Lesson 7. Editing Pitch and Time

Lesson Files Time Goals

Logic Pro X Files > Media > Additional Media > Slow Drums.aif

Logic Pro X Files > Lessons > 07 Swing Groove

Logic Pro X Files > Lessons > 07 Little Lady

This lesson takes approximately 90 minutes to complete.

Match a project tempo to an audio file’s tempo

Create Apple Loops

Add tempo changes and tempo curves

Apply tape or turntable speed-up and slow-down effects

Make one track follow the groove of another track

Use Varispeed effects

Edit the timing of an audio region

Edit note pitches in an audio region

The use of loops and samples has become omnipresent in modern music. New technologies encourage experimentation, and it is more and more common to find, say, a sample of a Middle Eastern instrument in a modern rock song, a sample of classical music in a pop song, or a sample of a pop song in a hip-hop track.

Mixing prerecorded material into a project can lead to exciting results, but the material must be carefully selected to ensure that it seamlessly blends into the project. The first challenge is to match the prerecorded musical material’s tempo with the project’s tempo.

Even when you record your own performances, precisely correcting the pitch and timing of an individual note can help you realize the perfection expected by a demanding audience. You can use note correction to fix imprecisions (or mistakes) in the recording, or you can use it creatively. Furthermore, special effects such as Varispeed and tape speed-up or slow-down can provide new inspiration.

In this lesson, you will match the tempo and groove of audio files to make sure they combine into a musical whole. You’ll manipulate the project tempo to add tempo changes and tempo curves, apply Varispeed and Speed Fade effects, and

tempo changes and tempo curves, apply Varispeed and Speed Fade effects, and use Flex editing to precisely adjust the position and length of individual notes and correct the pitch of a vocal recording.

Setting a Project Tempo by Detecting the Tempo of a Recording

While listening to various recordings, you've found a recording of drums you like because of the way it grooves at its original tempo. To build a project around it, you need to adjust the project's tempo to match the recording. When the two tempos match, you can use the grid to edit and quantize regions, or add Apple Loops and keep everything synchronized.

In this exercise, you will import a drums recording into a new project, let Logic detect the tempo of the drums, and set it as the project tempo.

1. Choose File > New (or press Shift-Command-N), and create one audio track.
2. In the control bar, click the Browsers button (or press F).
3. With the All Files tab selected, navigate to Desktop > Logic Pro X Files > Media > Additional Media, and drag **Slow Drums.aif** to bar 1 on the audio track.

   The new *Slow Drums* region spans about 25 bars at the current project tempo (120 bpm).

4. In the control bar, click the Metronome button (or press K) and listen to the drums.

   At first, the metronome plays twice as fast as the drums, which were probably recorded at close to half the current project tempo (close to 60 bpm). After a few bars, the metronome and the drums drift out of sync.

5. In the inspector, click the Audio FX slot on the Slow Drums channel strip and choose Metering > BPM Counter.
6. Go to the beginning of the project and start playback.

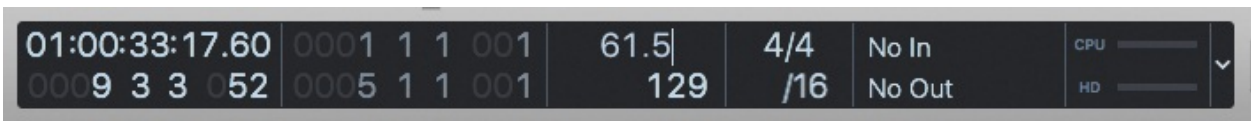
The BPM Counter flashes for a few bars and settles on a tempo of around 123.0 bpm. However, the drums tempo is actually half as fast.

7 In the BPM Counter window, click the :2 button.

The BPM Counter reads 61.5 bpm.

8 In the LCD display, click the small arrow to the right, and choose Custom.

9 Double-click the tempo and enter *61.5 bpm*.



10 Listen to the song. The drums are perfectly in sync with the metronome.

11 Click the Metronome button (or press K) to turn it off.

12 Close the BPM Counter plug-in window.

Now that you've set the project tempo to match the drums tempo, you can add Apple Loops and they will automatically match the tempo of your drums. You can also use the grid in the workspace to cut an exact numbers of bars in a region, which you'll need later in this lesson to cut a drum loop.

Using and Creating Apple Loops

Apple Loops are AIFF or CAF format audio files containing additional information that allows them to automatically match the tempo and key when they're imported into a Logic project. They also contain descriptive information (such as instrument, mood, genre, and scale) that helps you search the vast library of loops using the Loop Browser.

Using the Loop Browser

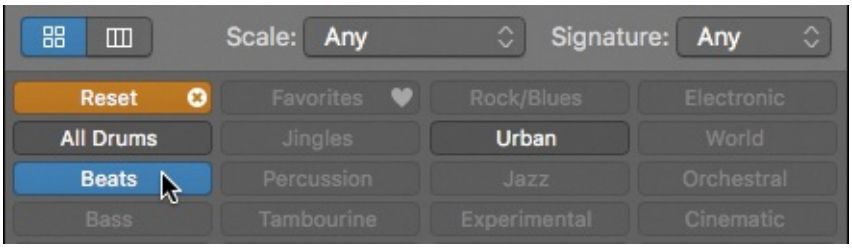
You were introduced to the Loop Browser in Lesson 1 when you previewed and chose loops to create a project. You will now use it to add two Apple Loops to your drums track.

1 In the control bar, click the Apple Loops button (or press O).

2 At the top of the Loop Browser, from the Loops pop-up menu, choose Hip Hop.

Let's try to find a couple of loops that were recorded at a tempo close to the current project tempo (61.5 bpm).

3 Click the Beats keyword button.



4 At the top of the results list, click the Tempo column header.

In the results list, the loops are reordered by ascending tempos.

5 Click Intergalactic Beat to preview it.

That loop sounds as if it would work with the drums recording.

6 Drag Intergalactic Beat to the workspace, below the drums track at bar 1.

7 Place the mouse pointer over the upper-right edge of the *Intergalactic Beat* region. When the pointer turns into the Loop tool, drag to loop the region until bar 13.

Let’s add a synth loop from the same Intergalactic collection.

8 Click the Reset keyword button.

9 In the search field, type *Intergalactic.*

10 In the Loop Browser, click Intergalactic Rising Synth to preview it.

By default, Intergalactic Rising Synth plays in the current project key, which is C. The loop's original key, displayed in the results list, is B. Let's listen to the loop in its original key.

11 At the bottom of the Loop Browser, from the "Play in" pop-up menu, choose Original Key.

The loop now plays in B.

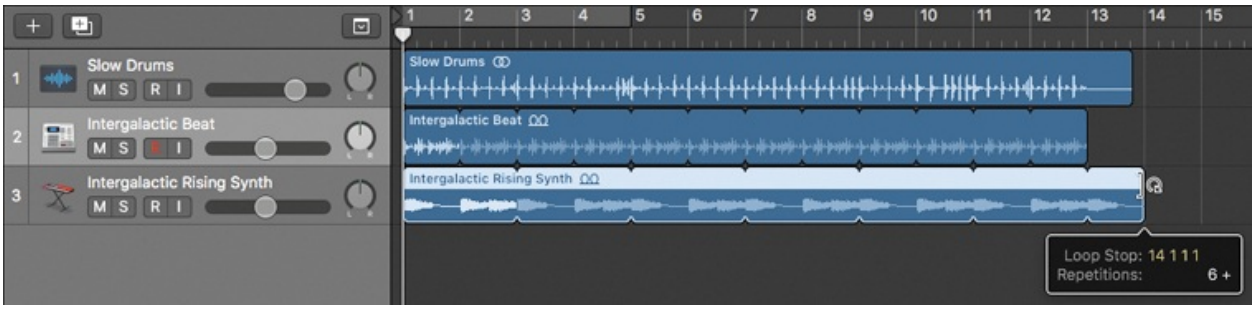
12 Drag Intergalactic Rising Synth to bar 1 below the tracks in the workspace.

Note

Apple Loops are automatically transposed to match the root note of the project's key signature. However, they do not match the tonality, so loops sound the same, for example, in C major and in C minor.

---

13 Loop the region until bar 14.



Listen to the song. The synth loop is once again playing in the key of the project, C. In the next exercise you'll change the project key.

Setting a Project's Key Signature

Loops generally sound more natural when they're played in their original keys. Their sound is closer to their producer's original intention, and with no transposition to process, the timbre of the loop is closest to the original recording and you hear fewer artifacts (distortion resulting from the time-stretching or pitch-shifting process).

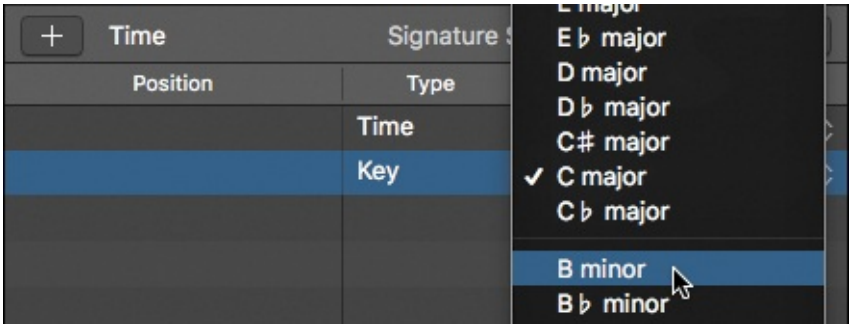
Let's change the key of the project to B minor, the original key of the synth loop you imported on track 3.

1 In the control bar, click the Lists button.

2 At the top of the Lists area, click the Signature tab.

The Signature list shows the Time and Key signatures. The default key signature is C major.

3 In the Value column, click the key signature (C major), and from the pop-up menu, choose B minor.



The Key signature is now B minor.

4 Click the Lists button to close the Signature list.

5 Listen to your song. The Intergalactic Synth plays in the new project key, B. Note that rhythmic loops without pitches are not affected by the project's key, so the Intergalactic Beat loop on track 2 isn't transposed.

Creating Apple Loops

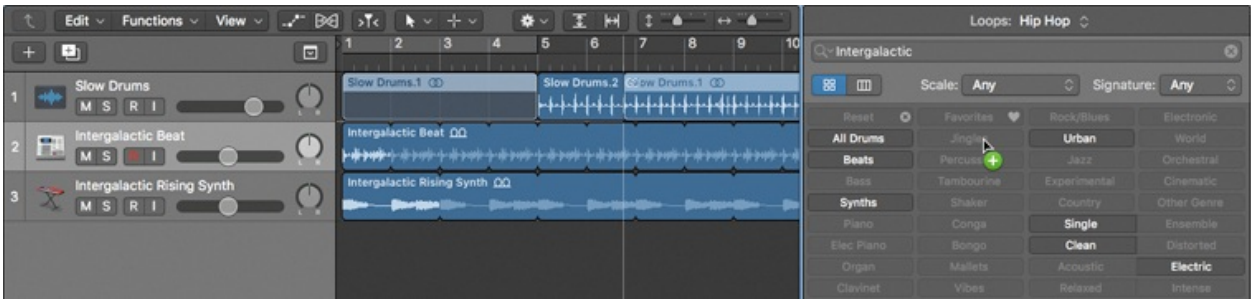
When you want to catalog a section of an audio recording so you can reuse it in future projects, you can save it as an Apple Loop. The Apple Loop will be indexed in the Loop Browser so that you can easily find it later, and it will automatically match the tempo (and, when appropriate, the key) of the project into which you import the loop.

In the next exercise, you will first divide the first four bars of drums and then save them as a new Apple Loop.

1 Command-drag to select the first four bars in the *Slow Drums* region, from 1 1 1 1 to 5 1 1 1.

2 In the control bar, click the Apple Loops button (or press O) to open the Loop Browser.

3 Using the Pointer tool, drag the selected section of the drums to the Loop Browser.

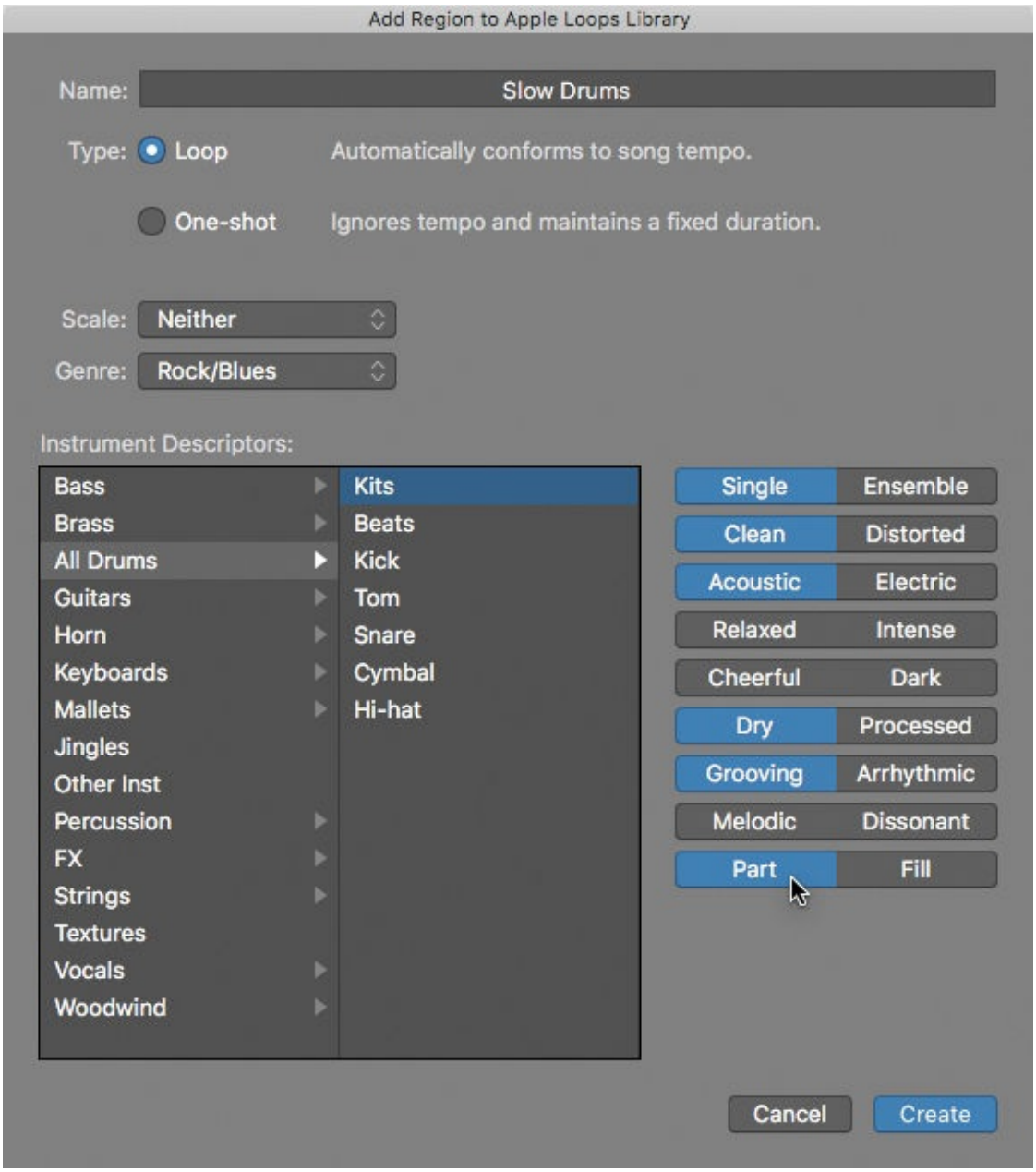


As soon as you click the marquee selection, it is divided as a new region. When you release the mouse button over the Loop Browser, the “Add Region to Apple Loops Library” dialog opens.

4 In the dialog, enter or choose the following:

- Name: *Slow Drums*
- Type: Loop
- Scale: Neither
- Genre: Rock/Blues
- Descriptors: All Drums > Kits

5 Click the Single, Clean, Acoustic, Dry, Grooving, and Part descriptor buttons. Descriptors determine which keyword buttons you’ll later select in the Loop Browser to find that loop.



Note

When dragging a region to the Loop Browser, you can create loops only when the number of beats in the region is an integer. This function uses the project tempo to tag the transient positions and works best for audio files that match the project tempo. If the selected region's number of beats is not an integer, the Type parameter will be set to One-shot and dimmed, and the resulting Apple Loop will not automatically match a project's tempo and key.

6 Click Create.

Logic bounces the section as a new Apple Loop and indexes it in the Loop Browser. You will come back to the current project shortly, but for now let's find the new loop in a new project.

7 Choose File > New (or press Command-Shift-N) and create a new project with one audio track, but do not close the current project.

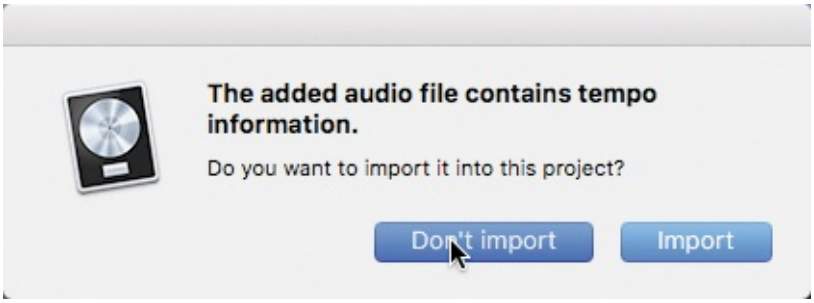
8 Open the Loop Browser.

9 In the Loop Browser, in the search field, type *Slow Drums*.

10 Drag the new Slow Drums Apple Loop to the audio track.

An alert appears asking you if you want to import the 61.5 tempo information from the Slow Drums loop into your project. In this case, you want to keep your project at 120 bpm.

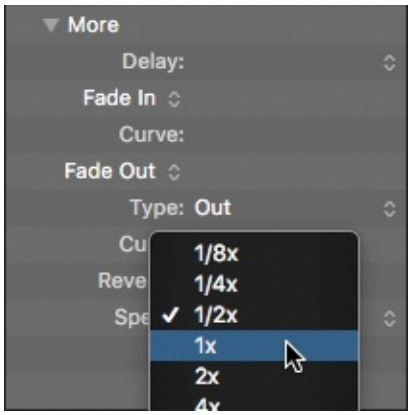
11 Click "Don't import."



12 Play the project.

Logic automatically plays the loop at half speed (60 bpm).

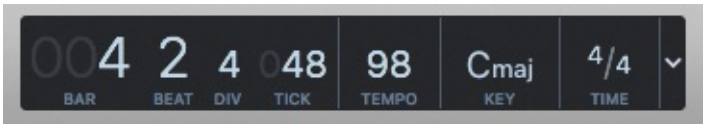
13 Make sure that the *Slow Drums* region is selected, and in the Region inspector's More options, set Speed to 1x.



14 Start playback.

The loop plays at the current project tempo, 120 bpm. Notice that in the Loop Browser's results list, Slow Drums does not have a key associated with it.

15 As the loop continues playing, experiment by changing the tempo of the project in the LCD display. The loop matches the project tempo.



16 Stop playback.

17 Choose File > Close to close the new project, and do not save it.

You are back in the original project.

18 Close the Loop Browser.

Tip

You can also drag a MIDI region on a software instrument track to the Loop Browser to create a green Apple Loop. As with the blue Apple Loops you've already used, you can apply green Apple Loops as audio regions on audio tracks, or as MIDI regions on software instrument tracks, giving you the additional flexibility of being able to edit the sound of the instrument and the MIDI events.

Creating Tempo Changes and Tempo Curves

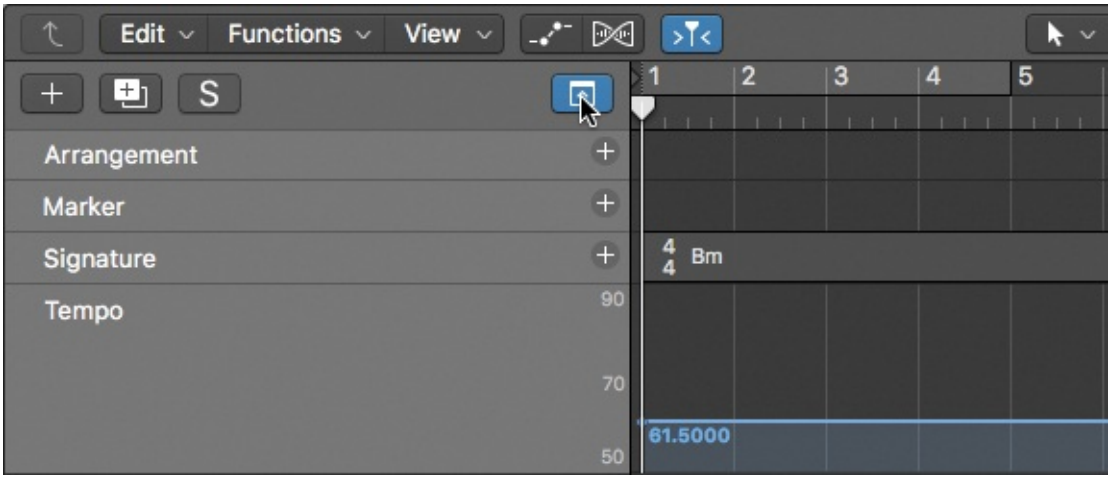
When you want to vary the tempo throughout a project, you can use the Tempo track to insert tempo changes and tempo curves. All MIDI regions and Apple Loops automatically follow the project tempo, even when tempo variations occur in the middle of a region. For non–Apple Loops audio regions (such as the

Slow Drums region on track 1), you first have to turn on Flex for the tracks containing the regions to make those regions follow the project tempo.

Creating and Naming Tempo Sets

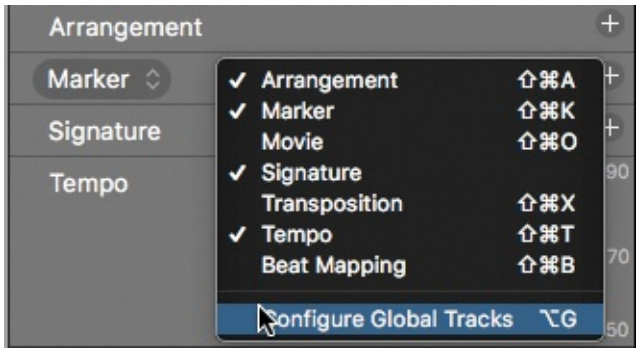
In this exercise, you will create a new tempo set, and name both the current and new tempo sets. You will create a new tempo curve in the new tempo set, and later switch between the original tempo and the new tempo curve.

1 At the top of the track headers, click the Global Tracks button (or press G).



Below the ruler, the global tracks open. For this exercise, you need to see only the Tempo track.

2 Control-click a global track header, and choose Configure Global Tracks (or press Option-G).

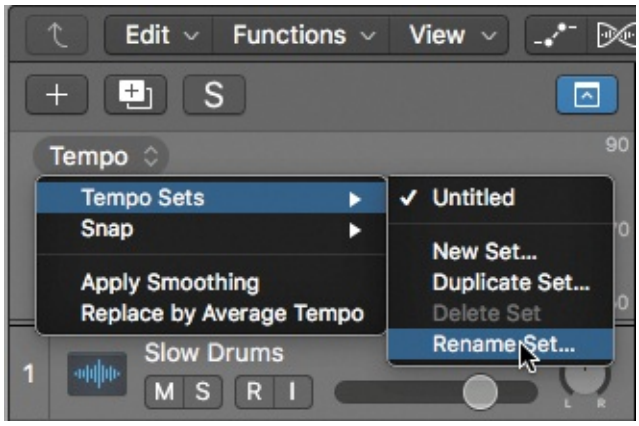


3 In the shortcut menu, deselect Arrangement, Marker, and Signature. Click outside the shortcut menu to close it.

Only the Tempo track remains. Before you start editing the tempo, you will create a new tempo set and name both the current and the new sets.

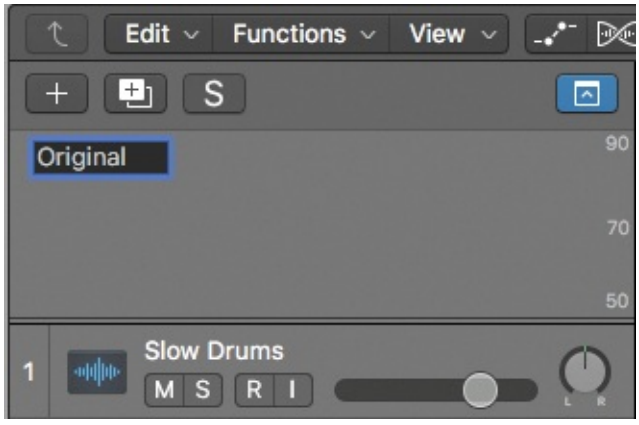
4 In the Tempo track header, from the Tempo pop-up menu, choose Tempo

Sets > Rename Set.



A text field appears on the Tempo track header.

5 Enter *Original*, and press Return.



6 From the Tempo pop-up menu, choose Tempo Sets > New Set.

A new tempo set is created with a default value of 120 bpm. A text entry field appears, ready for you to enter a name for the new set. In this set, you will make the tempo go gradually faster, so let’s name it Accelerando.

7 Rename the new tempo set *Accelerando*, and listen to the song.

Both Apple Loops play at the new tempo (120 bpm), but the drums on track 1 continue playing at their original tempo. To make them follow the project tempo, you need to choose a flex mode for their track, but only when the track is playing at its correct tempo.

8 From the Tempo pop-up menu, choose Tempo Sets > Original. The project tempo is 61.5000 bpm, the correct tempo of the drums performance.

9 Select the Slow Drums track header (track 1).

10 Open the Track inspector, and set Flex Mode to Flex Time - Slicing.

This mode slices the audio where it detects a transient, and moves the slices without time-stretching them, which typically works great for drums.

11 In the Tempo track, from the Tempo pop-up menu, choose Tempo Sets > Accelerando. Listen to the song.

This time, all three tracks follow the default 120 bpm tempo of the new tempo set.

Creating Tempo Changes and Tempo Curves

You now have two tempo sets, and you will edit the new one to create a tempo that starts at a 62 bpm tempo and progressively ramps up to about 85 bpm, dropping abruptly to 40 bpm for the last sustained note of the synth.

1 In the Tempo track, drag the tempo line down to 62 bpm.

Although the line seems to stop at the bottom edge of the Tempo track,

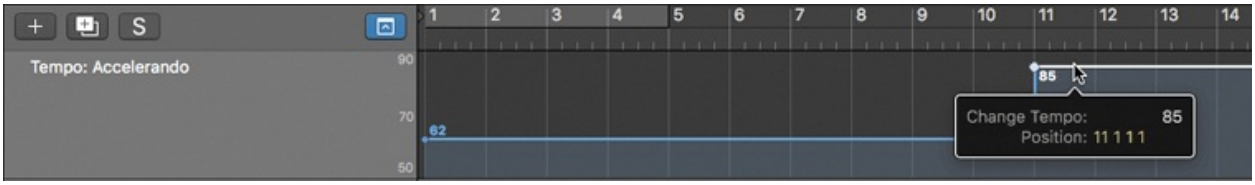
keep dragging down until you see the desired tempo value displayed in the help tag. When you release the mouse button, the scale in the Tempo track header updates and you can see the new tempo.

Let’s insert a tempo change at bar 11.

2 Click the tempo line at bar 11.

A new tempo point is inserted at bar 11 with the current 62 bpm value.

3 Drag the line that is located to the right of the new tempo change up to a value of 85 bpm. Listen to the tempo change.



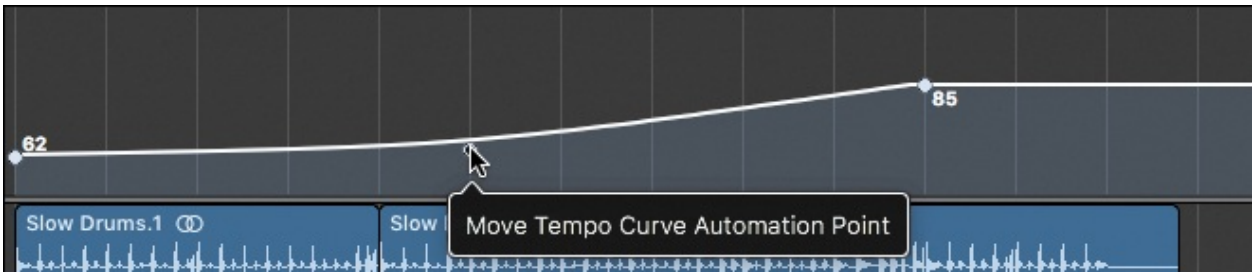
Tip

To reposition a tempo point, drag the tempo horizontally.

The tempo changes abruptly at bar 11. To smooth the tempo change, you’re going to accelerate the tempo from 62 bpm at bar 1 to 85 bpm at bar 11.

4 At bar 11, position the mouse pointer on the corner below the 85 bpm tempo point.

5 Drag the tempo point to the left.

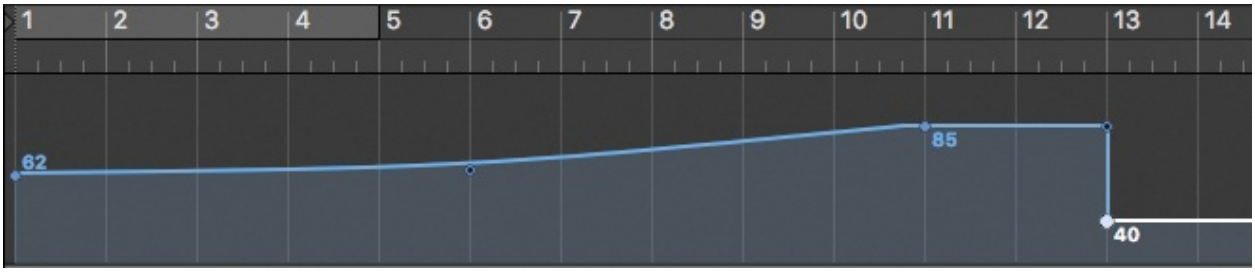


You can precisely adjust the tempo curve by dragging the tempo point farther to the left, up, or in both directions.

6 Listen to the song. The tempo now ramps up progressively between bar 1 and bar 11.

Let’s slow the tempo at bar 13.

7 Click the tempo line at bar 13, and drag the new tempo line to 40 bpm. Listen to the ending.



Although the drums seem rather fast in bar 11, the last synth note in bar 13 plays very slowly. You will later apply a tape slow-down effect to that last synth note.

8 Click the Global Tracks button (or press G) to close the global tracks.

You can create complex tempo maps to add excitement to your arrangements. Sometimes, a chorus that’s a bit faster than the rest of the song is all an arrangement needs to really take off. Or you can use tempo curves to create the classic ritardando at the end of a song. All your Apple Loops and MIDI regions will automatically follow the tempo map, and you can use a flex mode for each audio track you want to follow the tempo map.

Adding a Turntable or Tape Slow-Down Effect

When you stop a turntable with the stylus on the record, or stop a tape machine while keeping the playhead in contact with the magnetic tape, the result is a sound that drops in pitch as it slows down. This highly recognizable effect has recently regained popularity along with its opposite—the sound rising in pitch as speed increases when the tape transport or turntable starts.

You will now apply the turntable stop effect to the last sustained synth note at

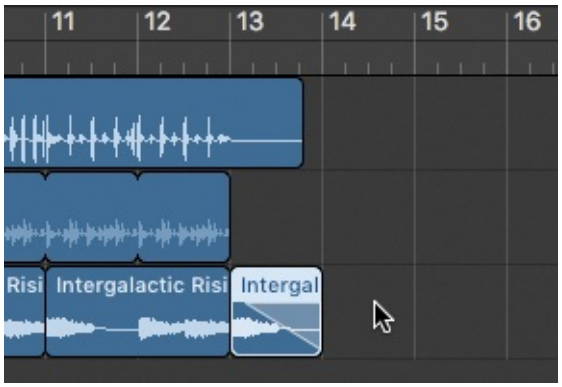
You will now apply the turntable stop effect to the last sustained synth note at the end of the song. First, you need to turn that last loop into an individual region.

1 Select the *Intergalactic Synth* region, and choose Edit > Convert > Loops to Regions (or press Control-L).

All repeating loops are replaced by individual regions. To avoid applying the effect to all of the selected regions, you must first deselect them.

2 Click the background of the Tracks area to deselect all regions.

3 Control-Shift-drag over the last *Intergalactic Rising Synth* region's end to create a fade-out.



Let's turn that volume fade into a speed fade.

4 Control-click the fade-out and choose Slow Down.

The fade-out turns orange, indicating that it is now a speed fade.

5 Listen to your fade. It sounds just like a tape stopping!

You can adjust the length and curve of the speed fade just as you would a volume fade.

6 As you listen, adjust the fade's curve and length as follows:

- Control-Shift-drag the middle of the fade to adjust its curve.

- Control-Shift-drag the left edge of the fade to adjust its length.

7 Choose File > Close Project without saving the project.

You just used a speed fade to create a realistic tape slow-down effect, but you can use speed fades for many kinds of effects. Try applying multiple rapid speed fades to short regions to create DJ scratching effects. Or add a speed fade at the end of a kick sample to make it drop in pitch.

Making One Track Follow the Groove of Another Track

Playing all tracks at the same tempo is not always sufficient to achieve a tight rhythm. You also need to make sure they play with the same groove. For example, a musician may play slightly late to create a laid-back feel, or he may add some swing to his performance by delaying only the upbeats. On another track, notes may be placed on a rigid grid.

To learn how to get your tracks in the same groove, you will open a new project with a drummer playing a swing groove, and then make a shaker on another track follow the groove of the drummer.

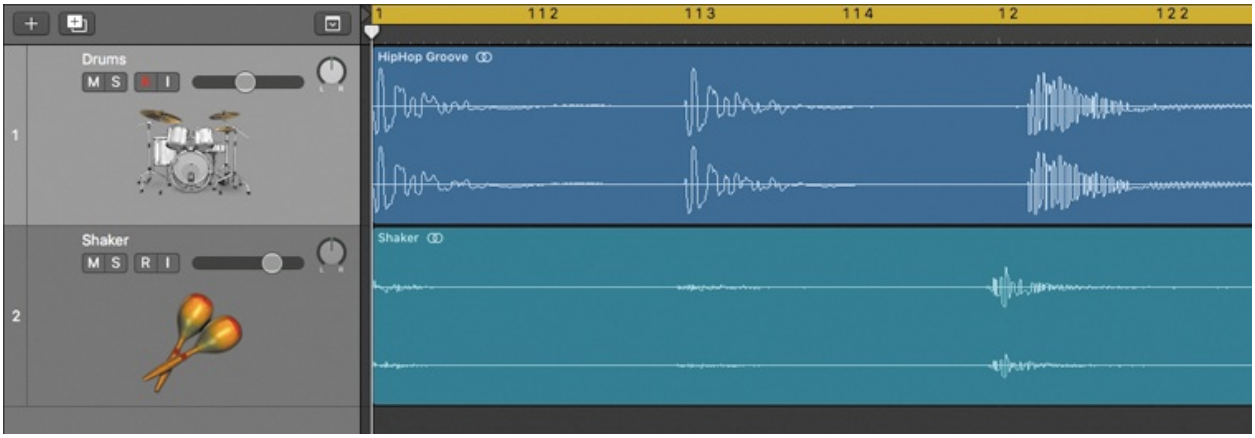
1 Open Logic Pro X Files > Lessons > **07 Swing Groove**, and listen to the song.

Even though both tracks play at the same tempo, they are not synchronized. The drums (track 1) are playing a hip-hop shuffle groove while the shaker is playing on a straight sixteenth-note grid. Feel free to solo the individual tracks to clearly hear each instrument's feel.

Let's zoom in so you can see the individual drum hits on the waveforms.

2 Press Return to go back to the beginning of the project.

3 Press Command-Right Arrow nine times to zoom in on the first two beats (so you can clearly see 1 and 1.2 in the ruler).



Below the 1.2 grid mark in the ruler, you can clearly see that the waveforms on the two tracks are out of sync.

To make the shaker follow the groove of the drums, you need to set the Drums track as the groove track.

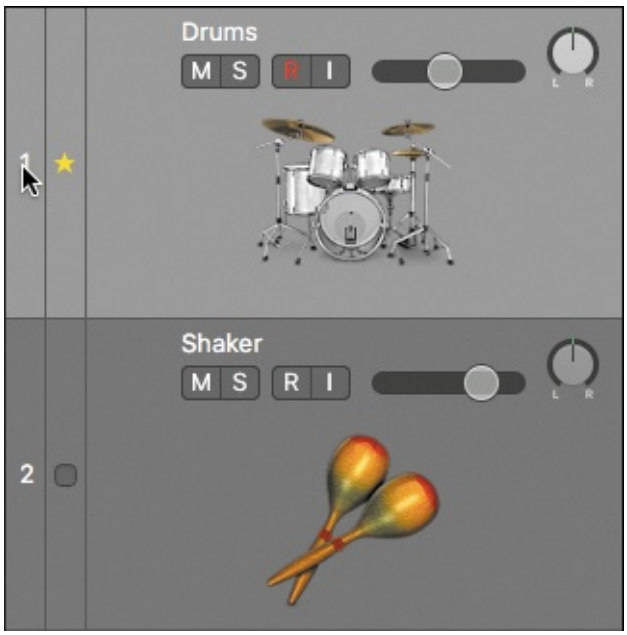
4 Control-click a track header, and from the shortcut menu, choose Track Header Component > Groove Track.

At first glance, nothing seems to have changed in the track headers.

5 Position the mouse pointer over the track number (1) of the Drums track.

A gold star appears in place of the track number.

6 Click the gold star.



The gold star appears in a new column on the track header to indicate that the Drums track is now the groove track. On the Shaker track header, in the same column, you can select the checkbox to make that track follow the groove track.

7 On the Shaker track, select the Match Groove Track checkbox.

The waveform on the Shaker track updates so that the notes are in sync with the notes on the groove track.

8 Listen to the song. The shaker now follows the groove of the drums, and they play in sync.

9 Solo the Shaker track.

10 While listening to the shaker, deselect and select the Match Groove Track checkbox to compare the original performance with the new groove.

When the checkbox is deselected, the shaker plays straight eighth notes and sixteenth notes.

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

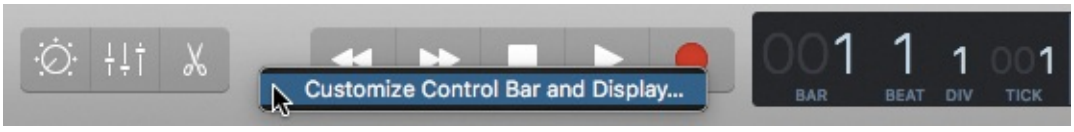
In the days of analog tape recording, engineers performed all sorts of tricks by changing the tape speed. Many major albums were sped up ever so slightly during the mixing process to add excitement to tracks by raising their tempos. This simultaneously raised the pitch, giving the impression of the vocalist 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