammers. The suitcase piano featured a pre-amplifier that could create a sound with a very dominant mid-range. Appropriate pre-amplification and equalization can, however, deliver an identical tone from almost any stage piano. The MkII does not have the treble range resonance clamps of earlier models; it has less sustain in the treble range. The most significant sonic differences are dependent on the proximity of the tine to the pickup. When the tine is moved closer to the pickup, the bell characteristic becomes more prominent. In the 1980s, many Rhodes pianos were adjusted to have more “bell.”

Note: The Vintage Electric Piano *Metal Piano* and *Attack Piano* models feature idealized sound qualities that could only be aimed at with the original Rhodes instruments. Although these models may not sound realistic, they have at least partially achieved the goals that Rhodes technicians may have envisaged when preparing their keyboards.

Hohner and Wurlitzer models

The extremely rare Hohner Electra Piano (not the similarly named all-electronic Electrapiano from RMI) offers striking hammers like those of the Rhodes, but a stiffer keyboard action. It was designed to resemble the look of a conventional acoustic upright piano. Led Zeppelin’s John Paul Jones played it on “Stairway to Heaven,” “Misty Mountain Hop,” and “No Quarter.”

Wurlitzer, best-known for manufacturing music boxes and organs, also built electric pianos that helped write pop and rock music history. The 200 series, notably the 200A and 240V, Wurlitzer pianos are smaller and lighter than the Rhodes pianos, with a keyboard range of 64 keys (A to C) and an integrated amplifier and speakers.

The velocity sensitive hammer action resembles that of a conventional acoustic piano. The Wurlitzer sound generation system is based on spring steel reeds that can be tuned with a solder weight. The Wurlitzer has electrostatic pickups The reeds are supplied with a zero volt current and move between the teeth of a comb, connected to a 150-volt current. The tone of the Wurlitzer, which was first manufactured in the early 1960s, features a number of odd harmonics.

The Wurlitzer is best known as the signature piano sound of the band Supertramp, as heard on their “Crime of the Century” album. You might also recognize the Wurlitzer sound when listening to Pink Floyd’s “The Dark Side of the Moon” or “I Am the Walrus” by The Beatles.

Note: The Vintage Electric Piano *Funk Piano* model offers a special synthetic piano engine sound, with an exaggerated bass. This is not based on any real-world Wurlitzer instruments, but it can be a useful sound nonetheless.

Vintage Electric Piano MIDI controllers in Logic Pro for iPad

Vintage Electric Piano responds to the MIDI continuous controller numbers (CC) outlined in the table.

Controller number	Parameter name
1	Main Volume knob
12	Model pop-up menu
13	Model parameters Decay knob
14	Model parameters Release knob
15	Model parameters Bell Volume knob
16	Model parameters Damper Volume knob
17	Model parameters Stereo knob
18	EQ parameters Treble knob
19	EQ parameters Bass knob
20	Drive parameters Gain knob
21	Drive parameters Tone knob
22	Phaser parameters Rate knob
23	Phaser parameters Color knob
24	Phaser parameters Stereo knob
25	Tremolo parameters Rate knob
26	Tremolo parameters Depth knob
27	Tremolo parameters Stereo knob
28	Chorus parameters Int(ensity) knob

Vintage Mellotron

Vintage Mellotron in Logic Pro for iPad

Vintage Mellotron recreates the features and a number of sounds from this famous keyboard instrument that has featured on dozens of classic rock and pop songs from the 1960s, ‘70s, and beyond.

The Mellotron is considered a precursor to modern sample-playback instruments. It uses a number of magnetic tapes that are drawn across a tape head when a key is pressed. Each key has an individual tape playhead and pressure pads on a spring-loaded mechanism. Rollers for each key are driven by a constantly turning capstan that spans the keyboard range.

Each key has a tape strip with up to three different sounds running in parallel. Sound length is limited to eight seconds, at which point the sound abruptly stops. Tapes return to their start position when the corresponding key is released. By offsetting the playheads with the racks that hold the tapes, a musician can switch the entire keyboard between a string and choir sound, for example. Partial offsets of the tape heads result in a layered blend of two adjacent sounds on each tape strip.

More advanced Mellotron models can use longer tapes, with different sounds allocated at precise positions along their length. This is similar to switching between banks of presets on a modern synth. Even then, a maximum of around 24 sounds is possible. If you require different sounds, the machine needs to be dismantled, and a new tape rack is used to replace one already in place. Not ideal, and certainly tough to accomplish during a live performance.

The original library sounds were recorded note by note, with varied performances and pitch fluctuations. This makes Mellotron instrument mapping somewhat inconsistent across the keyboard range, which is an essential part of its sonic character and charm.

The mechanical complexity of early Mellotrons—tape stretching, head alignment problems, and environmental factors, such as temperature and humidity fluctuations, smoke, dust, and magnetic fields—made them difficult to maintain. Even when new, no two Mellotrons sounded exactly the same because of these variables.

Vintage Mellotron features painstakingly sampled versions of each note from the original Mellotron sound library tapes, capturing the full sound length and performance quirks. Unlike the originals, Vintage Mellotron sounds are looped, enabling you to indefinitely sustain notes. Looping isn’t static, so sounds retain their “organic” flavor and mirror the continuous sonic movement of the original instruments.

Vintage Mellotron also allows you to blend any two sounds together, including combinations that weren’t available in the original tape library. A further bonus is control of the balance between sounds, a feature not found on the original machines.

A tape speed control mimics the tonal fluctuations caused by this feature on the original instruments. Also included are octave transposition and tone controls. See Vintage Mellotron controls.

As with other instrument plug-ins, you can fully automate Vintage Mellotron parameters.

If you’re new to synthesizers, see Intro to synthesizers, which will introduce you to the terminology and give you an overview of different synthesis methods and how they work.

To add Vintage Mellotron to your project, choose it from the Instrument > Vintage Keys submenu in an Instrument channel strip or the Plug-ins area. See Intro to plug-ins.

User Guide conventions

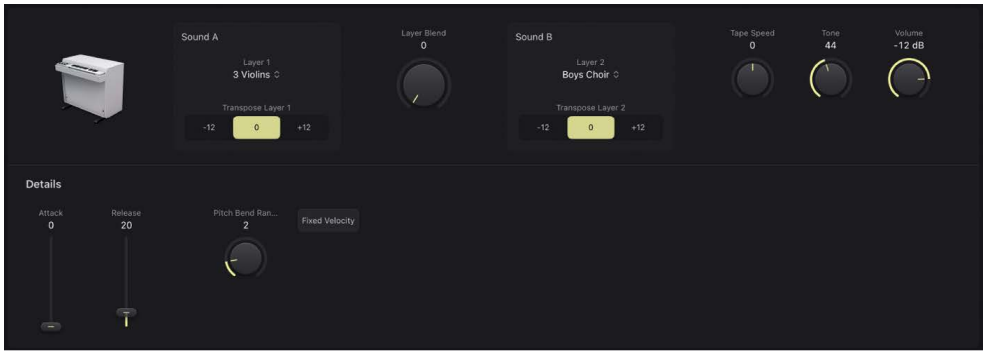
Logic Pro for iPad plug-ins have two primary views:

- Tile view, which shows a few key parameters in the Plug-ins area
- Details view, where you can access all plug-in parameters

Throughout the guide, parameters available in Tile view are indicated by .

Vintage Mellotron controls in Logic Pro for iPad

Vintage Mellotron lets you choose one or two sounds, set the playback octave for each, and adjust the mix between them.



Vintage Mellotron parameters

Vintage Mellotron provides two layers, indicated as Sound A and Sound B. Each sound can be independently transposed and you can set the balance between them with the Layer Blend parameter. Other available controls affect both layers.

- *Layer 1/2 pop-up menus:* Choose an instrument sound for each layer.
- *Transpose Layer 1/2 buttons:* Set an independent playback octave for the instrument sound chosen on each layer.

  This mimics the behavior of the half speed or double speed tape switches found on some Mellotron models, but enhances these facilities by enabling independent octave control for each sound layer.
- *Layer Blend knob and field:* Set the level balance between instrument sound A and B. Set to the full left or right position to hear layer 1 (Sound A) or layer 2 (Sound B) in isolation.
- *Tape Speed knob and field:* Set the tape speed for all notes of Sound A and Sound B. This mimics the tonal fluctuations caused by this control on the original instrument.
- *Tone knob and field:* Rotate to the right to reduce bass and to make the sound brighter and more nasal. Rotate to the left to reduce brightness, making the sound warmer and more mellow. This control affects all notes of Sound A and Sound B.
- *Volume knob and field:* Set the overall output level of Vintage Mellotron.

Details parameters

Vintage Mellotron offers additional controls that were not available on the original instruments. These provide flexibility, but their use isn’t true to the source hardware.

- *Attack slider and field:* Set the time required for the signal to reach the initial signal level, known as the sustain level. Not available on the original instrument.
- *Release slider and field:* Set the time it takes for the signal to fall from the sustain level to a level of zero, after releasing a key. Not available on the original instrument.
- *Pitch Bend Ran(ge) knob and field:* Set the pitch bend range in semitone steps. This allows you to use the pitch bend controller of your keyboard to bend Vintage Mellotron pitch. Not available on the original instrument.
- *Fixed Velocity button:* Turn on to ignore incoming note velocity information from your MIDI keyboard or a MIDI region.

  This mimics the behavior of the original instrument which was not velocity sensitive.

Synth basics

Intro to synthesizers

If you're new to synthesizers, this appendix will help you understand the basics of sound itself and how this applies to synthesizers.

Important facts about synthesizers are discussed and explained, including the differences between analog, digital, and virtual analog synthesizers. You will also be introduced to the major synthesizer terms as you learn about the basic workings of these hardware- or software-based devices.

This appendix is not a detailed, scientific treatise on the inner workings and mathematical theories of synthesis. It is a basic guide to what you need to know, including some extras that are useful to know.

Experiment with ES1, ES2, Retro Synth, and other instruments while you read. Seeing and using the parameters and other elements that are discussed will help you understand the conceptual and practical aspects of synthesizers. See Intro to plug-ins.

Note: Information that references built-in instruments is based on features available in Logic Pro for Mac.

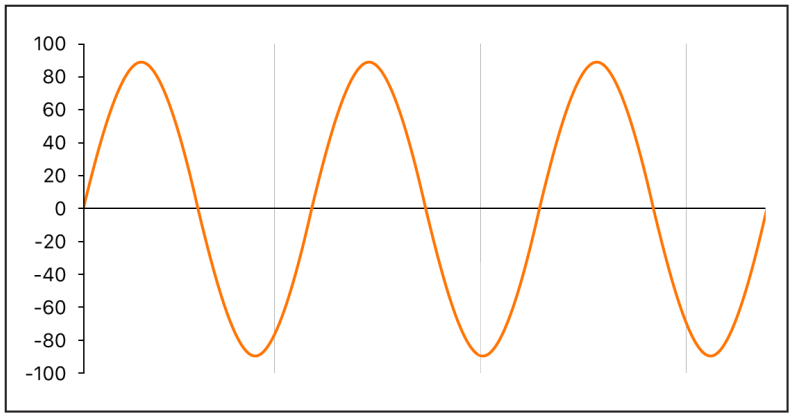
Sound basics

Sound basics overview

Prior to considering any of the sound-generating components found in a synthesizer, it's important that you understand sound itself.

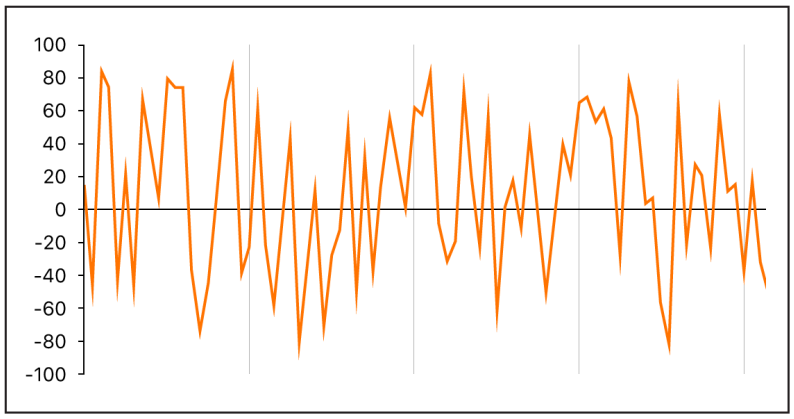
Technically, sound is the conversion of physical energy—such as a hand clap—to an air pressure disturbance. This change in air pressure is transmitted as a series of vibrations—a sound wave—through the air. Sound vibrations can also be transmitted through other matter, such as a wall or floor.

If the vibrations follow a periodic pattern, the sound is said to have a *waveform*.



The figure above shows an oscillogram—a graphical representation—of a sine wave, the simplest and purest kind of waveform.

If the vibrations do not follow a discernible pattern, the sound is called *noise*.



A repetition of a waveform—each peak and trough in the oscillogram—is known as a *cycle*. The number of cycles that occur per second determines the basic pitch of the waveform—commonly known as the *frequency*. Most instruments provide an oscillator frequency control, measured in hertz (Hz), that determines the number of cycles per second—and therefore the basic pitch of your sound.

Tones, overtones, harmonics, and partials

The base, or core, frequency of a sound is known as its *fundamental tone*.

The waveforms of all sounds, apart from a basic sine wave, consist of the fundamental tone *and* many other tones of different frequencies.

Non-fundamental tones that are whole-number multiples of the fundamental tone are known as *overtones* or *harmonics*. A tone with a frequency that is a fraction of the fundamental tone is referred to as a *subharmonic*.

- The fundamental tone is referred to as the *first harmonic*. This is generally louder than the other harmonics.
- A tone played at twice the frequency of the first harmonic is called the *second harmonic*.
- A tone played at four times the frequency of the first harmonic is called the *fourth harmonic*, and so on.

Each of these harmonics has a timbral quality that is different from that of the fundamental tone. In general, harmonics that can be multiplied or divided by a whole number, such as octaves, odd-numbered or even-numbered harmonics, and so on, sound more "musical."

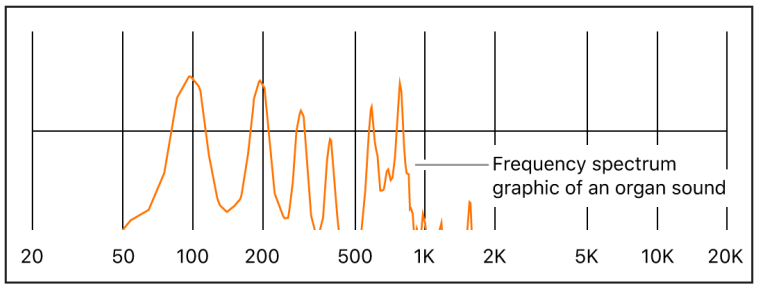
Tones that cannot be multiplied or divided by a whole number are known as *inharmonic overtones,* or *partial tones*. When you combine a number of these inharmonic overtones, it tends to sound "noisy."

Non-fundamental tones that are multiplied by fractional amounts—not whole numbers—are called *partials*.

The frequency spectrum

A fundamental tone, when combined with various harmonics of different levels, is perceived as a sound. The level relationships between these sonic elements change over time (controlled by *envelopes*, as described in Amplifier envelope overview). The combination of a number of harmonics is referred to as the *harmonic spectrum* or, more commonly, the *frequency spectrum*.

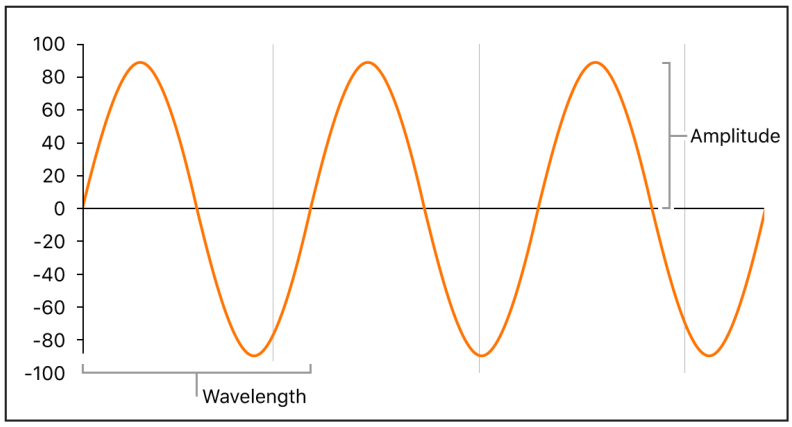
The frequency spectrum shows all individual sonic elements in a sound. It is shown low to high and runs from left to right over time. The respective levels of all harmonics are reflected vertically, with taller spikes indicating higher levels.



The illustration shows the level and frequency relationships between the fundamental tone and the harmonics at a particular moment in time. These relationships constantly change over time, which results in continuous changes to the frequency spectrum and, therefore, changes to the sound.

Other waveform properties

In addition to frequency, other properties of sound waves include *amplitude, wavelength, period,* and *phase*.

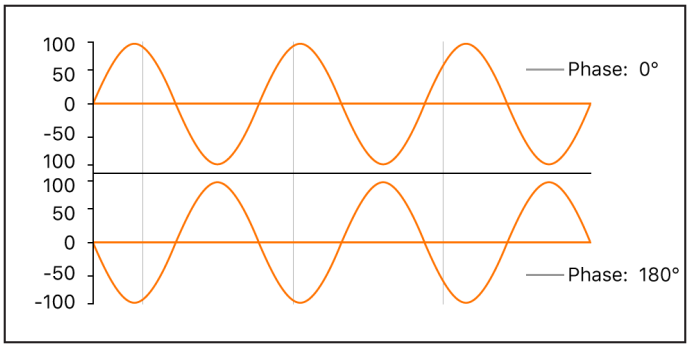


- *Amplitude:* The amplitude of a waveform indicates the amount of air pressure change. It can be measured as the maximum vertical distance from zero air pressure, or “silence” (shown as a horizontal line at 0 dB in the illustration). Put another way, amplitude is the distance between the horizontal axis and the top of the waveform peak, or the bottom of the waveform trough.
- *Wavelength:* The wavelength is the distance between repeating cycles of a waveform of a given frequency. The higher the frequency, the shorter the wavelength.
- *Period:* The wave period is the amount of time it takes to complete one full revolution of a waveform cycle. The higher and faster the frequency, the shorter the wave period.
- *Phase:* Phase compares the timing between waveforms and is measured in degrees—from 0 to 360.

  When two waveforms begin at the same time, they are said to be *in phase* or *phase-aligned*. When a waveform is slightly delayed in comparison to another waveform, the waveforms are said to be *out of phase*.

  Note: It is difficult to discern a constant phase difference over the entire wave period, but if the phase of one of the waveforms changes over time, it becomes audible. This is what happens in common audio effects such as *flanging* and *phase shifting*.

  When you play two otherwise identical sounds out of phase, some frequency components—harmonics—can cancel each other out, thereby producing silence in those areas. This is known as *phase cancelation*, and it occurs where the same frequencies intersect at the same level.



Fourier theorem and harmonics

According to the Fourier theorem, every periodic wave can be seen as the sum of sine waves with certain wave lengths and amplitudes, the wave lengths of which have harmonic relationships—that is, ratios of small numbers. Translated into more musical terms, this means that any tone with a certain pitch can be regarded as a mix of sine tones consisting of the fundamental tone and its harmonics, or overtones. For example, the basic oscillation—the fundamental tone or first harmonic—is an "A" at 220 Hz, the second harmonic has double the frequency (440 Hz), the third harmonic oscillates three times as fast (660 Hz), the next harmonics four and five times as fast, and so on.

Synthesizer fundamentals

Sound synthesis is the electronic production of sounds—starting from basic properties such as sine tones and other simple waves.

Synthesizers are so named because they can emulate, or *synthesize*, a wide variety of sounds—such as the sound of another instrument, a voice, a helicopter, a car, or a barking dog. Synthesizers can also produce sounds that don't occur in the natural world. The ability to generate tones that cannot be created in any other way makes the synthesizer a unique musical tool.

The simplest form of synthesizer would be a basic sine wave generator that provided little or no control over pitch. Such a synthesizer would not be able to synthesize anything except a sine wave. Combining multiple sine generators with pitch control, however, can produce interesting and useful tones.

In a synthesizer, the task of tone generation falls to a component known as an *oscillator*. Most synthesizer oscillators generate harmonically rich waveforms such as *sawtooth, triangle, square*, and *pulse* waves, in addition to sine waves. These waveform names are based on the resemblance of their respective shapes to a tooth on the blade of a saw, to a triangle, to a square, and so on. For information about the most common synthesizer waveforms, see Oscillators.

Sculpting the fundamental tone and related harmonics into another sound is achieved by routing the signal from one component, also known as a *module*, to another in the synthesizer. Each module performs a different job that affects the source signal.

In a modular synthesizer, signal routing is achieved by physically cabling modules to each other. In most modern synthesizers the signal routing between modules is internally prewired and is typically changed using switches, knobs, and other controls.

For a discussion of synthesizer components and their interaction with each other to control and shape sound, see How subtractive synthesizers work.

Synthesizers have existed far longer than you might imagine. In the days that preceded the use of digital technology, all electronic synthesizers were analog. Prior to the use of electricity, synthesizers were mechanical. There are significant differences between analog and digital synthesizers:

- *Analog:* An analog synthesizer combines voltage-controlled circuits—such as oscillators, filters, and amplifiers—to generate and shape sounds. The amount of voltage is typically related directly to the waveform pitch, with higher voltages equaling higher pitches.
- *Digital:* In a digital synthesizer, the signal flow is digital. Binary *descriptions* of the signal—a string of zeros and ones—are fed from one algorithm to another.
- *Hybrid analog and digital synthesizers:* Some synthesizer designs feature digital oscillators that generate signals—using binary descriptions of waveforms. The digital oscillator signal is then sent to analog filters and amplifiers. The main advantage of this approach is that digital oscillators don't drift in pitch, which is a common problem in analog oscillators.
- *Virtual analog:* A virtual analog synthesizer is a digital synthesizer that mimics the architecture, features, and peculiarities of an analog synthesizer. The behaviors and functions of the oscillators, filters, and other modules that you would find in an analog synthesizer are emulated by computer algorithms.

ES1 is a virtual analog synthesizer. Its virtual signal flow is that of a typical analog synthesizer, but all components and signal processing—the virtual oscillators, filters, and so on—are calculated by the central processing unit (CPU) of your computer.

ES1 emulates some of the idiosyncrasies of particular analog circuits—in cases where they tend to sound nice—such as high oscillator levels overdriving the filter. Other analog synthesizer phenomena, such as slowly drifting out of tune (as the instrument heats up), are not simulated. See ES1 overview.

Virtual analog synthesizers have other advantages over their analog counterparts as well. They are programmable, which means that you can save sound settings; they can be automated, so you can record and play back fader and knob movements; and they are often multi-timbral, which allows you to play different sounds at the same time, on different instrument channels. Aspects such as polyphony—the ability to play multiple notes—and velocity sensitivity are found in most virtual analog synthesizers but in very few analog instruments.

Subtractive synthesizers

How subtractive synthesizers work

There are many approaches to sound creation with a synthesizer. See Other synthesis methods overview. There are also numerous differences between synthesizer models, but most follow a fundamentally similar architecture and signal flow that is based on subtractive synthesis principles.

According to legend, when Michelangelo was asked how he managed to carve David out of a block of stone, he replied, "I just cut away everything that doesn't look like David."

In essence, this is how subtractive synthesis works. You filter, or cut away, parts of the sound that you don't want to hear. In other words, you subtract parts of the frequency spectrum, consisting of the fundamental tone and associated harmonics.

Subtractive synthesis assumes that an acoustic instrument can be approximated with a simple oscillator that can produce waveforms with different frequency spectrums. The signal is sent from the oscillator to a filter that represents the frequency-dependent losses and resonances in the body of the instrument. The filtered (or unfiltered) signal is shaped over time by the amplifier section of the synthesizer.

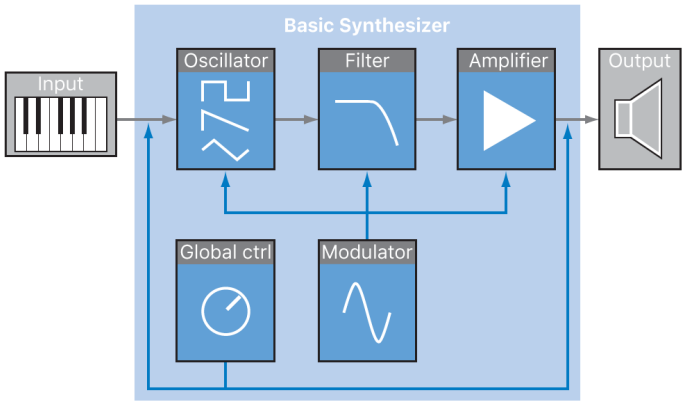
The distinctive timbre, intonation, and volume characteristics of a real instrument can theoretically be recreated by combining these components in a way that resembles the natural behavior of the instrument you're trying to emulate.

In reality, however, subtractive synthesizers aren't perfect at emulating real-world instruments. No synthesized clarinet is going to be mistaken for a real clarinet—particularly when compared with sample playback instruments like Alchemy or Sampler, which are able to recreate real instruments far more convincingly by using multi-gigabyte sound libraries.

The true strength of subtractive synthesizers is that they offer a unique sound palette of their own.

Subtractive synthesizer components

The front panel of most subtractive synthesizers provides similar signal-generating and processing modules—coupled with a number of modulation and control modules. The signal-generating and processing modules typically run from left to right, mirroring the synthesizer signal flow.



Signal-generating and processing components

- *Oscillators:* Generate the basic signal. This is usually a waveform that is rich in harmonics. See Oscillators. Many synthesizers provide more than one oscillator, and almost all synthesizer oscillators can generate several waveform types.
- *Filter section:* Used to alter the basic signal by filtering out (removing) portions of the frequency spectrum. Many synthesizers have a single filter that is applied universally to all oscillator signals. Multioscillator synthesizers can provide multiple filters, allowing each oscillator signal to be filtered in a different way. See Filters overview.
- *Amplifier section:* Used to control the level of the signal over time. The amplifier has a module known as an *envelope*, which is divided into several elements that provide level control for the beginning, middle, and end portions of your sound. Simple synthesizers generally have a single envelope, which is used to control the oscillator (and filter) over time. More complex synthesizers can provide multiple envelopes. See Amplifier envelope overview.

Modulation and control components

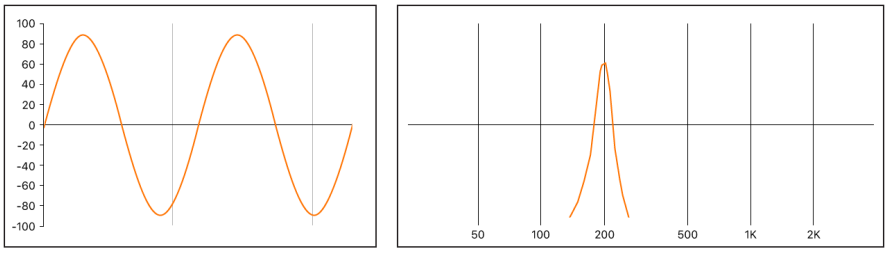
- *Modulators:* Used to modulate the signal-generating and processing components. Modulations can be machine-based—automatically generated by a synthesizer component—or can be manually activated by using the modulation wheel, for example. Most synthesizers have a component called an *LFO* (low frequency oscillator) to provide a waveform that modulates the signal. See Modulation overview.
- *Global controls:* Set the overall characteristics of your synthesizer sound, such as tuning, glides between notes, pitch bends, and monophonic or polyphonic playback. See Global controls.

Oscillators

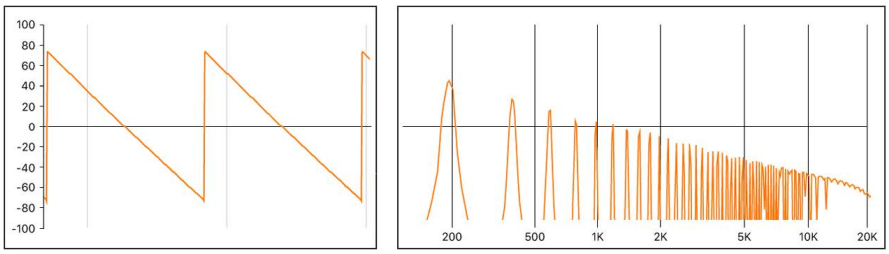
The audio signal of a synthesizer is generated by the oscillator. You can choose from a selection of waveforms that contain various types and amounts of harmonics. The level relationships between the fundamental tone and the harmonics of the chosen waveform are responsible for the basic sound color or timbre.

Waveform types

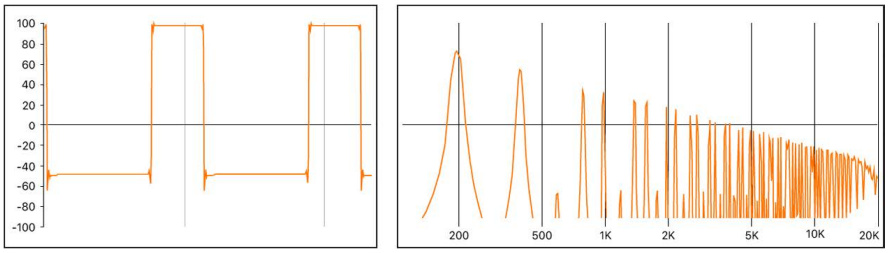
- *Sine wave:* Clean and clear-sounding, a sine wave contains only the first harmonic; in other words, it is the fundamental tone. The sine wave, used alone, can create “pure” sounds like whistles, the sound of wet fingers on the rim of a glass, tuning forks, and so on.



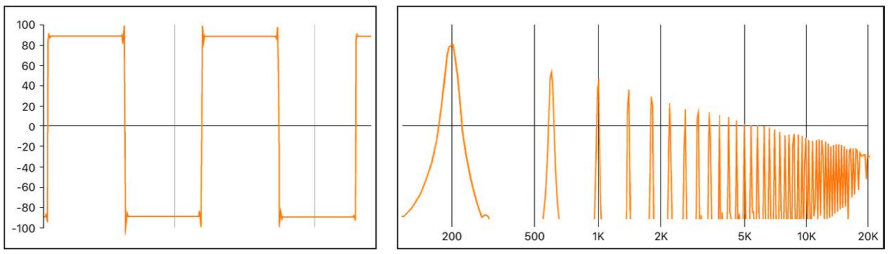
- *Sawtooth wave:* Clear and bright-sounding, a sawtooth wave contains both odd and even harmonics, as well as the fundamental tone. It is ideal for creating string, pad, bass, and brass sounds.



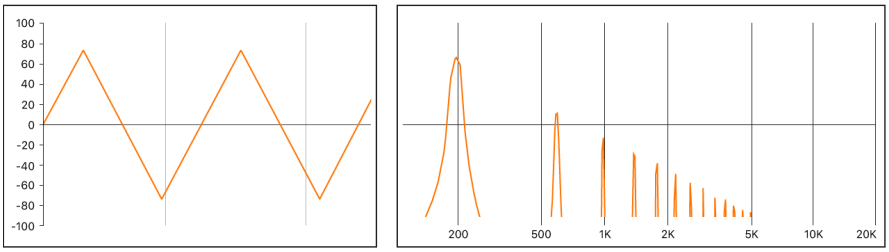
- *Square and pulse waves:* Hollow and woody-sounding, a square wave can contain a wide range of odd harmonics, as well as the fundamental tone. It is useful for creating reed instruments, pads, and basses. It can also be used to emulate kick drums, congas, tom-toms, and other percussive instruments—often when blended with another oscillator waveform, such as noise.



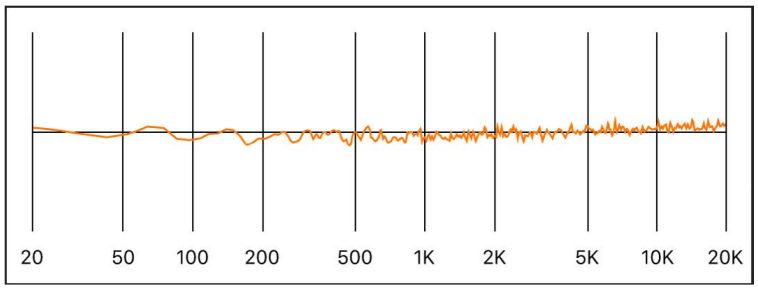
The square wave can be reshaped to make the waveform cycles, or pulses, more rectangular, by using a *pulse width modulation* (PWM) control. The more rectangular the wave becomes, the more nasal it sounds. When modulated in this way, the square wave is known as a *pulse wave*, and contains fewer harmonics. It can be used for reeds, basses, and brass sounds.



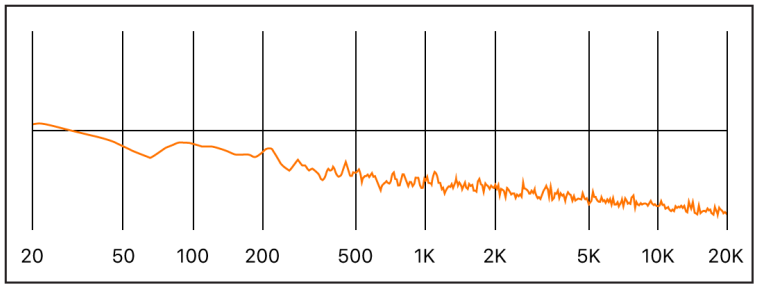
- *Triangle wave:* A triangle wave contains only odd harmonics, as well as the fundamental tone. The higher harmonics of the triangle wave roll off faster than those of a square wave, making the triangle wave sound softer. It is ideal for creating flute sounds, pads, and vocal “oohs.”



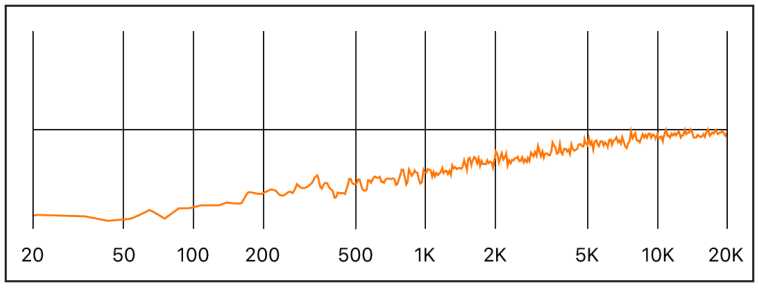
- *Noise: white, pink and red, blue:* Noise is useful for emulating percussive sounds, such as snare drums, or wind and surf sounds. There are more noise wave colors than those listed, but they are rarely found in synthesizers.
  - *White noise:* The most common noise waveform found on synthesizers. White noise contains all frequencies—at full level—around a center frequency.



  - *Pink and red noise:* These noise colors also contain all frequencies, but they are not at full level across the frequency spectrum. Pink noise decreases the level of higher frequencies by 3 dB per octave. Red noise decreases the level by 6 dB per octave.



  - *Blue noise:* Blue noise is inverse pink noise, and *increases* the level of all frequencies in higher octaves by 3 dB.



You can deform the basic waveforms to create new waveforms, which results in a different timbre, or tonal color, thus expanding the palette of sounds you can create.

There are many ways to reshape a waveform, the most common of which is changing the pulse width of a square wave. Other ways include changing the phase angle, moving the start point of a waveform cycle, or combining multiple waveforms in multioscillator synthesizers.

When waveforms are reshaped in these and other ways, the relationships between the fundamental tone and other harmonics change, thus altering the frequency spectrum and the basic sound being produced.

Filters

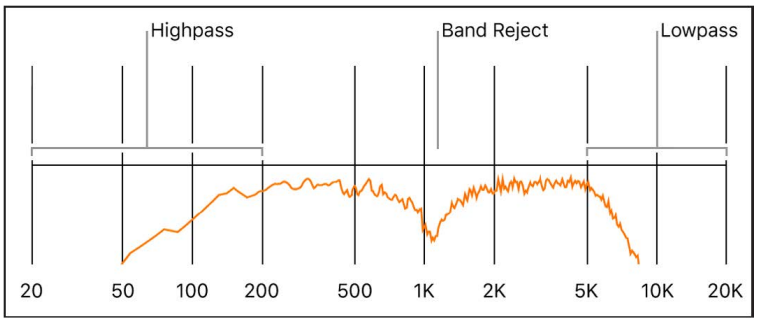
Filters overview

The purpose of the filter in a subtractive synthesizer is to remove portions of the signal—the frequency spectrum—sent from the oscillators. After filtering, a brilliant-sounding sawtooth wave can become a smooth, warm sound without sharp treble.

The filter sections of most subtractive synthesizers contain two primary controls known as *cutoff frequency*—often abbreviated to *cutoff*—and *resonance*. Other common filter parameters are *drive* and *slope*. The filter section of most synthesizers can be modulated by envelopes, LFOs, the keyboard, or other controls such as the modulation wheel. See Modulation overview.

Basic filter types

There are several basic filter types. Each has a different effect on various portions of the frequency spectrum.

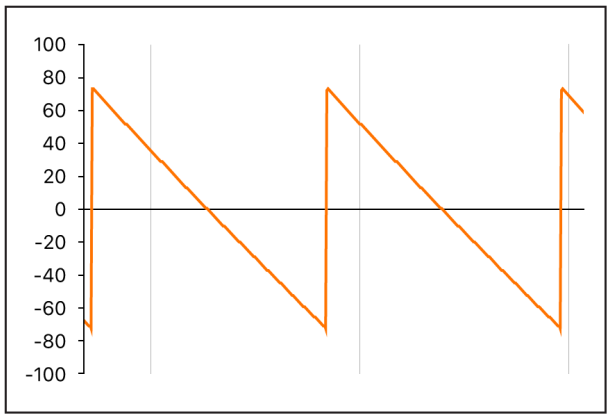


- *Highpass filter:* High frequencies are passed; low frequencies are attenuated.
- *Lowpass filter:* Low frequencies are passed; high frequencies are attenuated.
- *Bandpass filter:* Only frequencies within a frequency band are passed.
- *Band reject filter:* Only frequencies within a frequency band are attenuated. This filter type is also known as a *notch* filter.
- *Allpass filter:* All frequencies in the spectrum are passed, but the phase of the output is modified.

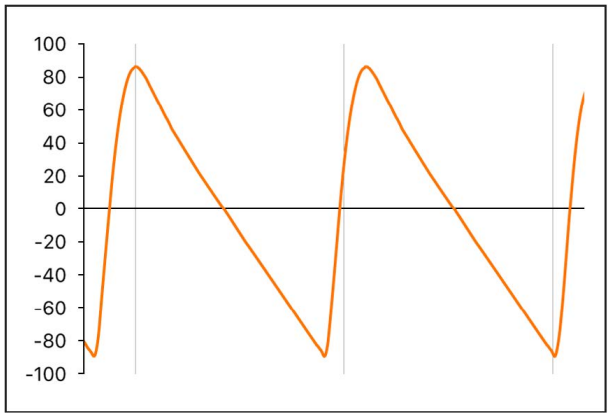
Cutoff frequency

The cutoff frequency, or cutoff, determines where the signal is cut off. Simpler synthesizers have only lowpass filters. If a signal contains frequencies that range from 20 to 4000 Hz and the cutoff frequency is set at 2500 Hz, frequencies above 2500 Hz are filtered. The lowpass filter allows frequencies below the cutoff point of 2500 Hz to pass through unaffected.

The figure below shows a sawtooth wave. The filter is open, with cutoff set to its maximum value. In other words, this waveform is unfiltered.



The figure below shows a sawtooth wave with the filter cutoff near a 50% value. This filter setting results in suppression of the higher frequencies and a rounding of the edges of the sawtooth waveform, making it resemble a sine wave. This setting makes the sound softer and less “brassy.”

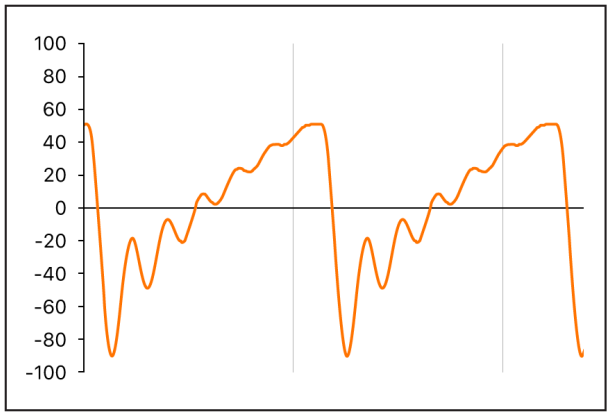


This example illustrates how using a filter to cut away portions of the frequency spectrum alters the waveform shape, thus changing the timbre of the sound.

Resonance

The resonance control emphasizes or suppresses signals around the cutoff frequency.

The figure below shows an ES1 sawtooth wave with a high resonance setting and the cutoff frequency set to 660 Hz.



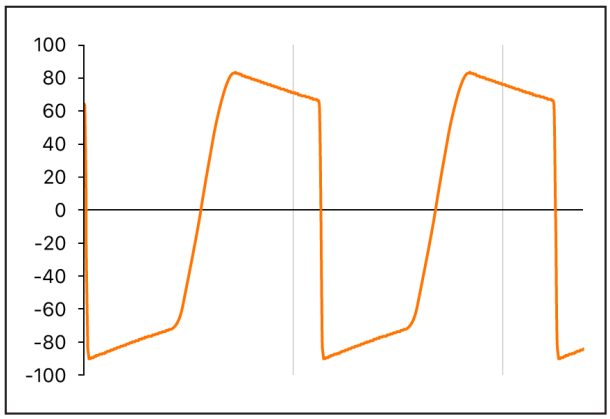
This resonant filter setting results in much brighter and harsher signals close to the cutoff frequency. Frequencies below the cutoff point are not affected.

The result of using filter resonance is a change in the basic waveform shape and, therefore, the timbre of the sound.

Very high filter resonance settings can cause the filter to self-oscillate, resulting in the filter generating an audible sine wave.

Filter drive

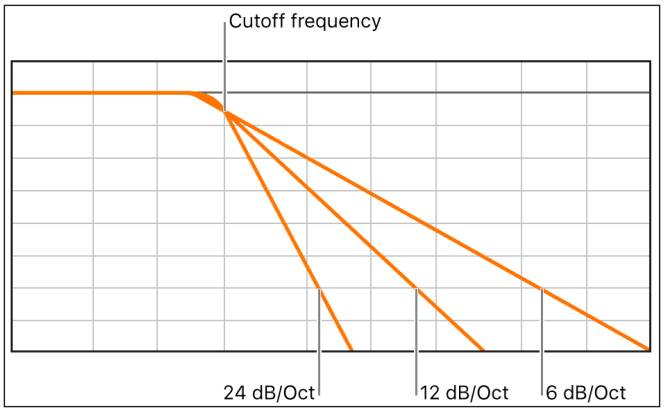
Filter drive adds an amount of gain to the waveform as it enters the filter—an input gain control—overdriving the filter and distorting the waveform. This waveform distortion changes the timbre of the sound, making it harsher.



The figure shows an unfiltered sawtooth wave, with drive set to a value of 80%. Note the wave cycles touching the floor and ceiling of the filter dynamic range.

Filter slope

A filter cuts off the signal at the specified cutoff frequency. This cutoff doesn't happen abruptly but rather at a given slope, which is measured in decibels (dB) of gain reduction per octave. You can define how steep the "cliff" is at the cutoff point by choosing a severe or gentle slope.



Envelopes in the amplifier

Amplifier envelope overview

The amplifier module of a synthesizer is responsible for controlling the level, or loudness, of the signal over time.

Consider the sound of a violin, for example. The sound slowly ramps up to a peak, or maximum, level as the bow is dragged across a string, then it is sustained for a period until the bow is moved away from the string, at which point it cuts off abruptly.

In contrast to the violin example, hitting a snare drum with a drumstick results in a very fast peak level with no sustain portion, then the sound immediately dies out—although there is some *decay*, the time it takes to fall from the peak level.

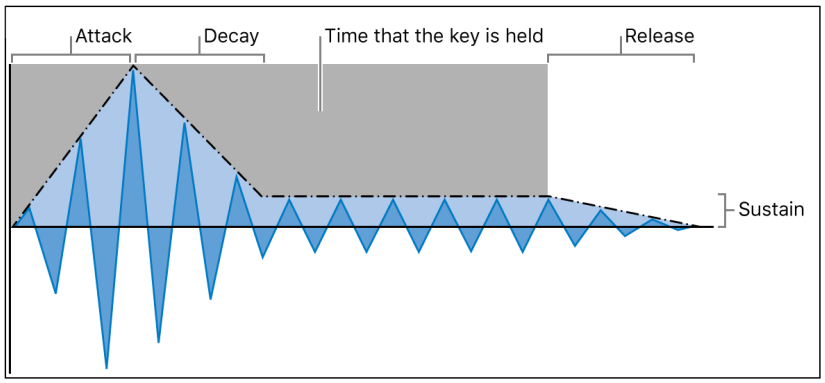
These two sounds clearly have different characteristics over time.

Synthesizers emulate these sonic characteristics by providing control over different parts—the beginning, middle, and end—of the sound level over time. This control is achieved using a component called an *envelope generator*.

Note: Envelope generators are not limited to controlling signal amplitude. They can also control the rise and fall of the filter cutoff frequency or they can modulate other parameters. In short, envelope generators can be used as a modulation source—or as a "remote control" for a given parameter. See Modulation overview.

Attack, decay, sustain, and release

The oscillogram of a percussive tone shown below illustrates the level rising immediately to the top of its range and then decaying. If you drew a box around the upper half of the oscillogram, you could consider it the “envelope” of the sound—an image of the level as a function of time. The role of the envelope generator is to set the shape of this envelope.



The envelope generator usually features four controls—Attack, Decay, Sustain, and Release, commonly abbreviated as *ADSR*.

Envelope controls

- *Attack:* Sets the time it takes for the signal to rise from an amplitude of 0 to 100% (full amplitude).
- *Decay:* Sets the time it takes for the signal to fall from 100% amplitude to the designated sustain level.
- *Sustain:* Sets the steady amplitude level produced when a key is held down.
- *Release:* Sets the time it takes for the sound to decay from the sustain level to an amplitude of 0 when the key is released.

Note: If a key is released during the attack or decay stage, the sustain phase is usually skipped. A sustain level of 0 produces a piano-like—or percussive—envelope, with no continuous steady level, even when a key is held.

Modulation

Modulation overview

Without modulation, sounds tend to be uninteresting and fatiguing to the ear. They also sound synthetic, rather than natural, in the absence of some type of sonic modulation. Vibrato is a type of modulation commonly used by orchestral string players to add animation to their instrument pitch.

To make sounds less static, you can use a range of synthesizer controls to modulate basic sound parameters. To this end, many synthesizers, including ES2 and Quick Sampler, provide a modulation router. Sculpture provides further unique modulation options.

The router lets you direct, or *route*, one or more modulation *sources* (the parameter or control that is modulating another parameter) to one or more modulation *targets* (the parameter being modulated).

You can affect modulation targets, such as oscillator pitch or filter cutoff frequency, by using modulation sources that include the following:

- *Velocity modulation:* You can modulate a target in different ways with the impact of your keyboard playing (harder or softer). The most common example of modulation controller use is a velocity-sensitive keyboard, set to control the filter and level envelopes. The harder you strike the notes, the louder *and* brighter the sound is.
- *Key scaling:* You can modulate a target in different ways by adjusting the position you play on the keyboard (low or high notes). Keyscale modulation is often used to control filter cutoff, resonance, or both; higher notes sound brighter than low notes. This emulates the behavior of many acoustic instruments.
- *Controls:* You can use controls such as the modulation wheel, ribbon controllers, or pedals attached to your keyboard. The modulation wheel is most commonly used for pitch bends during performance.
- *Automatic modulation:* You can use envelope generators or LFOs to modulate signals automatically. The most common LFO modulations are control of the pitch or level of a sustained note, resulting in a vibrato or tremolo.

Modulation sources can be—and often are—triggered by something you've done, such as playing a note on the keyboard or moving the modulation wheel.

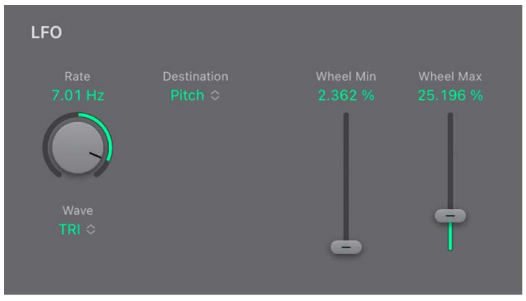
The modulation wheel, pitch bend ribbons, foot pedals, keyboard, and other input options are referred to as *modulation controllers, MIDI controllers,* or just *controllers*.

Modulation routing in ES1 and ES2

ES1 and ES2 provide an easy way to route a control—a modulation source—to part of the sound engine—a modulation target.

ES1 modulation routing

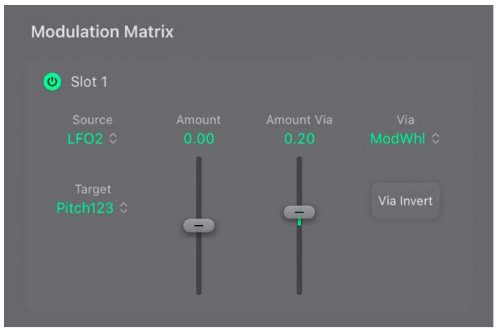
You create an ES1 modulation routing by selecting a modulation target.



- The modulation target can be controlled, in amount, with the modulation wheel of your keyboard.
- The target you select in the Destination pop-up menu dynamically responds to keyboard velocity.
- The amount, or range, of this modulation is determined by the two sliders, Wheel Min and Wheel Max. These determine the minimum and maximum amount of modulation.

ES2 modulation routing

ES2 provides ten modulation routings, in Mod Matrix Slots. Each routing is quite similar to the modulation controls found in ES1.



In the routing shown above:

- The modulation target is Pitch123. The pitch—the Frequency parameter—of Oscillators 1, 2, and 3 is affected by LFO2, the modulation source.
- LFO2 is the modulation source. The two sliders beside the Source and Target pop-up menus indicate the modulation amount. To make the modulation more intense, drag the slider handles, thereby increasing the range of the modulation amount. The Amount Via slider determines the maximum amount of modulation, and the Amount slider determines the minimum amount of modulation.
- The Via control is the ModWhl. Its range is determined by the sliders. The amount of modulation is directly controlled with the modulation wheel of your keyboard. When the modulation wheel is at the minimum setting, at the bottom of its travel, the amount of oscillator pitch modulation is minimal, or off (no modulation). As you move the modulation wheel upward, the frequency of all three oscillators is directly controlled by the LFO (within the range determined by the sliders).

Common modulation sources

The main envelope generator of the synthesizer not only controls levels over time, but it also is often used to modulate other sound parameters when you press or release keyboard keys. Many synthesizers, such as ES2, feature multiple envelope generators.

The most common use of envelope modulation is to control the filter cutoff and resonance parameters with the keyboard velocity or keyboard scaling modulation sources (see Modulation overview).

A modulation source found on nearly all synthesizers is the LFO (low frequency oscillator). This oscillator is used only as a modulation source and does not generate any audible signals that form part of your actual synthesizer sound, because it's too low to be heard. It can, however, affect the main signal by adding vibrato, filter sweeps, and so on.

Common LFO controls

- *Waveform:* Allows you to choose the type of waveform—triangle waves and square waves are common.
  - Triangle waves are useful for filter sweeps—slow changes to the filter cutoff frequency—or when simulating an ambulance siren—slow changes to the oscillator frequency.
  - The square waveform is useful for rapid switches between two different pitches, such as vibratos or octaving.
- *Frequency/Rate:* Determines the speed of the waveform cycles produced by the LFO. When it is set to low values, very slow ramps are produced, making it easy to create sounds such as ocean waves rolling in—when white noise is chosen as the waveform in the main oscillator.
- *Sync mode:* Allows you to choose between free running—a user-defined LFO rate—or synchronization with the project tempo.
- *LFO Envelopes:* The LFO can also be controlled with an envelope generator in some synthesizers. For example, imagine a sustained string section sound where vibrato is introduced a second or two into the sustained portion of the sound. If this can happen automatically, it allows you to keep both hands on the keyboard. Some synthesizers include a simple LFO envelope generator for this purpose. Often, this envelope consists only of an attack parameter—some may also include decay or release options. These parameters perform in the same way as the amplitude envelope parameters (see Attack, decay, sustain, and release), but they are limited to control of LFO modulations.

Global controls

Global controls affect the overall output signal of your synthesizer.

Common global controls

- *Level or Volume:* Sets the overall loudness of your sound. This control is the master output volume control of your synthesizer.
- *Tune:* Sets the overall pitch of your sound—typically in semitone steps. Many Logic Pro instruments provide additional fine-tuning in cents; a hundredth of a semitone.
- *Glide (portamento):* Sets the amount of time that it takes for one note pitch to slide up or down to another note pitch. This control is useful for emulating wind instruments that slide from note to note, rather than move directly to another clear and distinct pitch.
- *Bender/bend range:* Bends the pitch—the oscillator frequency—up or down. This control is generally hard-wired to a pitch bend wheel on a keyboard. As the name suggests, moving the wheel up or down from its centered position bends the pitch up or down. The Bender/Bend Range parameter usually has an upper and lower limit of one octave but is typically set to around three semitones up or down. This setting is ideal for emulating small (or extreme) pitch fluctuations that occur in some instruments—such as when moving between notes with a trumpet, or bending the strings during a guitar solo.
- *Voices:* Sets an upper limit to the number of notes that can be played at a given time. Producing notes simultaneously is known as the *polyphony*—literally, “many voices”—of the instrument. The Voices parameter sets an upper limit to the number of notes that can be produced simultaneously.

- *Unison:* Used to "stack" voices—with the unison voice being heard one octave above the frequency of the played note. Because two voices are being used when you play a note, unison has two effects—it makes the sound richer and fuller, and it halves the polyphony.
- *Trigger mode:* Determines how the polyphony of the instrument is handled when the number of notes played exceeds the number of available voices. Trigger mode also allows you to assign legato mode. Essentially, this control changes the way the synthesizer responds to your playing technique. It is invaluable when you're emulating monophonic instruments, such as flutes, clarinets, and trumpets. When you use the trigger mode control and assign a last note priority, the played note is cut off by playing another note.
  - *Last note priority:* When new notes are triggered while all voices are playing, the synthesizer frees up polyphony (voices) by ending the notes played earliest. This is the default trigger mode of Logic Pro synthesizers when in a monophonic mode.
  - *First note priority:* Notes played earlier are not stopped. In this mode you need to stop playing notes in order to play a new one after you have reached the limit of the polyphony (voices) of the instrument.

Note: The trigger mode parameter can also allow you to set priorities for lower- or higher-pitched notes when playing monophonically (one voice at a time) in some synthesizers, such as Alchemy.

There are many other global controls found on different synthesizer models that have an impact on your overall sound.

Other synthesis methods

Other synthesis methods overview

There are many ways to create sounds, using different technologies and approaches to synthesis. This section covers all main methods, with reference to Logic Pro instruments where applicable.

Many of the methods described incorporate at least some elements of the subtractive synthesis design. See How subtractive synthesizers work.

- Sample-based synthesis
- Frequency modulation (FM) synthesis
- Component modeling synthesis
- Wavetable, Vector, and LA synthesis
- Additive synthesis
- Spectral synthesis
- Resynthesis
- Phase distortion synthesis
- Granular synthesis

Sample-based synthesis

Sample-based synthesis, which is sometimes known as *Pulse Code Modulation* (PCM), or *sampling and synthesis* (S&S) synthesis, is differentiated from subtractive synthesis mainly by the use of samples in place of oscillator waveforms.

The samples—digital recordings of existing sounds—are mapped across the keyboard. Typically, each sample is mapped to a note in the center of a keyboard range that spans a few notes that are unique to that sample. The reason for this limited range of notes is that samples tend to sound much less like the source sound if played more than a few notes higher or lower than the original pitch—due to the relationship between the pitch and playback speed of samples.

The pitch of each sample isn't changed with a frequency control, unlike the oscillator waveform of a synthesizer. Rather, a sample is played back at a faster or slower speed to alter its pitch, which has a corresponding impact on the sample playback time. For example, a sample played back at twice the speed requires half the time to play through.

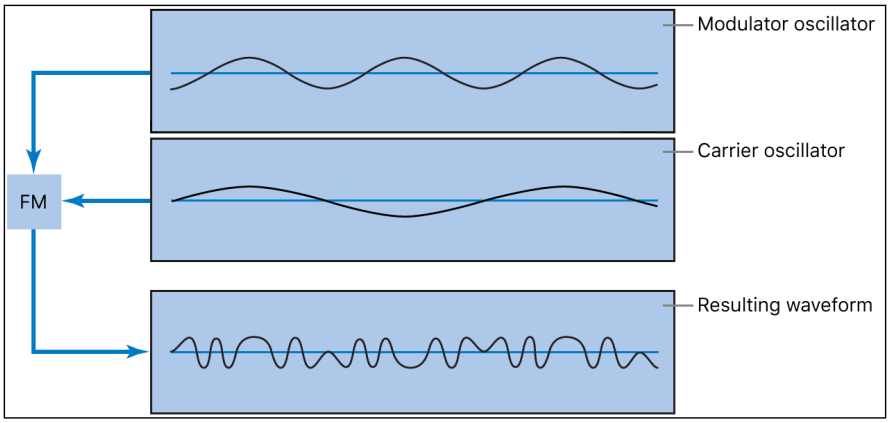
The Logic Pro for Mac version of Sampler is a sample player that can be used much like a sample-based synthesizer, due to the subtractive synthesis features that it offers. The Logic Pro for Mac version of Alchemy can also be used in this way, but adds additive and spectral resynthesis features that can result in very different sounds than are possible with subtractive synthesis techniques. Alchemy also provides a granular synthesis engine that offers further sample manipulation options, again extending the potential sonic outcome. See Resynthesis and Granular synthesis.

Popular instruments that use the sample-based synthesis approach include the Korg M1, O1/W, and Triton; the Roland JV/XP instruments; the Yamaha Motif series; and many others.

Frequency modulation (FM) synthesis

FM synthesis uses a *modulator* oscillator and a sine wave *carrier* oscillator. The modulator oscillator modulates the frequency of the waveform generated by the carrier oscillator within the audio range, thus producing new harmonics. These harmonics are known as *sidebands*.

Where there is a mathematical relationship between the carrier and modulator waveforms, the sound produced is harmonic. Where the modulator is a non-integer multiple of the carrier waveform, inharmonic sidebands are produced, resulting in an inharmonic sound.



Typically, FM synthesizers don't incorporate a filter. You can generate some subtractive synthesizer style sounds with FM synthesis, but it is difficult to recreate the sound of a resonant subtractive synthesizer filter using this method. FM synthesis is extremely good, however, at creating sounds that are difficult to achieve with subtractive synthesizers—sounds such as bell timbres, metallic tones, and the tine tones of electric pianos. Another strength of FM synthesis is punchy bass and synthetic brass sounds.

The EFM1 and Retro Synth FM synthesizers can produce many of the classic FM sounds made famous by the Yamaha DX series of synthesizers. The DX7, sold from 1983 to 1986, remains the most commercially successful professional-level hardware synthesizer ever made. The Retro Synth FM synthesizer adds a filter section and other features to the FM engine, opening up a much broader range of potential sounds.

ES2 also features some FM techniques that allow you to modulate one oscillator with another. You can use these FM techniques to partially bridge the gap between the digital sound of FM synthesis and the fat analog sound that ES2 is noted for.

Component modeling synthesis

Also known as *physical modeling,* this synthesis method uses mathematical models to simulate instruments. Parameters are used to describe the physical characteristics of an instrument, such as the materials the instrument is made of, the dimensions of the instrument, and the environment it is played in—under water, or in the air, for example. Equally important are descriptions of how the player would interact with the instrument—whether it is played by blowing; by plucking, bowing, or strumming strings; by hitting it with sticks; by placing fingers on sound holes, and so on.

To model a drum sound, for example, the following aspects need to be taken into account. Of primary importance is the actual drum strike—how hard it is and whether the drumhead is struck with a wooden stick, a mallet, a beater, and so on. The properties of the drumhead (the skin or membrane) include the kind of material, its degree of stiffness, its density, its diameter, and the way it is attached to the shell of the drum. The volume of the drum cylinder itself, its material, and the resonance characteristics of all of the above need to be mathematically described.

To model a violin, you need to take into account the bow against the string, the bow width and material, the bow tension, the string material, the string density, the string tension, the resonance and damping behavior of the strings, the transfer of string vibrations through the bridge (materials, size, and shape of the bridge), and the materials, size, and resonance characteristics of the violin body. Further considerations include the environment that your modeled violin is played in and the playing style—"hammering" or tapping with the bow as opposed to drawing it across the strings.

The Sculpture component modeling synthesizer can produce convincing recreations of acoustic (and electronic) instruments. It is also exceptionally good at creating atmospheric, constantly evolving pad sounds. Other instruments that include physical modeling components and techniques are: Vintage B3, Vintage Clav, and Vintage Electric Piano.

Wavetable, Vector, and LA synthesis

Wavetable synthesis uses a number of different single-cycle waveforms, laid out in what is known as a *wavetable*.

Playing a note on the keyboard triggers a predetermined sequence of waves. In general, this is not a stepped transition but rather a smooth blend from one waveform into another, resulting in a constantly evolving waveform. Multiple wavetables can also be used simultaneously—either played one after the other, or blended together—resulting in more harmonically complex waveforms.

A single wavetable can emulate filter cutoff with a series of bright, less bright, then dull-sounding waveforms played in sequence—which resembles a reduction of the filter cutoff frequency in a subtractive synthesizer.

Wavetable synthesis isn't well-suited for emulating acoustic instruments. It is noted for producing constantly evolving sounds; harsh and metallic, or bell-like sounds; punchy basses; and other digital tones.

Wavetable synthesis was championed by the PPG and Waldorf instruments. ES2 and Retro Synth include a number of wavetable features. Logic Pro for Mac Alchemy and Sample Alchemy take this a step further with granular synthesis, which shares some aspects with wavetable synthesis. See Granular synthesis.

Roland LA (Linear Arithmetic) synthesizers such as the D-50 work on a similar principle. In these synthesizers, complex sampled attack phases are combined with simple sustain or decay phases to create a sound. In essence, this is a simple wavetable that consists of two samples.

Where LA and wavetable synthesizers differ is that the latter were designed to create new, original, digital sounds. LA synthesizer designers, in contrast, wanted to emulate real instruments using a minimum of memory. To achieve this goal, they combined samples of the attack phase—the crucial part of a sound—with appropriate decay and sustain phases that were played with filtered sawtooth or pulse waves.

Vector synthesis—used in the Sequential Circuits Prophet-VS and Korg Wavestation—allows you to move through wavetables and sequences arranged on a two-dimensional grid (two different vectors, or less technically, on the X or Y axis). The main benefit of this approach is that the balance between samples and waves is achieved in real time by moving a joystick. You can also use ES2 to perform vector synthesis by modulating the Oscillator Mix parameter with the Vector Envelope.

Additive synthesis

Additive synthesis could be considered the reverse approach to subtractive synthesis. See Sound basics overview, Tones, overtones, harmonics, and partials, and How subtractive synthesizers work.

To obtain an insight into the additive synthesis method, consider the fact that all sounds are a sum of various sine tones and harmonics.

In additive synthesis, you start out with nothing and build a sound by combining multiple sine waves of differing levels and frequencies. As more sine waves are combined, they begin to generate additional harmonics. In most additive synthesizers, each set of sine waves is viewed and used much like an oscillator.

Depending on the sophistication of the additive synthesizer you're using, you will either have individual envelope control over the level and pitch of each sine wave, or you will be limited to envelope control over groups of sine waves—one envelope per sound and its harmonics, or all odd or all even harmonics, for example. In practical terms, working with groups of related harmonics is the best approach due to the mathematical relationships between them and the impact this has on the overall tone when adjusting them en masse, rather than individually.

Logic Pro for Mac Alchemy can be used as a true additive synthesizer, where you create sounds from scratch with sine waves, with full control of the level, pitch, and pan position of each harmonic. Logic Pro for Mac Alchemy and Sample Alchemy also allows you to resynthesize imported samples with additive (and spectral) synthesis techniques. See Resynthesis.

Some aspects of the additive synthesis approach are also used in Vintage B3 and other drawbar organs. In Vintage B3 you start with a basic tone and add harmonics to it, to build up a richer sound. The level relationships between the fundamental tone and each harmonic are determined by how far you pull each drawbar out. Because Vintage B3 doesn't provide envelope control over each harmonic, it is limited to organ emulations.

Spectral synthesis

Spectral (modeling) synthesis lets you build a sound by combining multiple (sine wave) harmonics and filtered noise signals. This synthesis method shares many underlying principles with vocoders, but tracks peaks in the overall spectrum, rather than individual amplitudes and frequencies in the signal.

Logic Pro for Mac Alchemy and Sample Alchemy provide a flexible spectral synthesis implementation, known technically as multiresolution sinusoidal modeling. In other words, a custom filter bank is used to analyze peaks (and other elements) in the frequency spectrum of the signal. Harmonic components, based on the spectral analysis, are modeled as a combination of sine waves and white noise passed through a filter that changes over time. The noise components are typically used to model "percussive" elements such as a piano strike or a speech fricative in a vocal sample, for example. The (sine wave) harmonic components are used to model the piano note or remainder of the vocal sound. The output of the modeled sound is a combination of the frequencies and levels of the detected harmonic components and the noise signal passed through a time-variable filter.

The spectral synthesis engine in Alchemy can be used to create sounds from scratch, by drawing or painting in the spectral edit window. You can also import and convert an image file into a spectrogram (an image of the frequency spectrum) in the spectral edit window. You can then edit this converted image with the drawing and painting tools. Alchemy analyzes the spectrogram and replaces peaks and percussive components with sine harmonics and filtered noise elements to create a sound.

Alchemy can also break imported samples down into "spectral bins," with each bin storing the amplitude and phase values in the given frequency band. These bins are used to resynthesize (or reconstruct an approximation of) the original sound. See Resynthesis. In noise mode, the amplitude values are used to generate filtered noise for each bin. In pitch mode, the amplitude and phase values are used to synthesize a sine wave for each bin. The signals associated with each bin are then summed and sent to other parts of the Alchemy synthesis engine.

Resynthesis

You can analyze the frequency components of a recorded sound and then resynthesize—reconstruct—a representation of the sound using additive or spectral techniques. See Additive synthesis and Spectral synthesis.

At a basic conceptual level, additive synthesis and spectral (modeling) synthesis are similar in that both techniques can recreate complex sounds by adding together many simpler signals. In practice, however, the two methods are very different. Additive resynthesis attempts to understand the harmonic structure of an audio file and then recreates each harmonic partial with a separate sine wave. Spectral resynthesis instead analyzes the changing frequency spectrum of the signal and attempts to recreate these spectral characteristics in the resynthesized signal.

An additive resynthesis system generates a series of sine waves, with appropriate pitches and levels over time, for each harmonic. It does this by calculating the frequency and amplitude of each harmonic in the overall frequency spectrum of the analyzed sound. After the sound has been resynthesized in this fashion, you can adjust the frequency and amplitude of any harmonic (sine wave). Theoretically, you could even restructure a harmonic sound to make it inharmonic, for example.

In a spectral resynthesis system, the audible spectrum is split into a large number of "spectral bins," and the distribution of energy across these bins is analyzed. The sound is recreated by filling each spectral bin with the required amount of signal, either using sine waves or filtered noise, and the results are then summed.

The difference in approach means the two techniques are suited to different types of sounds. Additive resynthesis excels at recreating single notes with a clear harmonic structure. Spectral resynthesis is better suited for complex inharmonic sounds such as drums, or polyphonic material containing chords rather than individual notes.

Logic Pro for Mac Alchemy and Sample Alchemy can resynthesize sounds using additive or spectral methods. It can also perform resynthesis using a combination of the two techniques, which is useful for sounds that feature both a clear pitch component and a noisy component. Examples of such sounds are the hammer strike of a piano and the string tone, or the breath noise of a flute and the flute tone.

Phase distortion synthesis

Phase distortion synthesis creates different waveforms by modifying the phase angle of a sine wave with a second modulator wave. In some respects, this is similar to FM synthesis. The principal difference between the two approaches is that the two waveforms are synchronized each cycle in phase distortion synthesis, resulting in the creation of more harmonic overtones.

In essence, you can bend a sine wave until it becomes a sawtooth wave, a triangle wave, a square wave, and so on. The synthesis engine beyond the waveform generators typically follows a subtractive synthesizer design.

Phase distortion synthesis was commercially introduced in the 1984 Casio CZ series synthesizers.

Several Logic Pro synthesizers allow you to reshape the source waveform, but you're not restricted to sine waves as the raw material.

Granular synthesis

The basic premise behind granular synthesis is that a sound can be broken down into tiny particles, or grains. In many respects, granular synthesis is similar to wavetable synthesis, but it works on a much finer scale. This method is ideal for creating constantly evolving sounds and truly unique tones.

Sample Alchemy extracts sampled grains—2- to 230-milliseconds long—which can be manipulated, reorganized, or combined with grains from other sounds to create new timbres. The effects that result from this technique depend on factors such as the duration and amplitude envelope of each grain, the degree of overlap or separation from one grain to the next, and the pitch and pan position of each piece of sound.

If each new grain is extracted from slightly further into the sample than its predecessor, playback of the resulting stream of grains in their original sequence, at the original speed, essentially puts the pieces of sound back together to closely resemble the source audio material. If you play back the stream of grains at a slower speed, separation (a small gap) occurs between grains. If you play back the stream of grains at a faster rate, each grain overlaps with the next one.

A number of interesting manipulations are possible using this synthesis method.

- Time-stretching. Grains can be sent out at a faster or slower rate than their counterparts in the original sample, allowing faster or slower playback—without the changes to pitch that occur with traditional sample playback. You can even “freeze” a sample at a certain position by extracting multiple grains from a single point. On this latter point, you could repeat a drum hit “grain” multiple times in a time-stretched loop to create a different drum pattern, for example.
- Pitch-shifting. Modifications to the pitch of each grain allow you to vary the pitch of a sample without affecting its timing. By modulating the pitch or pan position of each grain, you can also create spatial and “blurring” effects.
- You can also scramble the order in which grains are played back to produce effects ranging from mild fuzziness to extreme mangling.

A brief synthesizer history

Precursors to the synthesizer

The earliest seeds of modern electronic synthesizers began in the twilight years of the 19th century. In 1897, an American inventor named Thaddeus Cahill was issued a patent to protect the principle behind an instrument known as the Telharmonium, or Dynamophone. Weighing in at 200 tons, this mammoth electronic instrument was driven by 12 steam-powered electromagnetic generators. It was played in real time using velocity-sensitive keys and, amazingly, was able to generate several different sounds simultaneously.
The Telharmonium was presented to the public in a series of “concerts” held in 1906. Christened “Telharmony,” this music was piped into the public telephone network, because no public address systems were available at the time.

In 1919, Russian inventor Leon Theremin took a markedly different approach. Named after the man who masterminded it, the monophonic Theremin was played without actually touching the instrument. It gauged the proximity of the player's hands as they were waved about in an electrostatic field between two antennae, and used this information to generate sound. This unorthodox technique made the Theremin enormously difficult to play. Its eerie, spine-tingling—but almost unvarying—timbre made it a favorite on countless horror movie soundtracks. R. A. Moog, whose synthesizers would later garner worldwide fame, began to build Theremins at the age of 19.

In Europe, Frenchman Maurice Martenot devised the monophonic Ondes Martenot in 1928. The sound generation method of this instrument was akin to that of the Theremin, but in its earliest incarnation it was played by pulling a wire back and forth.

In Berlin during the 1930s, Friedrich Trautwein and Oskar Sala worked on the Trautonium, an instrument that was played by pressing a steel wire onto a bar. Depending on the player's preference, it allowed either infinitely variable pitches—much like a fretless stringed instrument—or incremental pitches similar to that of a keyboard instrument. Sala continued to develop the instrument throughout his life, an effort culminating in the two-voice Mixturtrautonium in 1952. He scored numerous industrial films, as well as the entire soundtrack of Alfred Hitchcock's masterpiece *The Birds*, with this instrument. Although the movie does not feature a conventional musical soundtrack, all bird calls and the sound of beating wings heard in the movie were generated on the Mixturtrautonium.

In Canada, Hugh Le Caine began to develop his Electronic Sackbut in 1945. The design of this monophonic instrument resembled that of a synthesizer, but it featured an enormously expressive keyboard that responded not only to key velocity and aftertouch but also to lateral motion.

The instruments discussed thus far were all designed to be played in real time. Relatively early, however, people began to develop instruments that combined electronic sound generators and sequencers. The first instrument of this kind—named the Automatically Operating Musical Instrument of the Electric Oscillation Type—was presented by the French duo Edouard Coupleux and Joseph Givelet in 1929. This hybrid married electronic sound generation to a mechanically punched tape control. Its name was unofficially shortened to Coupleux-Givelet Synthesizer by its builders, the first time a musical instrument was called a "synthesizer."

The term was formally introduced in 1956 with the debut of the RCA Electronic Music Synthesizer Mark I, developed by American engineers Harry F. Olson and Herbert Belar. Its dual-voice sound generation system consisted of 12 tuning forks, which were stimulated electromagnetically. For its time, the instrument offered relatively sophisticated signal-processing options. The output signal of the sound generator could be monitored by loudspeakers and, amazingly, recorded directly onto two records. A single motor powered both turntables and the control unit of the Mark 1. The synthesizer was controlled by information punched onto a roll of paper tape, enabling continuous automation of pitch, volume, timbre, and envelopes. It was extremely complicated to use, it was unreliable, and spontaneous playing was impossible.

Early voltage-controlled synthesizers

With the exception of the Telharmonium, which was conceived prior to the advent of the thermionic valve, the precursors to the modern-day synthesizer were all based on tube circuitry. This made these instruments unwieldy and volatile. After the transistor became available in 1947/48, more rugged, smaller, and thus portable, instruments were soon to come.

At the end of 1963, American innovator R. A. (Bob) Moog met the composer Herbert Deutsch. Deutsch inspired Moog to combine a voltage-controlled oscillator and amplifier module with a keyboard, and in 1964 the first prototype of a voltage-controlled synthesizer was constructed. This collaboration with the German musician prompted Moog to extend his range of modules and to combine them into entire systems. It wasn't until 1967, however, that Moog actually called his diverse mix-and-match systems *synthesizers*.

Moog's achievements spread by word of mouth, and Moog, always keen to elicit the feedback of his customers, continued to add further modules to his line. Wendy Carlos's LP release *Switched-On Bach* (1968) was responsible for the breakthrough of Moog's instruments. The record featured Moog's modular synthesizers and was one of the earliest commercial multitrack recordings. The album's success introduced the synthesizer to a wider audience and made the name "Moog" synonymous with the instrument. Hoping to capitalize on the new sounds that synthesizers made available, and match Carlos's commercial success, numerous studios, producers, and musicians acquired Moog modular synthesizers. In 1969, as many as 42 employees produced two to three complete modular systems every week at Moog's production facility.

Working independently, an engineer named Donald Buchla had conceived and implemented the concept for a modular, voltage-controlled synthesizer. This coincided with Moog's version. Buchla also developed his first instruments in close cooperation with users. The inspiration for his first synthesizer originated with composers Morton Subotnik and Ramon Sender, of the San Francisco Tape Music Center. Although he began working on this instrument in 1963, it didn't make its public debut until 1966. By design, Buchla's instruments catered primarily to academia and avant-garde musicians, so they never garnered the public attention and acclaim of Moog's synthesizers.

The Minimoog

Moog and Buchla's voltage-controlled synthesizers were modular. One chassis, or several, housed the power supply and the actual modules. The inputs and outputs of the modules had to be interconnected via a confusing tangle of patch cords before the synthesizer would make a sound. Establishing these connections properly was an art unto itself, and obtaining useful settings on the modules required significant expertise.

Moog realized that these modular synthesizers were too complex and expensive for the average musician and were likely to fail if sold through traditional music retailers. In 1969, Moog collaborated with engineers Jim Scott, Bill Hemsath, and Chad Hunt to design a compact, portable, affordable, and easy-to-use synthesizer. After three prototypes were built, the Minimoog Model D was released in the summer of 1970.

In contrast to previous modular synthesizers, it was neither necessary nor possible for players to connect the modules of the Minimoog as they saw fit. All of the modules' connecting circuitry was hard-wired at the factory. The type and number of modules was also fixed. This simplified manufacturing considerably, and cut costs dramatically. A major marketing campaign saw the Minimoog become a huge success. Without alteration to its basic design, 13,000 Minimoogs were sold worldwide, right up to 1981.

Storage and polyphony

Customers weren't entirely satisfied with the Minimoog and contemporary synthesizers, however. Although musicians no longer had to contend with countless cords in order to play a synthesizer, they still had to deal with numerous knobs and switches before they could do something as simple as switch from one sound to another. Moreover, keyboardists were bored with playing monophonic melody lines on synthesizers—they wanted to play chords. Although dual-voice keyboards that connected two monophonic synthesizers were available as early as 1970, customers wanted more.

Attempting to satisfy these demands, two schools of thought emerged in synthesizer design. One approach called for an independent, monophonic synthesizer to be assigned to every key on the keyboard. To this end, designers married the design principles of electronic organs to synthesizer technology. Although this breed of instrument was fully polyphonic—all notes of the keyboard could be heard simultaneously—it wasn't as versatile in its control options as a true synthesizer. The first fully polyphonic synthesizer to feature this type of design was the Moog Polymoog, released in 1975. Developed primarily by David Luce, it featured 71 weighted, velocity-sensitive keys.

In the second approach to polyphonic sound generation, a synthesizer was assigned to a key only when the key was pressed—in effect, semi-polyphony. As early as 1973, American company E-MU Systems introduced the Modular Keyboard System Series 4050, a digital keyboard that could be connected to up to ten monophonic synthesizers, and thus had ten-voice polyphony. The problem with this approach was that very few people owned ten synthesizers, and the amount of time and effort involved in programming a new sound was an overwhelming deterrent. Digital memory was still waiting to be developed, and, once again, the evolution of semi-polyphonic synthesizers required the qualities that only digital keyboards could provide.

The same prerequisite—digital engineering—eventually led to synthesizers that allowed sounds to be stored. Without the benefit of digital technology, early attempts at storing sounds included some unusual solutions. For example, a synthesizer with analog programmability required a dedicated row featuring all of the instrument's control elements for every "memory" slot. In this case, a selector switch accessed one of the many identical control panels and connected it to the sound generator.

The first synthesizer featuring storage slots implemented in this manner was the 1975 Yamaha GX1. The control elements for the system's storage slots were so small that they could be adjusted only by using jeweler's screwdrivers and complicated tools—called *programmers* and *comparators*.

It was not until 1978 that the problem was resolved. The five-voice polyphonic Prophet-5, released by the American company Sequential Circuits, was the world's first synthesizer with a global storage feature. All settings for each of its five onboard monophonic synthesizers were stored in memory slots—40 in the debut model. Moreover, all five synthesizers shared a single user interface, which simplified matters considerably. In spite of its initially high price, this instrument proved extremely popular and approximately 8,000 were built up until 1985. In addition to its digitally implemented polyphony and memory, the success of the Prophet-5 is due to the quality of its analog sound generation system.

Digital synthesizers

Modern digital synthesizers featuring variable polyphony, memory, and completely digital sound generation systems follow a semi-polyphonic approach. The number of voices that these instruments are able to generate, however, no longer depends on the number of built-in monophonic synthesizers. Rather, polyphony depends entirely on the performance capability of the computers that power them.

The rapid developments in the digital world are best illustrated by the following example. The first program that emulated sound generation entirely by means of a computer was Music I, authored by the American programmer Max Mathews. Invented in 1957, it ran on a university mainframe, an exorbitantly expensive IBM 704. Its sole claim to fame was that it could compute a triangle wave, although doing it in real time was beyond its capabilities.

This lack of capacity for real-time performance is the reason why early digital technology was used solely for control and storage purposes in commercial synthesizers. Digital control circuitry debuted in 1971 in the form of the digital sequencer found in the Synthi 100 modular synthesizer—in all other respects an analog synthesizer—from the English company EMS. Priced out of reach of all but the wealthiest musicians, the Synthi 100 sequencer featured a total of 256 events.

Ever-increasing processor performance made it possible to integrate digital technology into parts of the sound generation engine itself. The monophonic Harmonic Synthesizer, manufactured by Rocky Mountain Instruments (RMI), was the first instrument to do so. This synthesizer had two digital oscillators, combined with analog filters and amplifier circuits.

The Synclavier, introduced in 1976 by New England Digital Corporation (NED), was the first synthesizer with completely digital sound generation. Instruments like the Synclavier were based on specialized processors that had to be developed by the manufacturers themselves. This development cost made the Synclavier an investment that few could afford.

An alternative solution was the use of general-purpose processors made by third-party computer processor manufacturers. These processors, especially designed for multiplication and accumulation operations—common in audio processing tasks—are called *digital signal processors* (DSPs). Peavey's DPM-3, released in 1990, was the first commercially available synthesizer completely based on standard DSPs. The instrument was 16-note polyphonic and based mainly on three Motorola 56001 DSPs. It featured an integrated sequencer and sample-based subtractive synthesis, with factory presets and user-definable samples.

Another solution was to design synthesizers as a computer peripheral, rather than as a standalone unit. The growing popularity of personal computers from the early 1980s made this option commercially viable. Passport Soundchaser and the Syntauri alphaSyntauri were the first examples of this concept. Both systems consisted of a processor card with a standard musical keyboard attached to it. The processor card was inserted into an Apple II computer. The synthesizers were programmed via the Apple keyboard and monitor. They were polyphonic and had programmable waveforms, envelopes, and sequencers. Today's sound cards, introduced in countless numbers since 1989, follow this concept.

Exploiting the ever-increasing processing power of today's computers, the next evolutionary step for the synthesizer was the software synthesizer, which runs as an application on a host computer.

The sound card (or built-in audio hardware) is needed these days only for audio input and output. The actual process of sound generation, effects processing, recording, and sequencing is performed by your computer's CPU—using the Logic Pro software and instrument collection.

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