

its two subtracks.

Mapping Controller Knobs to Plug-in Parameters

In [Lesson 4](#), you used Smart Controls as a one-stop shop for adjusting multiple parameters, such as a bus send level, parameters of the instrument plug-in, and parameters of the channel EQ plug-in.

This time you will map a Smart Control knob to a plug-in parameter, and assign a real knob or fader on your MIDI controller to that Smart Control knob. Finally, you'll save your custom Smart Control layout within the patch.

Opening the Plug-Ins for Mapping

In this exercise, you'll select a patch in the Library and open the plug-in you want to control. In the Smart Controls pane, you will map one of that plug-in's knobs to a screen control.

- 1 Drag the track header of the main track into the inspector to delete the track.

The New Track dialog opens.

- 2 Create one new software instrument track.
- 3 Open the Library, and select Synthesizer > Bass > Dirty Fifth.
- 4 Play your MIDI keyboard.

The synth sounds thick and gritty. Wouldn't it be fun to make its timbre evolve while you play some notes? To do so, you will first open the plug-in windows that have parameters you can map to screen controls.

- 5 In the inspector, click in the middle of the Ringshifter plug-in slot to open the plug-in.



The Ringshifter plug-in window opens.



Tip

If the presence of plug-in windows hinders your ability to interact with the main window, press V to toggle all plug-in windows on and off.

Tip

To resize a plug-in window, drag its lower-right corner or use the View pop-up menu in the plug-in header.

Mapping Screen Controls to Parameters

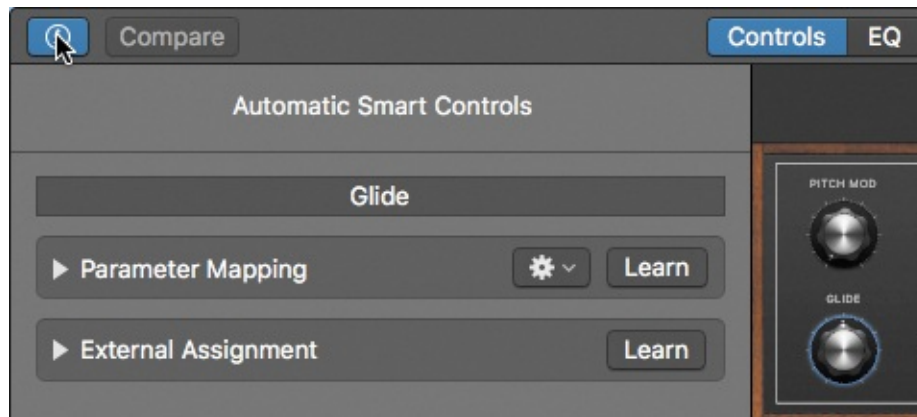
Now that you have opened the Ringshifter plug-in, you can use the Smart Controls pane to map a screen control to the Ringshifter's Frequency knob.

- 1 In the control bar, click the Smart Controls button (or press B).



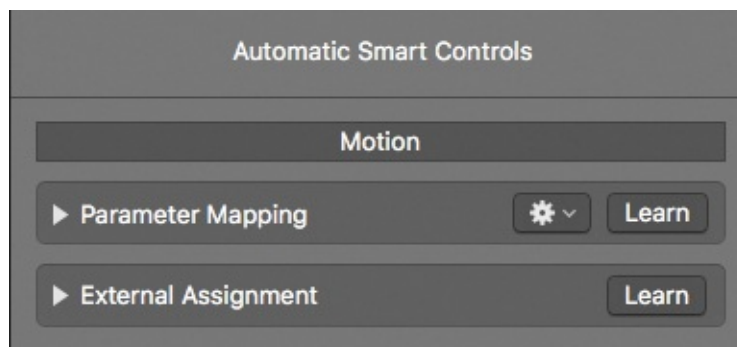
The Smart Controls pane opens at the bottom of the main window, displaying a collection of preassigned screen control knobs and buttons.

- 2 At the upper left of the Smart Controls pane, click the Inspector button.



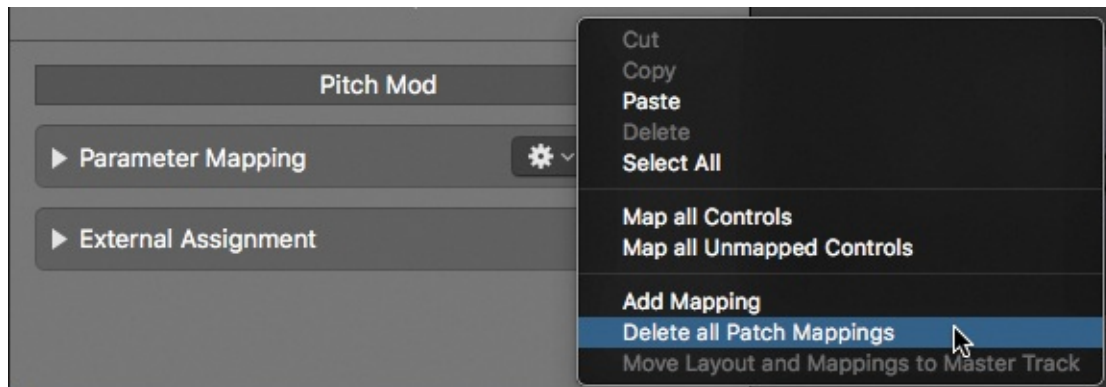
The Smart Controls inspector opens. It shows the parameter assignments for the selected screen control. You will map only one screen control knob, so let's choose a simpler layout.

- 3 At the top of the Smart Controls inspector, click the layout name, and choose Factory Layouts > Soundscape 6.



The simpler Soundscape 6 layout appears. It has only six knobs. The first (labeled Pitch Mod) is highlighted in blue to indicate that it is selected. First let's remove all factory mappings for this patch.

- 4 In the Parameter Mapping area, from the action menu, choose Delete all Patch Mappings.

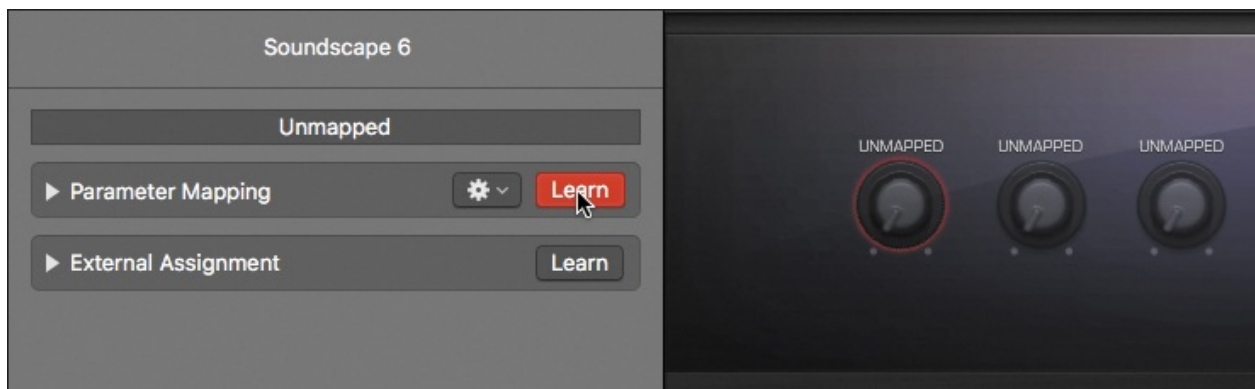


All screen controls for the current patch are unmapped.



You now will map the first screen controls knob so that it controls the big Frequency knob in the Ringshifter plug-in.

- 5 In the Parameter Mapping area, click the Learn button.

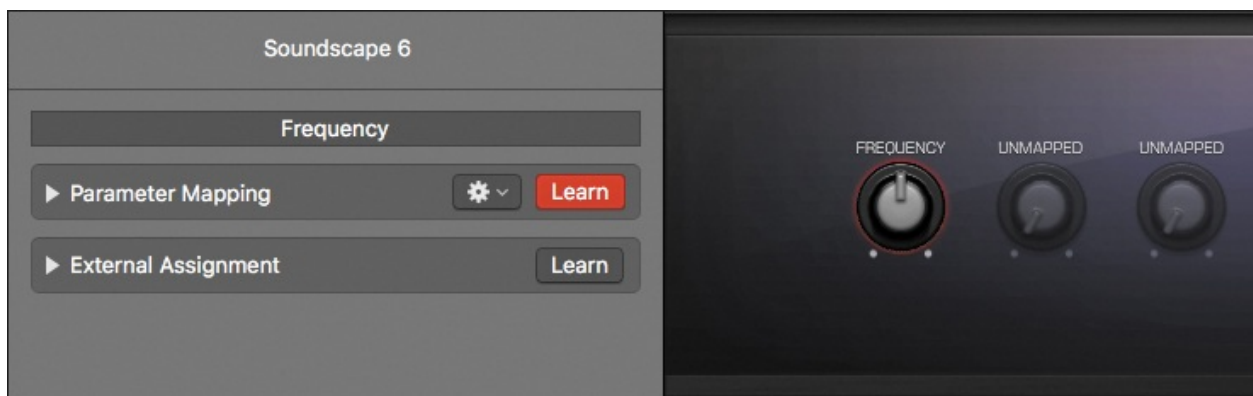


The first screen control knob is highlighted in red, indicating that it is ready to be mapped.

- 6 In the Ringshifter, click the big Frequency knob.

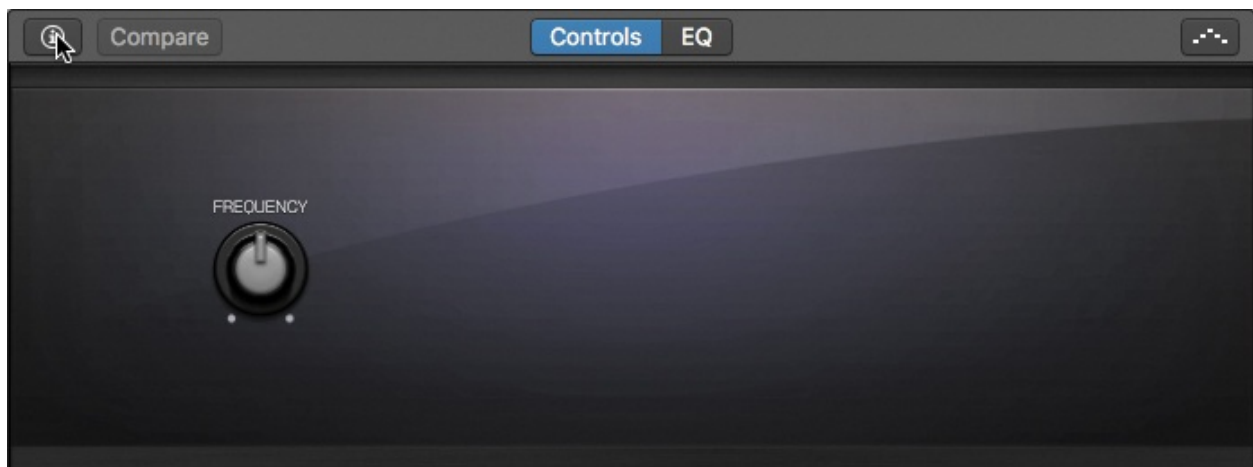


In the Smart Controls pane, the highlighted screen control is renamed “Frequency.”



7 In the Parameter Mapping area, click the Learn button to turn off Learn mode.

8 Close the Smart Controls inspector.



In the Smart Controls pane, the mapped Frequency knob is displayed and the unmapped knobs are hidden.

9 In the Smart Controls pane, drag the Frequency knob up and down while you play a few notes on your keyboard.

The big Frequency knob in the Ringshifter moves along with the Smart Control knob, and you can hear the Ringshifter effect modulate your synth sound.

10 Close the Ringshifter plug-in window.

You can now save this patch along with your custom Smart Control layout and mappings.

11 At the bottom of the Library, click the Save button.

12 In the Save dialog, name your patch *Dirty Fifth Shifter*, and click Save.

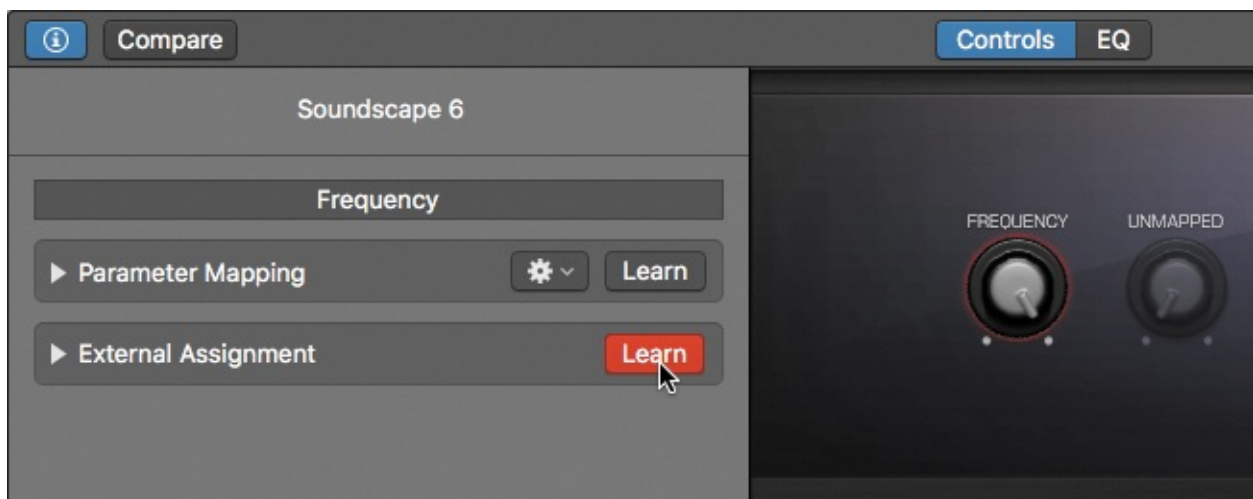
You have created and saved your own Smart Control layout, with a screen control mapped to a plug-in parameter. Smart Controls allow you to unite all the controls you need in a single pane, which makes it easy to control multiple parameters in multiple plug-ins without opening the plug-in windows.

Assigning MIDI Controller Knobs to Screen Controls

As fun as it is to tweak the frequency of the Ringshifter while playing on your keyboard, it's not usually practical to have one hand on the mouse tweaking a knob on your computer screen while the other is playing the keyboard. However, most recent MIDI keyboards and MIDI control surfaces have knobs or faders that can send MIDI Continuous Controller data to Logic, so let's assign a hardware knob to the screen control in the Smart Controls pane.

1 Open the Smart Controls inspector.

2 In the External Assignment area, click the Learn button.

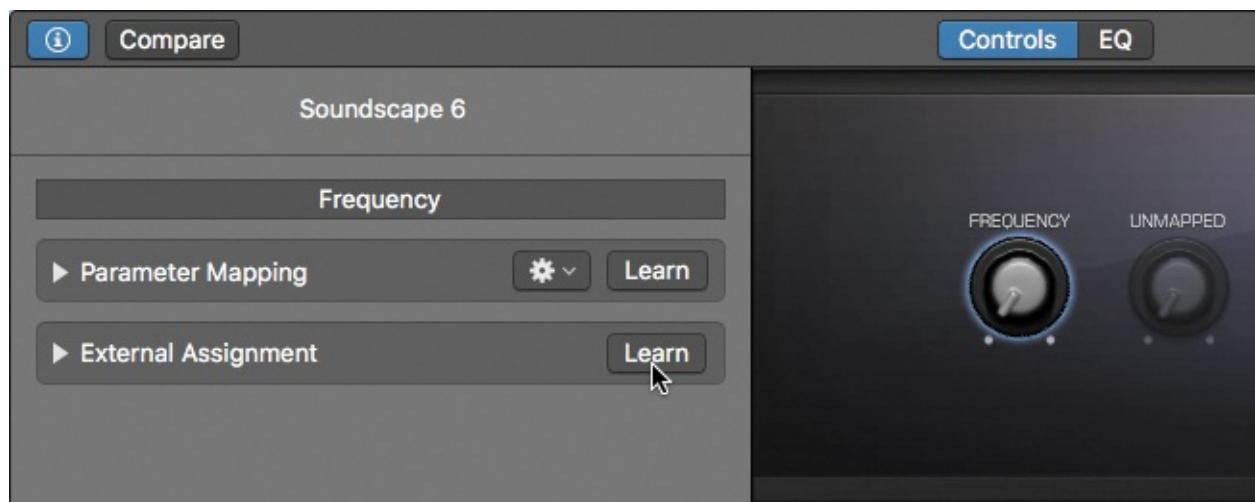


Note

When the External Assignment Learn button is on, do not play notes

on your keyboard, or touch knobs, faders, or wheels other than the one you intend to assign to the selected onscreen controller. If you do, that unintended action will also be learned as an assignment and may lead to unexpected results.

- 3 On your MIDI keyboard, turn a knob. Don't be timid. Move the knob all the way down and all the way up, if necessary. When the knob is assigned, it adjusts the Frequency screen control in the Smart Controls pane (which in turns controls the Ringshifter plug-in's Frequency parameter).
- 4 In the External Assignment area, click the Learn button to turn it off.



- 5 Close the Smart Controls inspector.
- 6 On your MIDI keyboard, play keys while turning the assigned knob.
As you move the knob on your keyboard, the Frequency screen control moves in the Smart Controls pane, and you can hear the Ringshifter effect process the sound.
- 7 Choose File > Close Project, but do not save the project.

You have assigned a physical knob on your MIDI controller keyboard to the first screen control in the Smart Controls pane of any patch you load. Being able to control Logic's sound effects remotely from your MIDI Controller allows you to place all of your focus on your musical performance.

Using the Arpeggiator MIDI Plug-In

MIDI effects are plug-ins that can process the MIDI data within a track before it reaches the instrument plug-in, regardless of whether it was generated in real time using your MIDI keyboard or placed in the MIDI regions on the track during playback. A MIDI plug-in may change the pitch and velocity of notes or

during playback. A MIDI plug-in may change the pitch and velocity of notes or even create new MIDI note or controller events.

In this exercise, you will hold down a chord on your MIDI keyboard and process the chord using the Arpeggiator MIDI plug-in, which automatically arpeggiates a chord's notes while staying in sync with the project.

- 1 Go to Logic Pro X > Lessons and open **05 Dub Beat**. This project has two empty software instrument tracks (Inst 1 and Low Down Dub).
- 2 On the first track, double-click the Inst 1 name, and rename the track *Synth*.
- 3 On the Synth channel strip, click the Instrument slot, and choose Retro Synth.



The Retro Synth plug-in opens. This modeling instrument can imitate a wide range of classic synths and their specific synthesis techniques. In the Oscillator section at the upper left, four tabs let you access one of the four synthesizer engines: analog modeling (ANALOG), synchronized oscillators (SYNC), wavetable synthesis (TABLE), and frequency modulation (FM).

modulation (FM).

4 Play a few notes on your keyboard.

You can hear the Retro Synth play a classic analog synth sound.

Tip

To hear the results of your actions, continue playing your MIDI keyboard as you make adjustments throughout this lesson.

5 In the inspector on the Synth channel strip, click the MIDI FX slot, and choose Arpeggiator.



The Arpeggiator opens.

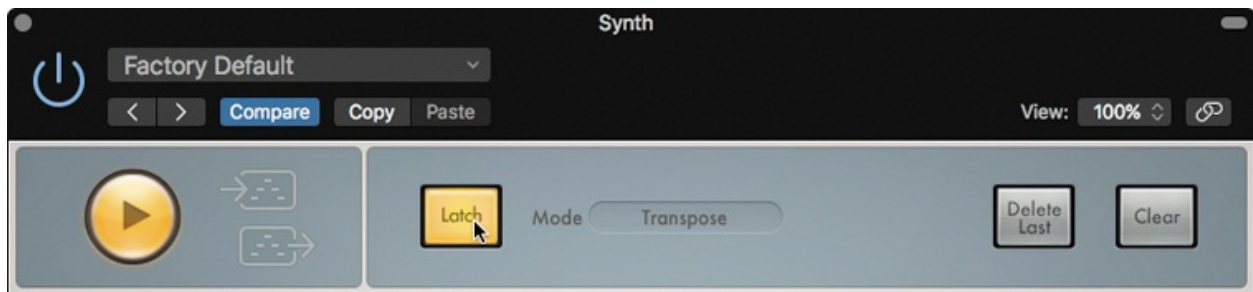


- 6 Hold down a single note. The Arpeggiator starts repeating it every sixteenth note.
- 7 Hold down a chord. The Arpeggiator plays one note at a time every sixteenth note, from the lowest note to the highest one.
- 8 Press the Spacebar.

You can hear the Low Down Dub beat on track 2. Track 2 uses the Ultrabeat instrument plug-in, which has a built-in sequencer. This is why you can hear the instrument play a beat even though you don't see any MIDI regions on its track.

For the rest of this exercise, feel free to stop and resume playback when you need a break, or when you want to focus on the arpeggiated synth.

- 9 At the top of the Arpeggiator, click Latch.



When Latch is enabled, the Arpeggiator memorizes the last chord you played as long as the project continues playing. You can click the Play button at the upper left of the Arpeggiator to stop and start playback.

10 Play a chord and release the keys. The arpeggio continues to play.

11 Play another chord to hear the arpeggiated chord.

Next to the Latch button, notice that Mode is set to Transpose. In that mode, you can use your MIDI keyboard to transpose the arpeggio to a different key.

12 Play a single key on your keyboard.

The previous chord is transposed, so it starts on the pitch of the note you play.

13 In the Note Order section, click the Down button.



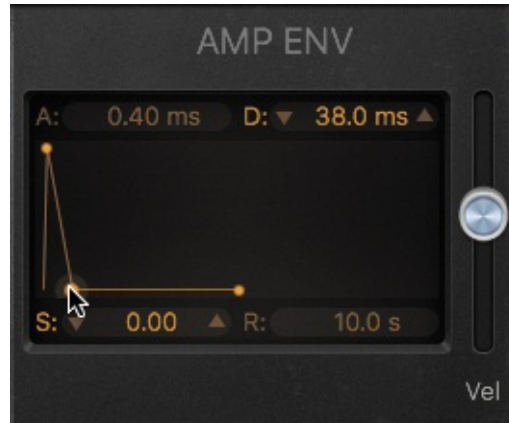
The arpeggio now plays from the highest note to the lowest note.

14 Drag the Oct Range switch to position 3.



The Arpeggiator repeats over a three-octave range.

- 15** In Retro Synth, at the lower right, try playing with the amplifier envelope (AMP ENV) by dragging the handles on the display or by adjusting the four parameters around the display: A, D, S, R (for Attack, Decay, Sustain, Release). Try making the sound of the synth evolve from long envelopes to very short ones.



- 16** In the Arpeggiator, try adjusting the Rate knob to change how fast the chord is arpeggiated.



Keep in mind that shorter amp envelopes work best for faster rates.

- 17** Choose File > Close Project, but do not save your project.

The Arpeggiator MIDI plug-in processes a simple chord played on your keyboard into simple and complex arpeggios. You've learned how to choose different note orders and their variations, and to expand the arpeggio over multiple octaves. You also manipulated the synthesizer's filter and amp envelopes to make the sound evolve while the arpeggio is playing.

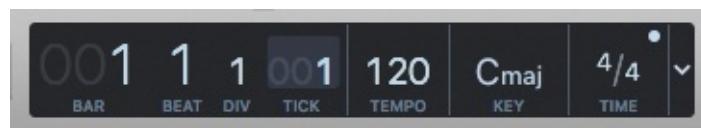
MIDI plug-ins give you more tools to process MIDI events in real time. Feel free to continue exploring the possibilities, perhaps by choosing different instruments to arpeggiate.

Recording MIDI

In Logic, the basic techniques used to record MIDI are similar to the techniques

you used to record audio in [Lesson 2](#). You will now observe the MIDI In display in the control bar as you send MIDI events to Logic and record a simple piano part.

- 1 Choose File > New (or press Command-Shift-N).
- 2 In the New Tracks dialog, choose Software Instrument. Make sure the Instrument pop-up menu is set to Empty Channel Strip, and click Create.
- 3 In the Control bar, click the Library button (or press Y).
- 4 In the Library, choose Piano > Steinway Grand Piano.
- 5 Play a few notes on your MIDI keyboard while observing the LCD display.

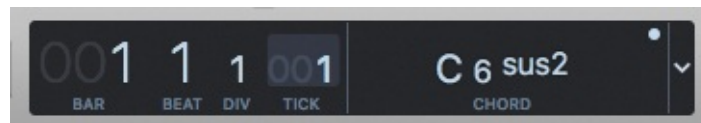


A small dot appears at the upper right of the LCD display to indicate that Logic is receiving MIDI events. These small dots can be useful to quickly troubleshoot MIDI connections.

Note

When Logic sends MIDI events to external MIDI devices, a small dot appears at the lower right of the LCD display.

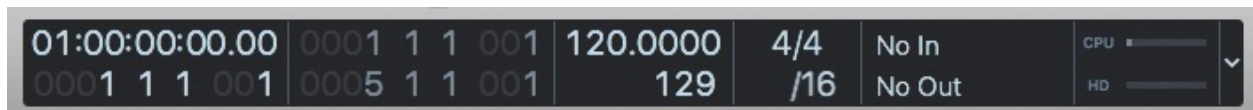
- 6 Play a chord on your MIDI keyboard.



The MIDI input activity monitor displays the chord name.

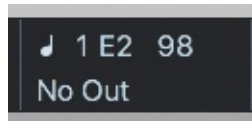
Logic can provide a more detailed view of the incoming MIDI events.

- 7 To the right of the LCD display, click the small arrow, and choose Custom.



The Custom LCD display appears, with a MIDI input activity monitor that shows incoming MIDI events in more detail.

- 8 Hold down a key on your MIDI keyboard.



A note icon indicates that the event received is a MIDI note on event. You can also see the MIDI channel number of the MIDI event, the note's pitch, and its velocity. In the previous image, the event's MIDI channel is 1, its pitch is E2, and its velocity is 98.

Note

MIDI events can be sent on up to 16 different MIDI channels, which allows you to control different timbres on different channels when using multi-timbral instruments.

9 Release the key on your MIDI keyboard.

Depending on your controller, in the LCD display you may see a note on event with a velocity of zero, or you may see a note with a strike through it, which represents a note off event.

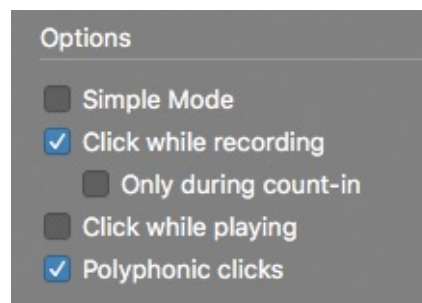
Note

Pressing and releasing a key on a MIDI keyboard sends two events: a note on event and a note off event. However, most MIDI editors represent the two events as a single note event with a length attribute.

You could start recording a piano part now, but first let's adjust the metronome and open the Piano Roll so you can watch the MIDI notes appear on the grid as they are recorded.

10 Choose Record > Metronome Settings.

11 Deselect Simple Mode, make sure "Click while recording" is selected, and close the Metronome settings window.



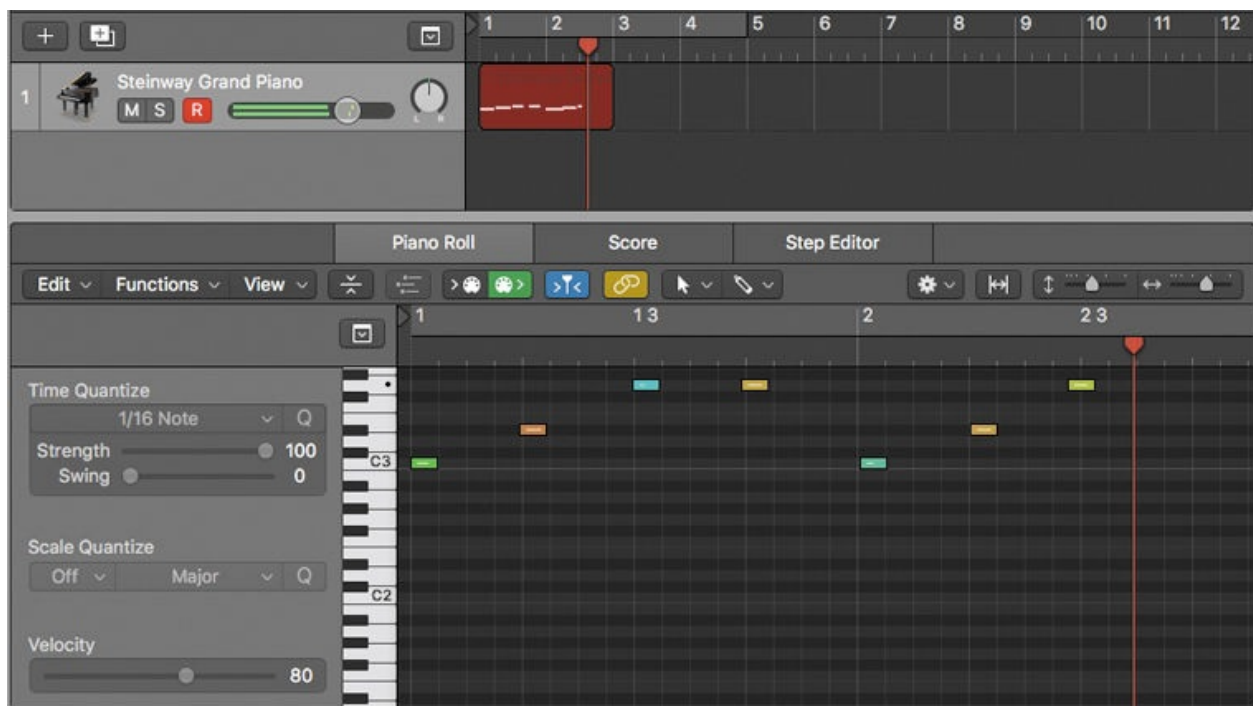
12 In the control bar, click the Editors button, and at the top of the Editors pane, ensure that Piano Roll is selected (or press P).

The Piano Roll opens at the bottom of the main window.

13 Make sure the playhead is at the beginning of the project, and click the Record button (or press R).

The LCD display and the playhead turn red to indicate that Logic is recording. The playhead jumps back one bar, giving you a four-beat count-in, and you can hear the metronome.

14 When the playhead appears, play quarter notes for a couple of bars to record a very simple bass line.



When you play the first note, a red MIDI region appears on the record-enabled track. The region's length constantly updates to include the most recent MIDI event received.

The MIDI notes appear in the Piano Roll and on the region in the workspace as you record them.

Note

If the pitch of the notes you record is outside the range of pitches displayed in the Piano Roll, you will not see the notes as they are recorded.

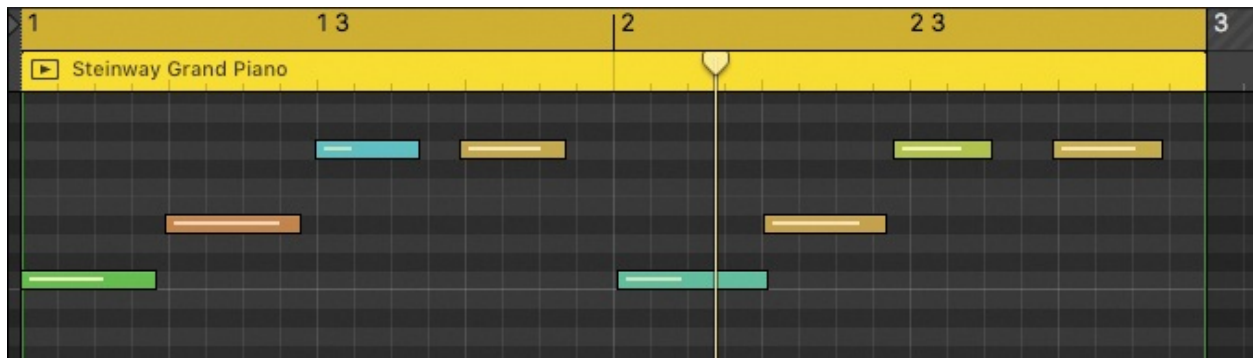
15 Stop recording.

The region is now shaded green. It is named *Steinway Grand Piano*. You can see the recorded notes in the Piano Roll.

Tip

To see all the notes in the Piano Roll, make sure they are all deselected and press Z.

16 In the Piano Roll, click the Play button at the upper left of the region.



The region starts playback in Solo and Cycle modes. If you are not happy with your performance, you can undo it (Command-Z) and try again.

If you are mostly happy but one or two notes need correction, you can quickly fix them in the Piano Roll:

- ▶ Drag a note vertically to change its pitch.
- ▶ Drag a note horizontally to change its timing.
- ▶ Click a note, and press Delete to remove it.

You will learn how to edit MIDI events in more detail in [Lesson 6](#).

17 Click the region's Play button again (or press the Spacebar) to stop playback.

Solo and Cycle modes are both turned off.

Correcting the Timing of a MIDI Recording

If you are not happy with the timing of your MIDI performance, you can correct the timing of the notes using a time-correction method called *quantization*. To quantize a MIDI region, you choose a note value from the Quantize menu in the Region inspector, and inside the region, the notes snap to the nearest absolute value.

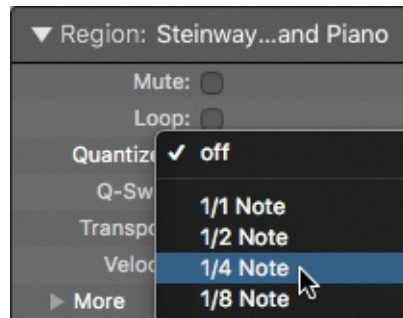
Quantizing MIDI Regions

In this exercise, you will quantize the piano passage you recorded in the previous exercise so that the notes are in sync with the metronome.

Note

If you were quite happy with the timing of your performance, you may want to undo your previous recording and record again with a less accurate timing so that you can more clearly hear the benefits of quantization.

- 1 In the workspace, make sure the piano region is still selected.
- 2 In the Region inspector, click the Quantize value (currently set to off) and choose 1/4 Note while looking at the notes in the Piano Roll.



All the MIDI notes in the piano region snap to the nearest quarter note.

- 3 In the control bar, click the Metronome button (or press K) to turn it on.
- 4 Play the piano region. The notes are now perfectly in sync with the metronome.

In Logic, quantizing is a nondestructive operation. You can always revert the notes to their original position.

- 5 In the Region inspector, set Quantize to off.

In the Piano Roll, the notes return to their original recording positions.

- 6 In the Region inspector, set Quantize back to 1/4 Note.

The notes are once more in sync with the metronome.

- 7 Turn off the metronome, and stop playback.

Choosing Default Quantization Settings

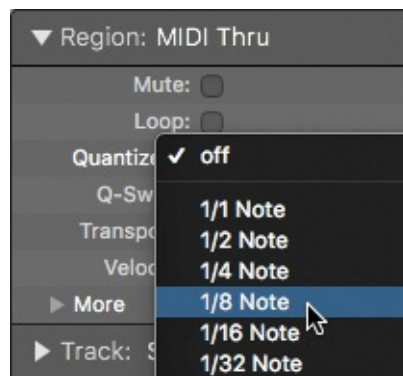
You can choose a default quantization setting so that any new recording is automatically quantized to that value. This is very useful when you are not

completely confident of your timing chops. Because the Quantize setting is nondestructive, you can always adjust it or turn it off for that region after you're finished recording.

- 1 In the workspace, click the background.

All regions are deselected, and the Region inspector now displays the MIDI Thru parameters. The MIDI Thru settings will be automatically applied to any new MIDI region you record.

- 2 In the MIDI Thru parameters, set Quantize to 1/8 Note.

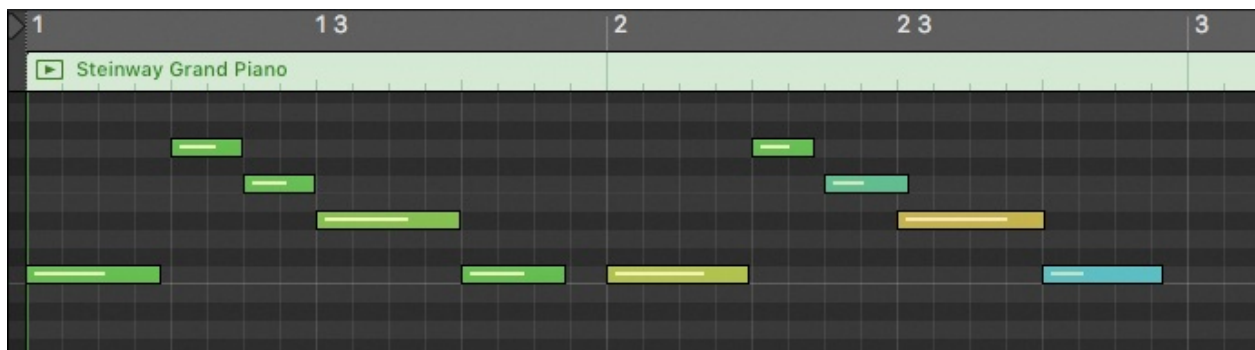


- 3 In the workspace, click the piano region, and press Delete to delete the region.

- 4 Move the playhead to the beginning of the project, and click the Record button (or press R).

Record another simple bass line as you did in the previous exercise. Feel free to play eighth notes this time since that's the Quantize value you selected.

- 5 Stop recording.



In the Piano Roll, the notes immediately snap to the nearest eighth note on the grid. In the Region inspector, the Quantize parameter for the new piano region is set to 1/8 Note. Remember that the Quantize setting is nondestructive, which means that you can still turn it off.

- 6 In the Region inspector, set Quantize to off. In the Piano Roll, the notes move to their original recorded positions.
- 7 Set Quantize back to 1/8 Note.

Merging Recordings into a MIDI Region

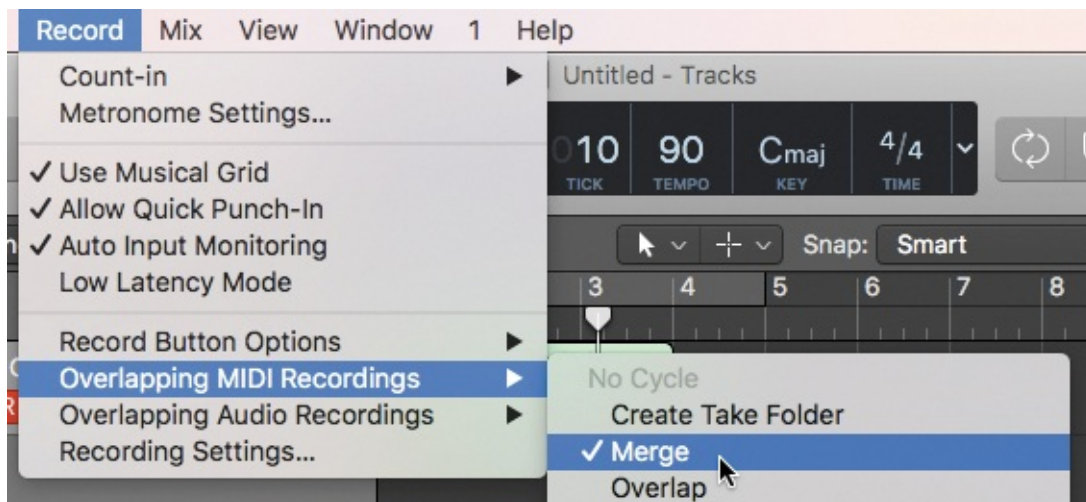
Sometimes you may want to record a MIDI performance in several passes. For example, when recording piano, you want to record just the left hand, and then record the right hand in a second pass. Or you could record drums in multiple passes, recording the kick drum first, then the snare drum, then the hi-hat, then the crash cymbal, building up a drum beat by focusing on a single piece of the drum kit at a time.

In Logic, when recording MIDI events on top of an existing MIDI region, you can choose to merge the new recording with the existing MIDI region.

Recording into an Existing MIDI Region

In the previous exercise, you recorded a simple bass line onto a piano track. Now you will record chords as you listen to your bass line, merging the new chords with that bass line inside the same MIDI region. First, you will choose the correct recording setting to merge your new recording with the existing region.

- 1 Make sure Record > Overlapping MIDI Recordings > No Cycle > Merge is chosen.



From now on the new recordings will be merged with the existing region on the track.

- 2 Move the playhead to the beginning and start recording.

This time, play only a couple of chords that complement the bass line you previously recorded