When the checkbox is selected, the shaker plays the same hip-hop shuffle feel as the drums.

11 Unsolo the Shaker track.

12 Choose File > Close Project without saving the project.

Groove tracks work with all track types (audio, software instrument, and Drummer tracks). Experiment by applying the groove of a sample to your MIDI programming or by making a Drummer track follow the groove of a live bass recording.

Change the Playback Pitch and Speed with Varispeed

In the days of analog tape recording, engineers performed all sorts of tricks by changing the tape speed. Many major albums were sped up ever so slightly during the mixing process to add excitement to tracks by raising their tempos. This simultaneously raised the pitch, giving the impression of the vocalist reaching higher notes in the most emotional passages of the song. On the other hand, engineers would sometimes slow the tape during recording so that a musician could play a challenging passage at a more comfortable tempo. When played back at its regular speed during mixdown, the recording created the illusion of the musician playing faster. DJs are probably the biggest users of Varispeed techniques, which gives them control over the tempo and pitch of a track, allowing for seamless transitions from one track to the next.

Logic takes this concept a step further, offering both the classic Varispeed—which, like a tape or record player, changes both the pitch and the speed—and a Speed Only mode, which allows you to change the speed without changing the pitch.

1 Open Logic Pro X Files > Lessons > **07 Little Lady**, and listen to the song. In the LCD display in the control bar, you can see that the song is in the key of A minor and its tempo is 152 bpm.

To use the Varispeed feature, you must add the Varispeed display to the control bar.

2 Control-click an empty space in the control bar, and from the shortcut menu, choose "Customize Control Bar and Display."
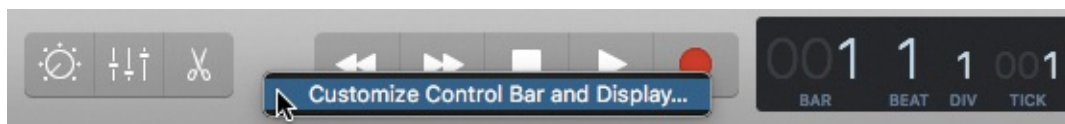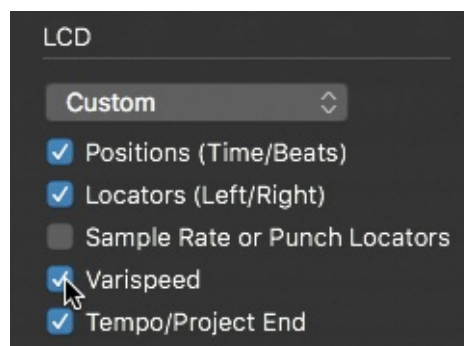

In the dialog's LCD column, the Varispeed option is dimmed. To turn it on, you first need to choose the custom LCD display.

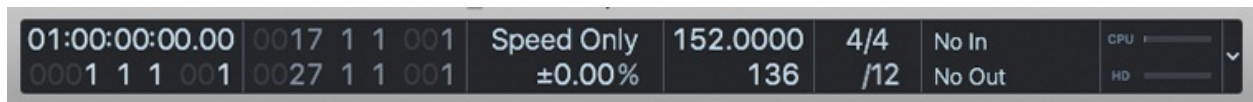on, you first need to choose the custom LCD display.

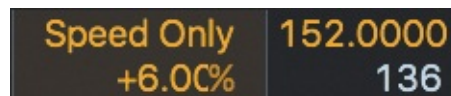**3** In the LCD column, from the pop-up menu, choose Custom.
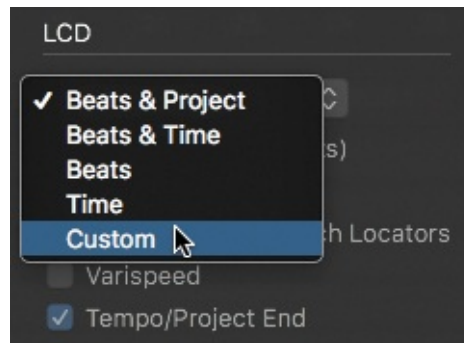
**4** Below the pop-up menu, select Varispeed, and click OK.

A new Varispeed display appears in the custom LCD display.

**5** In the Varispeed display, drag the 0.00% value up to 6.00%.

The Varispeed display is shaded in orange. The tempo value turns orange, too, indicating that the song is no longer playing at its normal tempo due to the Varispeed feature. To the right of the control bar, the Varispeed button turns orange to indicate that the feature is enabled.
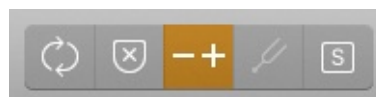

6 Listen to the song.

The song plays faster but retains its original pitch. Let's check the song's current tempo.

7 In the Varispeed display, click the % symbol, and from the pop-up menu, choose Resulting Tempo.
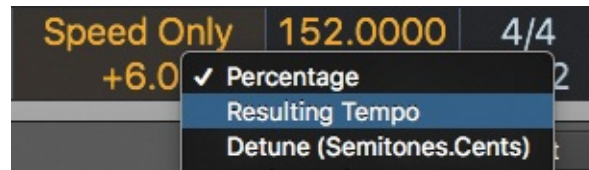
The Varispeed display shows the resulting tempo of 161.120 bpm. You can now use the display to set the desired playback tempo.

8 Double-click the 161.120 tempo value, and enter *140* bpm.
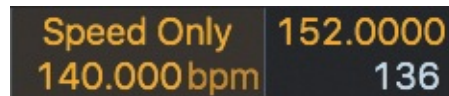
The song plays slower but still at its original pitch. This would be perfect for practicing a part by playing along with your instrument. You could even record your part at this speed, and then turn off Varispeed to play the whole song (including your newly recorded part) at the normal speed.

Now let's apply the classic Varispeed effect that changes both the playback speed and pitch.

9 In the Varispeed display, click Speed Only, and from the pop-up menu, choose Varispeed (Speed and Pitch).
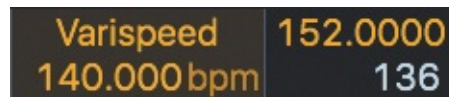
10 Listen to the song.

Now the song plays both slower and lower in pitch. This is the classic Varispeed effect available on tape machines and turntables.

11 In the Varispeed display, click the bpm symbol, and from the pop-up menu, choose Detune (Semitones.Cents).

12 Double-click the −1.42 detune value, and enter *−1.00*.
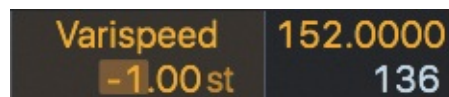
13 Listen to the song.

Now the song plays slower and pitched down by one semitones. If your singer isn't at the top of her game that day and can't reach her usual high notes, you could record at this slower speed and later turn off Varispeed to play the whole song at the higher pitch.

**14** In the control bar, click the Varispeed button to turn it off.

Editing the Timing of an Audio Region

You were introduced to Flex Time editing in Lesson 3 when you used it to tighten the rhythm of a few dead notes on a guitar. You will now go further and explore other Flex Time editing techniques while examining what happens to an audio waveform "under the hood."

Time-Stretching the Waveform Between Transient Markers

In this exercise, you will dive deeper into Flex Time editing by using it to correct the timing of a guitar.

1 From the global Marker track, drag the Breakdown marker (at bar 75) into the upper half of the ruler.
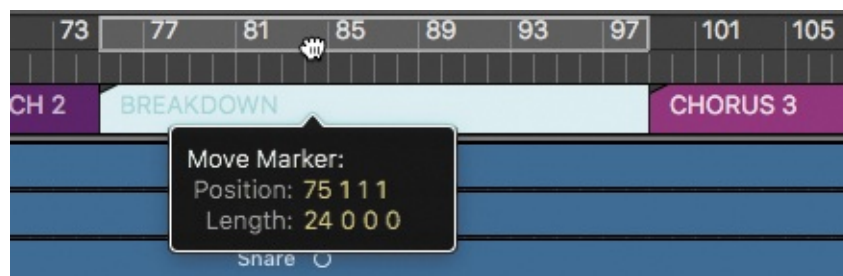
A cycle area is created that corresponds to the Breakdown marker.

2 Solo the two Gtr Bridge tracks (tracks 13 and 14).

3 Listen to the first three bars of the Breakdown section.

The two guitars on the soloed tracks play the same rhythm, but in two places the guitars are not hitting the notes together (bar 75, beat 2; and bar 77, beat 2).

4 In the Tracks area menu bar, click the Show/Hide Flex button (or press Command-F).
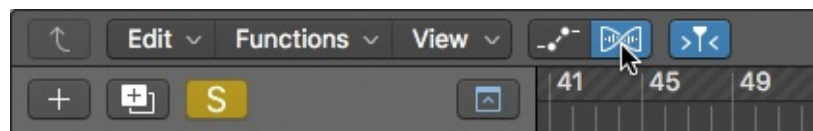
The Tracks area is zoomed in vertically, and each track header shows a Track Flex button and a Flex pop-up menu.

5 Scroll and zoom in to the workspace so you can see the beginning of the *Gtr Bridge L* region (at bar 75) at the upper left of the workspace, right below the ruler.
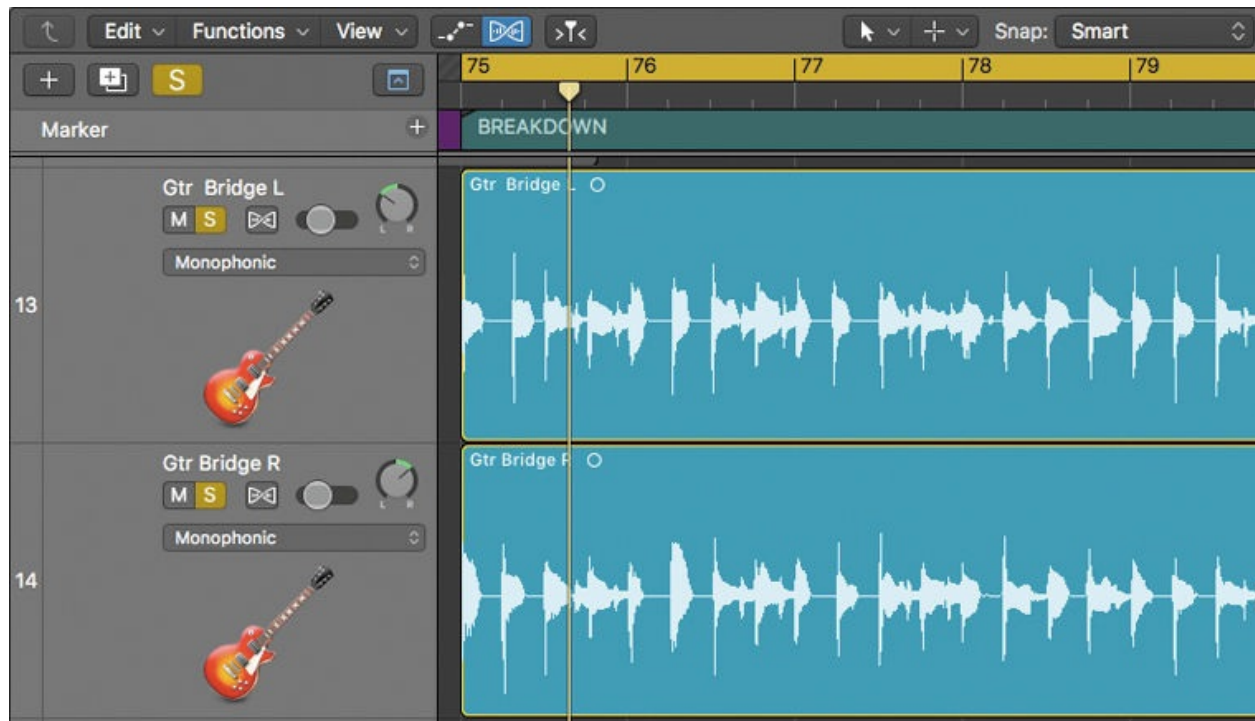
6 Click the lower half of the ruler at bar 75 to position the playhead. Click track 13 to select it, and drag the zoom sliders (or press the Command-Arrow keys) to continue adjusting your zoom level so that you can see the first three beats of bar 75 in the ruler (the 75, 75.2, and 75.3 grid marks).
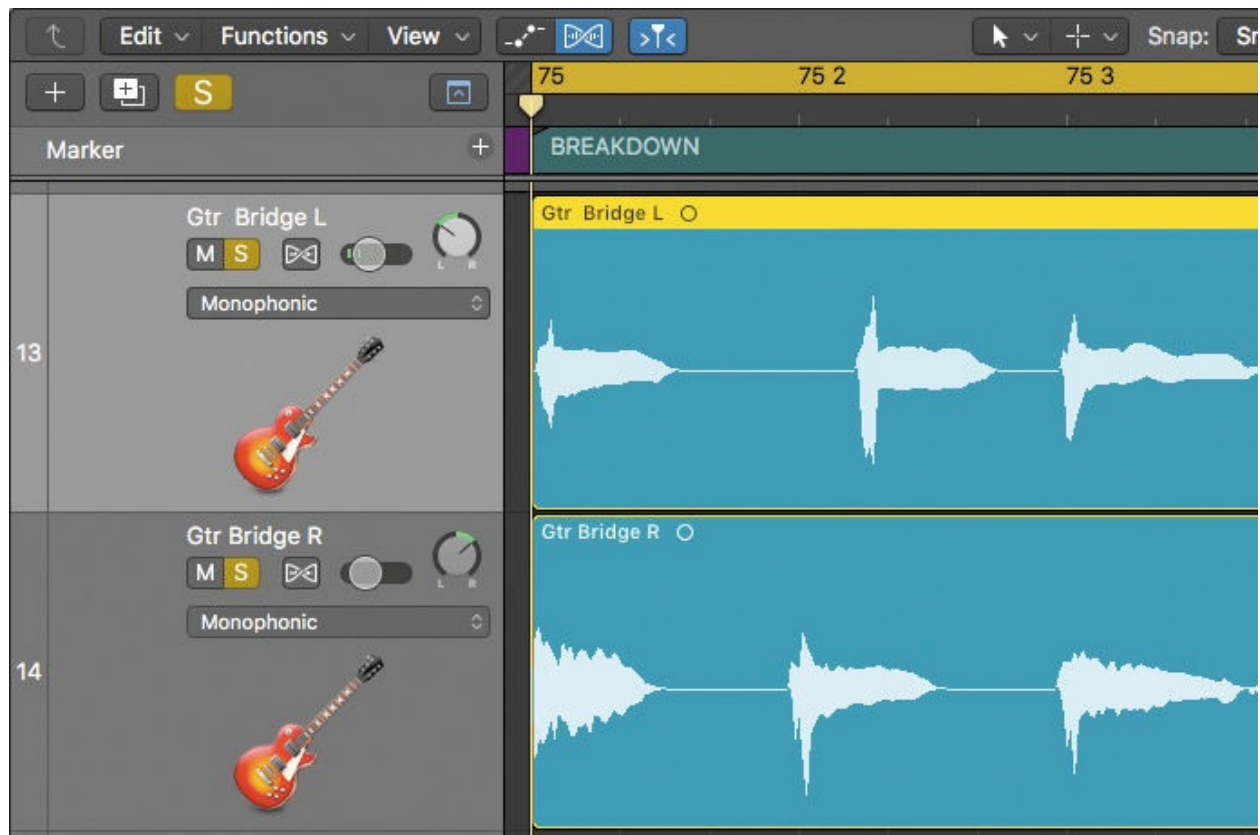
Remember that zooming with the zoom sliders or the Command-Arrow keys keeps the playhead at the same horizontal position in the workspace, and the selected track at the same vertical position in the Tracks area. Here, the beginning of the *Gtr Bridge L* region stays anchored at the upper left of the workspace.

7 In the Gtr Bridge L track header (track 13), click the Track Flex button.

Flex editing is turned on. The region on the track is darker, and transient markers appear where Logic detected the attack of a new note. Logic automatically detects the most appropriate Flex Time mode for the track, which is set to Monophonic.

Note

Monophonic mode is intended for instruments that produce only one pitch at a time (vocals, wind). Polyphonic is used with instruments that play chords (piano, guitar), and Slicing is for moving notes without time-stretching any audio (good for drums).

On track 13, the second note in the region is late. It should be in time with the second note of the *Gtr Bridge R* region on track 14 (under the 75.2 grid mark in the ruler).

8 In the upper half of the waveform, place the mouse pointer over the transient marker of the second note.
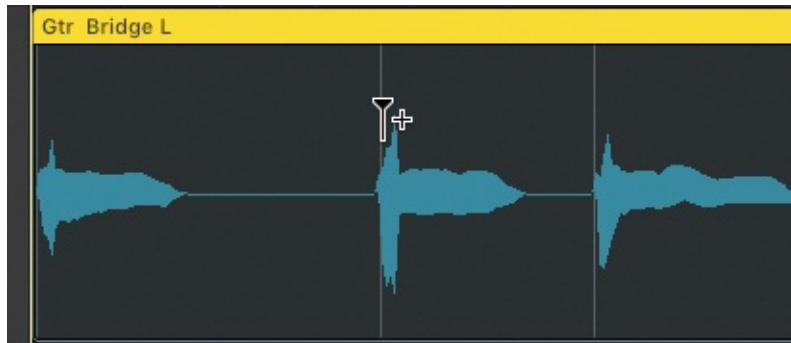
The mouse pointer turns into a Flex tool and looks like a single flex marker with a + (plus sign) next to it. This symbol indicates that clicking or dragging will insert one flex marker on the transient marker. When you drag the flex marker, the waveform is stretched between the region beginning and the flex marker, and between the flex marker and the region end. Let's try it.

9 Drag the Flex tool to the left to align the flex marker with the second note of the track below.
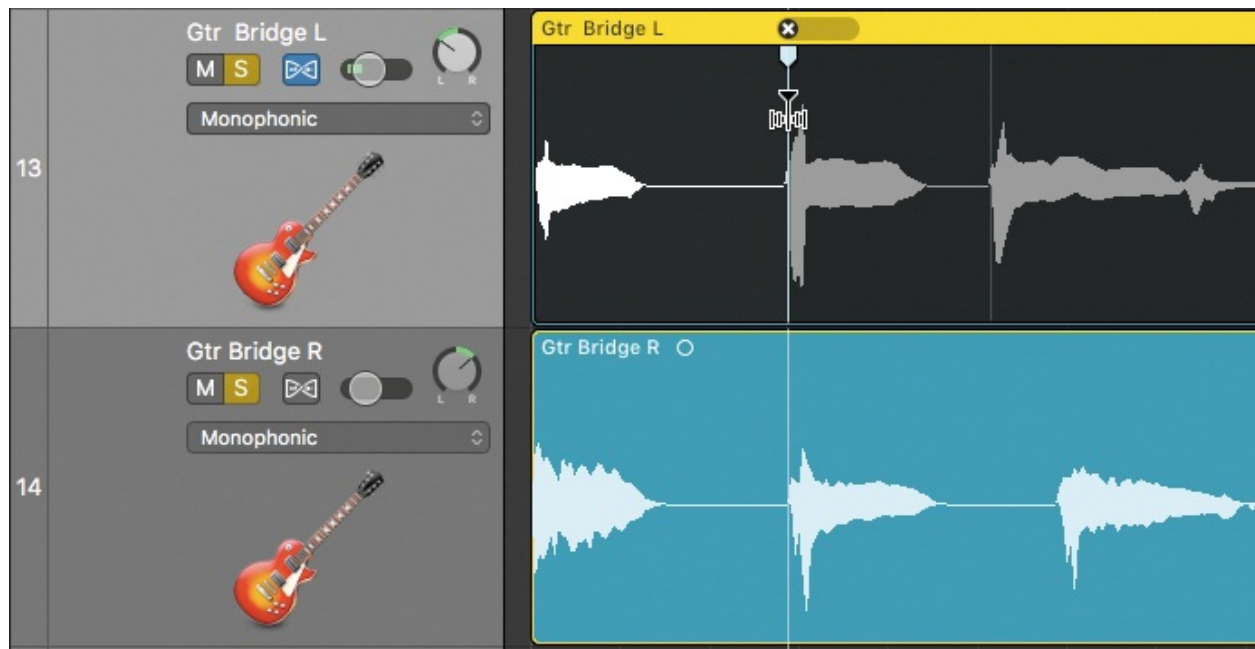
When the mouse pointer is positioned over a flex marker, a flex drag indicator in the region header above the flex marker shows how the flex marker was moved from its original position. You can click the X symbol inside the flex drag indicator to delete that flex marker (and return the waveform to its original state).

After you release the mouse button, the flex marker looks like a bright vertical line.

The waveform to the left of the flex marker is white (time compressed), and the waveform to the right of the flex marker is gray (time expanded). As a result, all the notes to the right of the flex marker have changed their positions, which is not what's wanted here.

10 Choose Edit > Undo (or press Command-Z).

11 In the lower half of the waveform, place the mouse pointer over the transient marker of the second note.

The Flex tool looks like three flex markers with a + (plus sign). Clicking it creates three flex markers, one at each of the following positions: ▶ On the transient marker you're about to drag ▶ On the transient marker before (which will not move) ▶ On the transient marker after (which will not move) **12** Drag the Flex tool to the left to align the note with the second note of the track below.

The first note is time compressed, the second note is time expanded, and the rest of the region remains unaffected.

13 Listen to the edit.

The timing sounds much better than in the original. However, the first note is now slightly shorter and the second note longer. It's a subtle difference, but in the next exercise you will use another technique to get a tighter result.

14 Choose Undo > Dragging (or press Command-Z) to undo the change.

Moving Waveform Sections Without Time-Stretching

Moving Waveform Sections Without Time Stretching

In the previous exercise, you applied the Flex tool to time-stretch a waveform using either the previous and next transient markers or the region's beginning and end points as boundaries.

Now you will create a flex marker after the first note so that no time-stretching occurs before that marker. You will then use the Marquee, your current Command-click tool, to select a section of the waveform, and move it without time-stretching the selection.

1 In the *Gtr Bridge L* region, place your mouse pointer in the upper half of the waveform, away from transient markers.
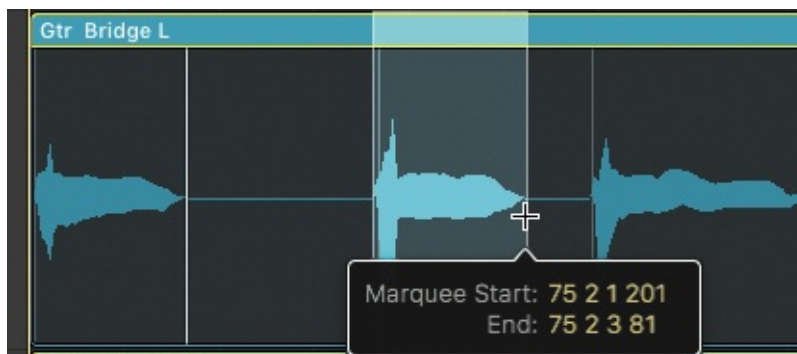

The cursor looks like a single flex marker with a + (plus sign).

2 Click the upper half of the waveform, after the end of the first note, to create a flex marker.
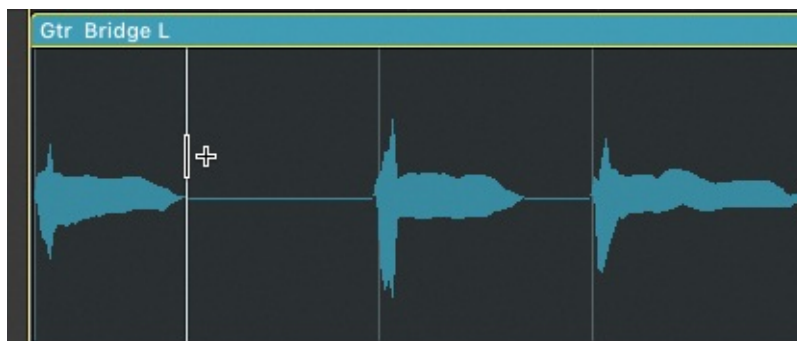
3 Command-drag the second note, starting on the transient marker.

Positioning the mouse pointer in the upper half of a marquee selection turns the pointer into the Hand tool, which lets you move the selected waveform without time-stretching it.

4 Drag the upper half of the marquee selection to align the selected note with the second note in the guitar track below.

5 Listen to the result. The two guitar tracks sound really tight together until the second note of bar 77, when the Gtr Bridge L plays early.

6 Scroll to the first note of bar 77, and click the upper half of the waveform after the note to create a flex marker.
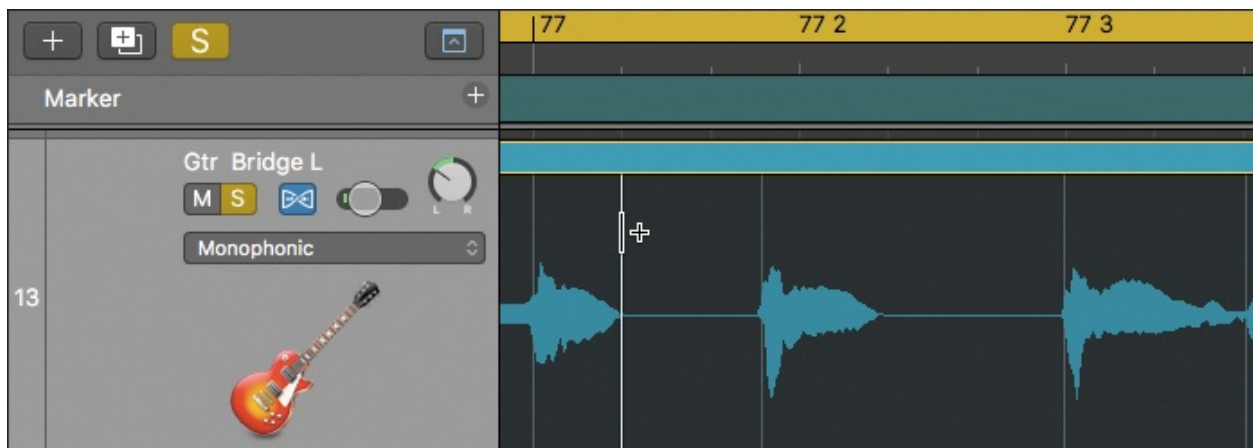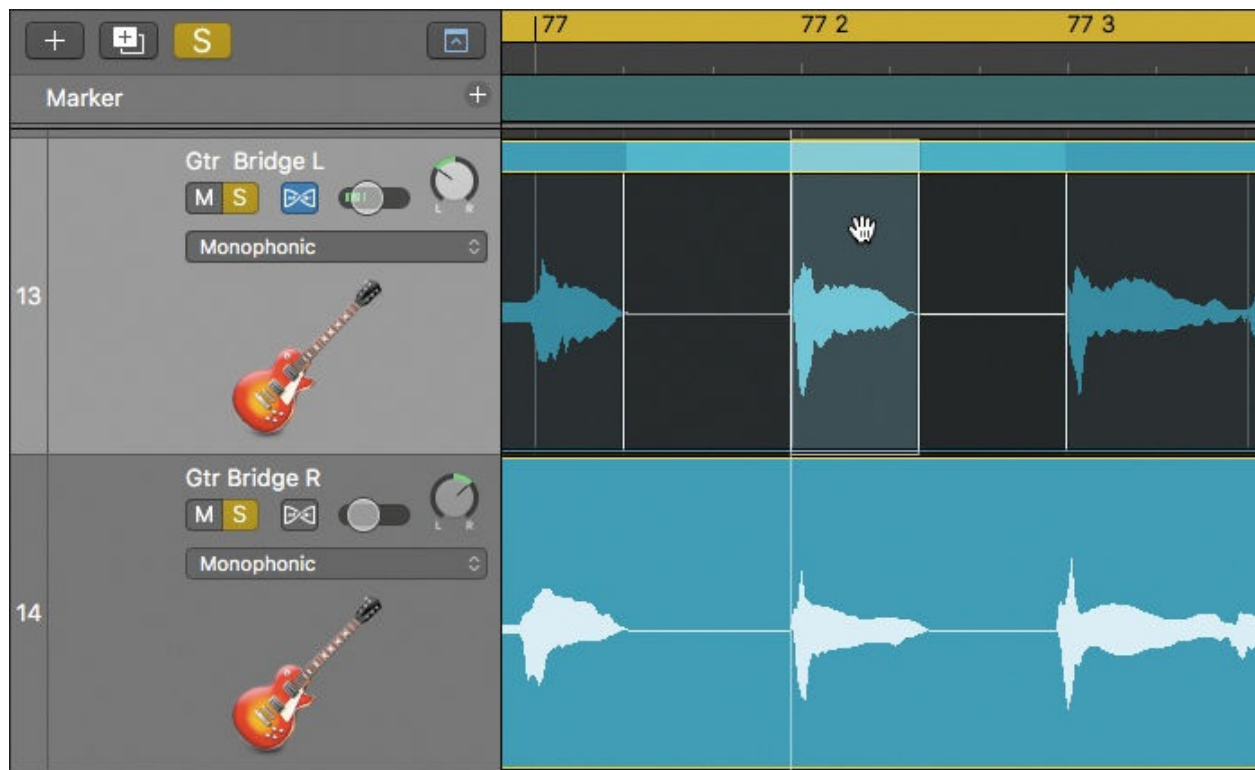

7 Select the second note of bar 77 using the Marquee tool, and then drag it to the right to align it with the corresponding note on the track below.

8 Click the background of the workspace to clear the marquee selection.

9 Listen to the result. Now both guitars sound tight.

10 Unsolo both guitar tracks.

In the next exercise, you will edit the timing of the bass tracks in the Breakdown section, so keep your current zoom level.

Time-Stretching a Single Note

Let's use the Flex tool to lengthen a bass note.

1 In the workspace, scroll up to see the two bass tracks (tracks 9 and 10).

You will stretch the single note at bar 79, first in track 9 and then in track 10.

2 Scroll and zoom as necessary so you can see the single bass note at bar 79.
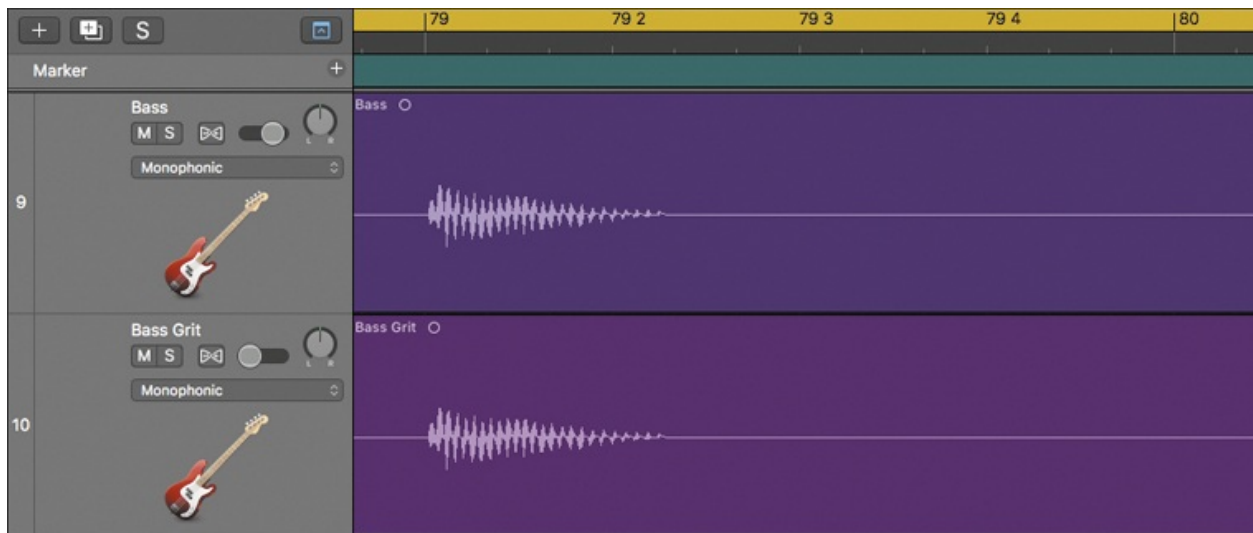
3 In the Bass track header (track 9), click the Track Flex button.
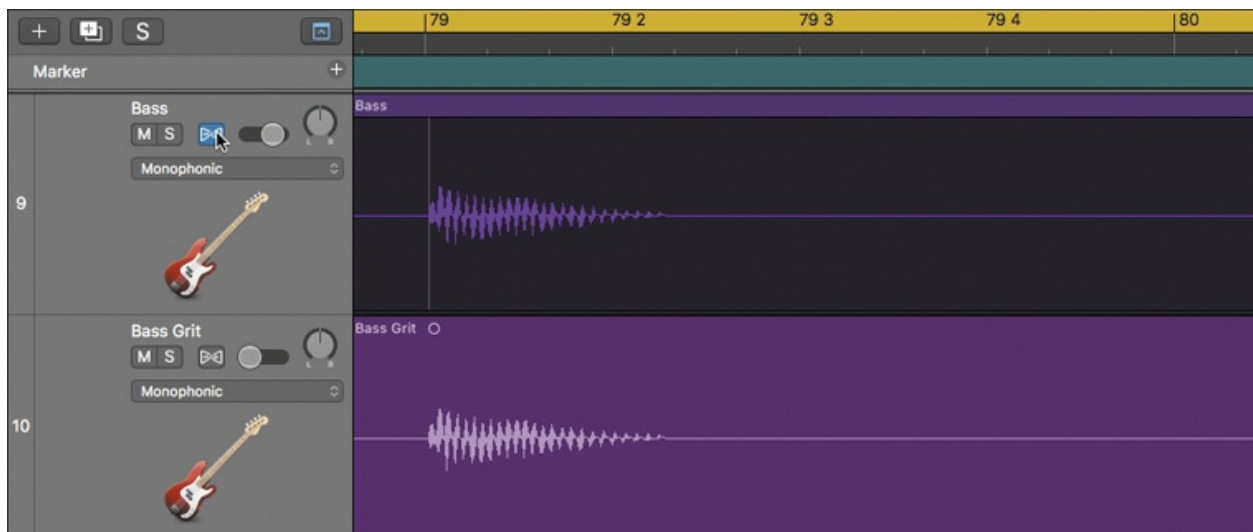
A progress bar appears while the audio file is analyzed for transients. After the analysis is completed, at bar 79, you can see a transient marker at the beginning of the note.

4 Position your mouse pointer in the lower half of the waveform, over the end of the note.

The mouse pointer looks like three vertical lines and a plus sign because it is not located over a transient marker. Clicking creates three flex markers:

► At the location you click

► On the transient marker before (which will not move) ► On the transient marker after (which will not move) 5 Drag the Flex tool to the right to end the note on 79.3.

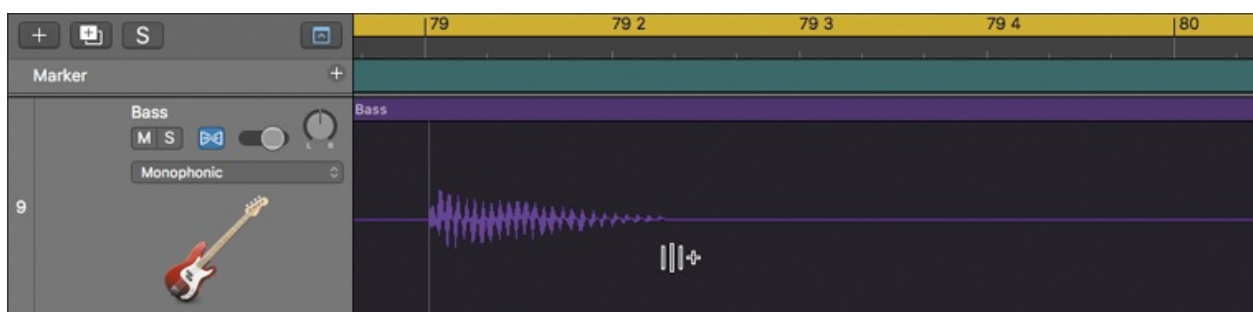The three flex markers are created, and the note is lengthened. The flex markers on the transient before (at bar 79) and after (end of bar 82) ensure that the rest of the region before and after the lengthened note stays unaffected.

6 Turn on Flex for the Bass Grit track (track 10), and lengthen the corresponding note by the same amount.
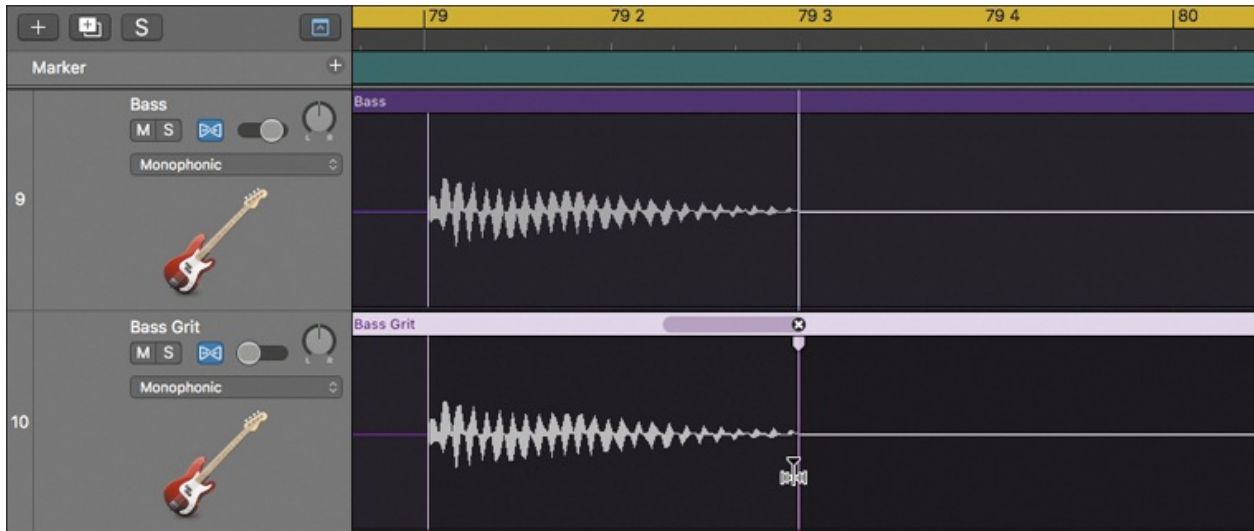
7 Listen to the result.

The bass note at bar 79 is sustained for a longer time. Don't hesitate to solo the two bass guitar tracks and to turn the Track Flex buttons on and off in the two bass track headers to compare the before and after results.

8 Click the background, and press Z to see the whole song.

Tuning Vocal Recordings

Hitting pitches perfectly on every single note can be a challenge for singers. Tuning software allows you to correct pitches in a recording. It can be useful for saving an emotional take that contains a few off-pitch notes, or even to refine the pitch of a good performance.

In Logic, Flex Pitch allows you to precisely edit the pitch curve of a single note, along with the amount of vibrato. In this exercise, you will use Flex Pitch to tune the vocals on the Verse track (track 24).

1 Drag the Verse 1 marker into the upper half of the ruler.

Flex Pitch data can be edited in the Tracks area or in the Audio Track Editor.

2 Double-click the Verse region at bar 11 on track 24.

The audio editor opens at the bottom of the main window.

3 At the top of the audio editor, click the Track tab.

4 In the Audio Track Editor menu bar, click the Show/Hide Flex button.

An alert asks you to confirm that you want to turn on Flex for that track.

5 In the alert, click "Turn on Flex."

6 In the Audio Track Editor menu bar, next to the Show/Hide Flex button, click the Flex pop-up menu, and choose Flex Pitch.

As in the Piano Roll Editor, the note pitches are represented as beams on a grid. (You may need to scroll up or down to see the note beams.) On the grid, light gray lanes correspond to the white keys on the piano keyboard, and dark gray lanes correspond to the black keys. The section of a note beam that intersects with the closest lane is colored, and the height of the hollowed-out section of the beam represents the amount of deviation from

the perfect pitch. When a note plays at the perfect pitch, it sits exactly on a lane, and the beam doesn't have any hollowed-out section.

7 Zoom in to the first four or five notes.

On top of the frame, a light-gray line represents the pitch curve so that you can see pitch drifts and vibrato.

8 Play the first three notes of the verse ("Here you come").

The first two notes (the words "here you") are short and their pitches sound good, so you will leave them unchanged.

The third note ("come") goes sharp at the end, and you will fix that.

9 Control-click the beam, and from the shortcut menu, choose "Set to Perfect Pitch."
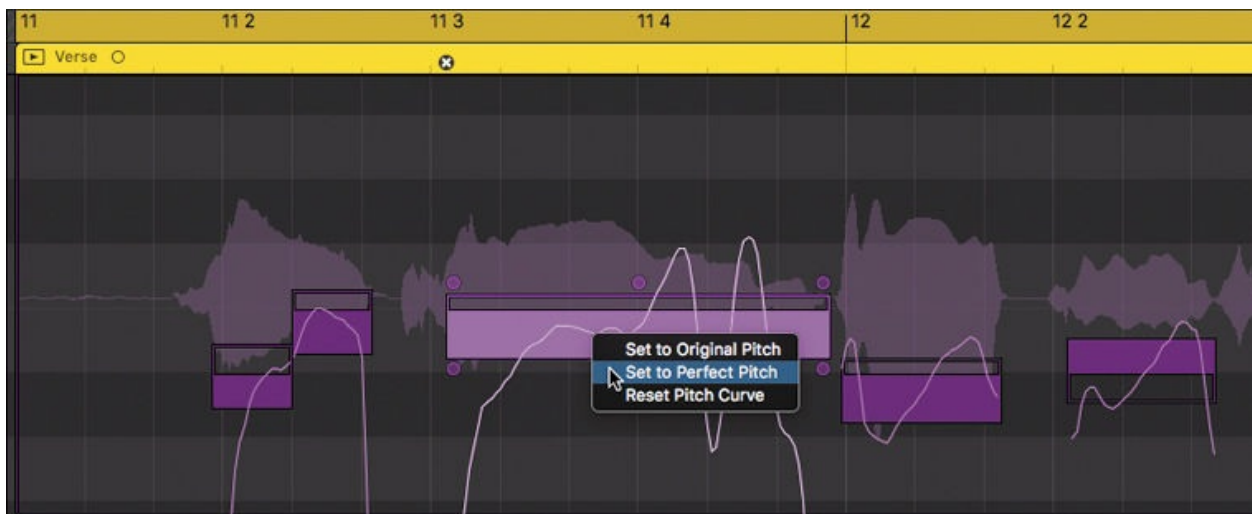
The beam snaps to the closest lane, and the entire beam is colored, indicating that the note plays at the perfect pitch.

Note that at the beginning of the note, the singer raises her pitch to the correct pitch, holds the pitch fairly straight for a short amount of time, adds a wide vibrato, and then drops in pitch at the end.

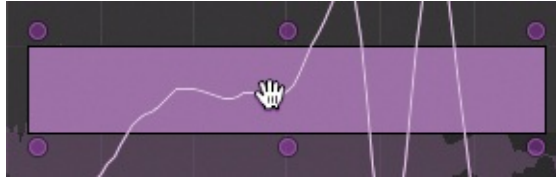As you position the mouse pointer in the vicinity of the colored beam, hotspots appear around the beam that allow you to perform various adjustments.

10 Drag the lower-mid hotspot to set Vibrato to 0%.

The pitch curve of that note is flatlined.

11 Listen to the result.

The word "come" now has a constant pitch without any drift at the beginning or end, and without any vibrato. The pitch is perfect, but it sounds unnatural.

12 Drag the lower-mid hotspot to set the Vibrato to 50% to halve the pitch deviations around the perfect pitch.

13 Drag the upper-left hotspot to set the Pitch Drift to 0.62 at the note start.

14 Listen to the result.

It sounds as if the singer attacks the note with the correct pitch, which works well if you want a straight pitch. However, for this verse, it sacrifices the bluesy feel imparted by the pitch slurs and wide vibrato.

15 Control-click the note, and choose Reset Pitch Curve from the shortcut menu.

The pitch curve is back to the original, but the note stays on its perfect pitch.

16 In the Tracks area, drag the left edge of the cycle area to bar 17.

17 Unsolo the Verse track (track 24), and listen to a few bars at the beginning of the cycle area.

On the first beat of bar 18, the beginning of the word "sun" is very flat. In fact, the note is so flat that Logic detected its correct pitch as D#3 below, even though the singer meant to reach the E3 above. Setting the note to perfect pitch would force the note to D#3, which would sound even worse, so you will have to tune that note manually.

18 Drag up the upper-mid hotspot to set the Fine Pitch to 0 on an E3 note.

As you drag the Fine Pitch hotspot vertically, you can hear the pitch of the point in the pitch curve at the location of your mouse pointer. In this case, after you click the Fine Pitch hotspot, you can drag to the right about halfway between the middle of the note and the end of the note, where the pitch curve is fairly stable in the middle of the beam. Then drag up while listening to the pitch.

Note

Sometimes, pitch correction can alter the timbre of a sound, especially when you play a note several semitones away from its original pitch. At some point, pitching up a vocal makes the singer sound like a chipmunk, whereas pitching it down makes the singer sound like a hulking monster. Dragging the Formant hotspot up or down helps you adjust the timbre to make it sound more realistic.

19 Feel free to correct more note pitches in the two regions on the Verse

track, using the different hotspots around the note beams to adjust the fine pitch, the pitch drifts at the start and end of the note, and the amount of vibrato in the pitch curve.

20 In the Tracks area menu bar, click the Show/Hide Flex button (or press Command-F).

The Flex display is hidden, but all your Flex edits remain active.

You now have a large repertoire of techniques you can use to edit the tempo of a project and the timing of its regions, and you can make a track follow the groove of another track. Mastering these techniques will give you the freedom to use almost any prerecorded material in your projects, so keep your ears tuned to interesting material you could sample and loop for your future songs.

Flex Time and Flex Pitch editing can help you correct imperfections in a performance, bringing your material to a new level of precision. Using Varispeed, turntable speed-up and slow-down effects, and Flex Time and Flex Pitch editing techniques, you have a full palette of special effects that can add ear candy to your productions.

Lesson Review

1. How do you detect the tempo of an audio recording?

2. How do you create an Apple Loop that follows the project tempo?

3. How can you add tempo changes and curves?

4. How do you apply a tape or turntable speed-up or slow-down effect?

5. How do you make one track follow the groove of another?

6. How do you turn on Flex editing?

7. How do you time-stretch an audio region using the region's start and end points as boundaries?

8. How do you time-stretch an audio region using the previous and next transient marker as boundaries?

9. Using Flex Pitch, where can you edit the pitch of notes inside an audio region?

10. When Flex Pitch is turned on for a track, how do you quickly tune an entire audio region in the Audio Track editor?

11. How can you edit the pitch curve?

Answers

1. Place the recording on a track and insert the BPM counter plug-in on that track's channel strip.

2. Select a region in the workspace, ensure that its length has an integer number of beats, and drag it to the Loop Browser.

3. Open the global tracks. On the Tempo track, click the tempo line to create a tempo point, and drag the line to the right of the new tempo point up or down. Drag the corner that appears above or below your tempo change to adjust the tempo curve.

4. Add a fade-in or a fade-out, Control-click the fade, and in the shortcut menu, choose Speed Up or Slow Down.

5. Configure the track headers to show groove tracks; then click over the track number to set the groove track, and select the Match Groove Track checkbox in the other track(s).

6. Choose a flex mode for the selected track in the Track inspector, or click the Show/Hide Flex button in the Tracks area menu bar and turn on the Track Flex button for the desired track.

7. Assuming there are no preexisting flex markers in the region, drag the Flex tool on the upper half of the waveform.

8. Drag the Flex tool on the lower half of the waveform.

9. In the workspace, or in the Audio Track Editor

10. Control-click the background of the workspace, and choose "Set all to Perfect Pitch" from the shortcut menu.

11. Using Flex Pitch editing in the Audio Track Editor, drag the six hotspots around a note beam.

Keyboard Shortcuts

Editing

Command-F	Toggles Flex view on and off

Windows and Panes

G	Opens the global tracks
Option-G	Configures global tracks