Creating Variable Speed Playback Effects

You’ve been able to change a clip’s playback speed to another constant speed since FCP 1.0. You can speed up, slow down, or reverse clips, but until now, your adjustments were limited to one playback speed modification per clip. FCP users (and their clients) have been begging for a time remapping tool that allows continuously variable playback speeds. No more.

Final Cut Pro 4 marked the debut of the Time Remap feature, a tool/interface combo that allows you to make complex variable speed adjustments directly in the Timeline—without math calculations, folks.

This section will describe the time remapping tools and walk you through a couple of basic variable speed adjustments. For more information, see “Changing Clip Speed and Time Remapping” on page III-337 of Apple's Final Cut Pro User Manual PDF.

To learn how to change a clip’s playback speed to another constant speed, see “Changing the playback speed of a clip” in Chapter 10.

Anatomy of the time remapping tools

Time remapping tools appear in a clip's Motion tab and in the Timeline keyframe area.

Motion tab

Time remapping is classified as a motion property, so when you open a Timeline clip in the Viewer, you’ll find its Time Remap controls at the bottom of the Motion tab (Figure 15a.1).

Figure 15a.1 The Time Remap keyframe graph appears at the bottom of the Viewer’s Motion tab. Parameter controls offer a detailed view of playback speed values and source frame relative to the current playhead position. See Apple’s FCP manual for settings details.
FCP Protocol: Reading Time Graphs

You can keyframe the Time Remap keyframe graph (known as the *Time Graph*) to vary a clip's playback speed either in the Motion tab or in the Timeline keyframe area, just as you would any other motion property. The Time Graph, however, reads differently than other keyframe graphs:

- The default 100 percent playback speed is graphed as a diagonal line (Figure 15a.2).
- Freeze-frames—0 percent playback speed—are graphed as a horizontal line (Figure 15a.3).
- Shallow angles indicate slow-motion playback speeds; the graph line angle increases as playback speeds increase (Figure 15a.4).
- Steep angles indicate playback speeds greater than 100 percent (Figure 15a.5).
- A downward-sloping graph line indicates reverse playback (Figure 15a.5).

![Figure 15a.2](image1.png) 100 percent playback speed as shown in the Timeline keyframe graph.

![Figure 15a.3](image2.png) A freeze-frame (0 percent playback speed) is indicated by a horizontal line.

![Figure 15a.4](image3.png) 50 percent playback speed—the keyframe graph angle increases with playback speed.

![Figure 15a.5](image4.png) Playback speeds over 100 percent appear as a steeply angled graph line; reverse playback appears as a downward-sloping angle, as shown on the right side of this Timeline keyframe graph.
Timeline keyframe area

You can set and adjust speed keyframes on the Time Graph in the Timeline’s keyframe area. Select the Time Remap tool from the Tool palette, and you can also sculpt variable speed effects directly in the Timeline by dragging on the clip. Figure 15a.6 shows the Timeline keyframe area configured to support the use of the Time Remap tool. For more information on configuring the keyframe area, see “Working with Keyframes in the Timeline” in Chapter 14.

- **Clip speed indicator:** Tic marks indicate the playback speed at each point in the clip. Wide spacing indicates slow motion; narrower spacing indicates faster motion. Reverse play is indicated by red tic marks.

- **Time Graph:** You don’t need to use the Time Remap tool to sculpt variable speed playback effects. You can also adjust a clip’s playback speed by setting Time keyframes. To learn how the angles of the graph correspond to playback speed, see “FCP Protocol: Reading Time Graphs,” in this chapter.

- **Time Remap tool:** Drag the tool on a Timeline clip to make variable speed adjustments.

- **Speed tooltip:** Click the Time Remap tool on a speed-modified clip, and the Speed tooltip appears. The tooltip’s reading updates as you scrub the tool over the clip, providing feedback on frame position and playback speed.

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**Figure 15a.6** Time remapping tools in the Timeline.
To vary a clip’s speed by keyframing its Time Graph:

1. In the Timeline, click the Clip Keyframes control to show the keyframe area; then select Time Remap > Time Graph from the keyframe area’s shortcut menu (Figure 15a.7). The clip’s Time Graph appears.

2. Locate the frame in your clip where you want to start your speed modification; then use the Pen tool to set a keyframe on the Time Graph (Figure 15a.8). The first keyframe locks the clip frames preceding the keyframe location at 100 percent playback speed.

3. Locate the frame in your clip where you want to end speed modification; then set a second keyframe on the Time Graph by dragging the Pen tool on the graph line—up for accelerated playback, down for slow motion (Figure 15a.9).

4. Play your clip to preview the playback speed you’ve established. You can fine-tune the playback speed by dragging the second keyframe to reposition it (Figure 15a.10).

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5. Select the Time Remap tool from the Tool palette; then click the last frame of the clip. Drag the Time Remap tool on the clip, and use the Speed tooltip to set the playback speed for the remainder of the clip (Figure 15a.11). The Speed Left setting determines the playback speed from the second keyframe to the end of the clip. Ignore the Speed Right setting; it won’t be applied to any of the frames you’re using in the clip.

6. If you want to smooth the rate of change for your playback speed, Control-click a keyframe and choose Smooth from the shortcut menu (Figure 15a.12). The keyframe is converted to a curve type (Figure 15a.13). Use the ease handles to fine-tune your speed variation.

✓ Tips

- If you get tangled up in time remapping and want to start from scratch, don’t forget the Remove Attributes command in the clip’s shortcut menu. Then you can get some sleep and start fresh in the morning.

- You can save a clip’s keyframed Time Remap information as a favorite motion and reuse it on other clips. See “Saving Effects Settings as Favorites” in Chapter 14.
To vary a clip’s speed by using the Time Remap tool:

1. In the Timeline, click the Clip Keyframes control to show the keyframe area, then select Time Remap > Time Graph from the keyframe area’s shortcut menu (Figure 15a.14). The clip’s Time Graph appears.

2. Locate the frame in your clip where you want to start your speed modification (in this example, the first frame you want to play in slow motion), then use the Pen tool to set a keyframe on the Time Graph (Figure 15a.15). The first keyframe locks the clip frames preceding the keyframe location at 100 percent playback speed.

3. This step is optional but recommended: Identify your clip source frame (in this example, the last frame you want to play in slow motion), and set a sequence marker at the source frame’s location. If you’re syncing your speed-modified playback to a particular frame in your sequence (for example, a specific point in a music track), set a sequence marker at that sync point as well (Figure 15a.16). The sequence markers aren’t a technical requirement, but they’ll help you stay oriented and get the effect you’re shooting for.

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4. Select the Time Remap tool from the Tool palette, then do one of the following:
   - With the Time Remap tool, click the clip at the sequence sync point (Figure 15a.17) (line up to your sync point sequence marker in order to hit the right frame), and then drag until you see your clip source frame in the Canvas (Figure 15a.18).
   - With the Time Remap tool, Option-click the clip at the source frame location (line up to your source frame sequence marker in order to hit the right frame); then drag to the location of your sequence sync point marker (Figure 15a.19).

5. Play your clip to preview the playback speed you've established. You can fine-tune playback speed by dragging the second keyframe to reposition it.
6. With the Time Remap tool, click the last frame of the clip. Drag the Time Remap tool on the clip, and use the Speed tooltip to set the playback speed for the remainder of the clip (Figure 15a.20). You may want to zoom in for this last step. The Speed Left setting determines the playback speed from the second keyframe to the end of the clip. Ignore the Speed Right setting; it won’t be applied to any of the frames you’re using in the clip.

7. If you want to smooth the rate of change for your playback speed, Control-click a keyframe and choose Smooth from the shortcut menu. The keyframe converts to a curve type. Use the ease handles to shift smoothly between speed variations.

✔ Tip

- Hold the Shift key as you drag to constrain speed adjustments to 10 percent increments as you drag. Hold the Command key to constrain adjustments to 1 percent increments.

FCP Mystery Theater: Why Must a Variable Speed Clip Maintain Its Duration?

When you modify a clip’s playback speed to another constant speed, the clip’s duration adjusts to reflect the time it takes to play the clip’s frames at the new playback speed. Slow motion increases duration and accelerated playback shortens the clip’s duration.

Why, then, when you add a keyframe to vary its playback speed, must the clip maintain its duration? This feature/quirk in the Time Remap tool dictates that if you’ve pushed one part of a clip to a faster playback speed, you must pull down the playback speed somewhere else to compensate and maintain the clip’s duration. Pull down the speed, and you have to speed up elsewhere. Editors generally want to slow down a portion of a clip, then return to normal playback speed, or speed through the action in a clip.

Apologies to those reading this sidebar in search of an explanation for this mystery; I have no answer, just this inelegant workaround: Set a keyframe on the final frame of your clip, then use the Time Remap tool to set the Speed Left to your desired final playback speed, and relegate the absurd “leftover” playback speed to the Speed Right setting, which will apply only to the final frame of the clip.