



# Final Cut Pro User's Manual

Includes instructions for installing and using your software

 **Apple Computer, Inc.**

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# Getting Started

Welcome to Apple Final Cut Pro, the all-in-one solution for professional digital video editing, compositing, and special effects. Final Cut Pro has been designed to work with professional broadcast equipment in post-production environments. In addition, the program has been thoughtfully designed to take advantage of leading-edge digital technologies, enabling you to be creative as well as productive. Final Cut Pro supports Digital Video (DV) as well as all QuickTime formats, including MJPEG and streaming video. Final Cut Pro includes powerful production management capabilities in an intuitive interface. There are also powerful, built-in effects generators as well as support for Adobe™ After Effects third-party plug-in filters. With Final Cut Pro you can produce broadcast-quality productions in a flexible, easy-to-use environment.

In this chapter you will find information resources and system requirements for Final Cut Pro. Installation instructions will step you through the installation process. You will also be given hardware setup and configuration information to help you put together hardware components designed for use with Final Cut Pro. At the end of this chapter there are tips for optimizing and troubleshooting Final Cut Pro.

## Where to Find Information

- *Final Cut Pro User's Manual:* This book documents all of the features of Final Cut Pro. It contains installation instructions and informative material as well as an instructional tutorial that can be taken using the video and audio clips included on the Final Cut Pro CD-ROM disc. Appendixes contain a complete list of effects scripting commands, sample effects, keyboard shortcuts, and indexes.
- *Help system:* Online help is built into the application. You can search it for information while using Final Cut Pro. To open the Help system, choose Context Sensitive Help from the Help menu or press the F1 key.
- *Read Me file:* You can find late-breaking information in this file on the Final Cut Pro CD.
- *Updates:* Look in the box for other essential information.

For general product information and updates, visit the Apple Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro)

## System Requirements

- A Power Macintosh G3/266 computer or faster (G3/300 or faster required for DV), or a PowerBook G3/300 or faster
- Mac OS 8.6 or later
- 128 MB of RAM
- A CD-ROM drive
- A 6 GB, A/V (Audio/Video rated) drive (16 GB recommended)
- A true-color display
- ATI built-in video support on G3 models (required for DV)
- An Apple FireWire or other QuickTime-compatible digital video card for capturing video from an external source or exporting video to tape
- The correct FireWire or device control cable and any additional cables you may need for connecting your deck or camcorder to your computer

## Preparing to Install Final Cut Pro

Final Cut Pro requires certain software components to be installed on your hard disk. QuickTime is required by Final Cut Pro and has been included with this program. Be sure to install QuickTime before installing Final Cut Pro.

### Installing QuickTime Components

- 1 Insert the Final Cut Pro CD into your CD-ROM drive.
- 2 Double-click the Final Cut Pro CD icon on your desktop.
- 3 Locate and open the QuickTime Installer folder and double-click the QuickTime Installer icon.
- 4 Follow the onscreen instructions in the QuickTime Installer.

**Important** On the “Choose Installation Type” panel, choose Custom and click Continue. Click the Select All button on the next screen and click Continue.

- 5 Complete the QuickTime installation process by restarting your computer.
- 6 Unlock QuickTime Pro by following the instructions on the update sheet in your box.

## Installing Final Cut Pro

Installation places the Final Cut Pro application and its components on your hard disk. Installation of certain software components is determined by the type of capture hardware you will be using with Final Cut Pro. If you have not yet installed and configured the additional hardware you will be using with your computer, read the section “Hardware Setup and Configuration” on page 20. If you already have a system configured with capture hardware and a camcorder or deck, proceed with the installation instructions in this section.

- 1** Insert the Final Cut Pro CD into your CD-ROM drive.
- 2** Double-click the Install Final Cut Pro icon.
- 3** Choose a destination disk from the pop-up list and click Select.  
**Note:** Final Cut Pro can only be installed on a hard disk with Mac OS 8.5 or later.
- 4** Read the Software License Agreement and click Continue.
  - Click Agree to continue with the installation.
  - Click Disagree to cancel the installation.
- 5** Specify the video capture hardware you will be using:
  - Select Pinnacle Systems Targa Series if you will use a Targa video capture card.
  - Select DV (digital video) if you will use Apple FireWire and DV devices. When you select DV, your default video frame size is set to 720 x 480.  
**Note:** Selecting DV will install FireWire extensions in your System Folder. These extensions are optimized for Final Cut Pro. If you have existing FireWire extensions in your System Folder that you want to retain, move them out of the Extensions folder before you continue.
  - Select None/Don't Know if you will use hardware other than DV or Pinnacle Systems Targa.
- 6** To specify a default video frame size (Pinnacle Systems Targa only):
  - Select NTSC Standard for a 640 x 480 frame size.
  - Select NTSC (CCIR 601) for a 720 x 486 frame size.
- 7** To specify the type of video source connection:
  - Select Composite to sample video over a single cable using a BNC or RCA connector.
  - Select S-Video to sample video over a single cable using a 4-pin S-video connector.
  - Select Component to sample video over three cables using Betacam (r-y, b-y, Y) Component BNC or RCA connectors.
- 8** Click Start to install Final Cut Pro.
- 9** Restart your computer.

- 10 Open the Final Cut Pro application and enter your registration information and serial number. The serial number can be found on the Final Cut Pro CD sleeve.

**Note:** Final Cut Pro is configured to use a standard set of preferences and preset controls based on answers given during installation. You may want to change these before you proceed any further. See Chapter 4, “Preferences and Presets,” on page 95, and “About Presets and Sequence Settings” on page 166.

## Hardware Setup and Configuration

Final Cut Pro is designed to work with DV and Pinnacle Systems Targa Series hardware. If you are using DV equipment, use the FireWire cable included with this package to connect your camcorder or deck to your computer. DV devices with FireWire transmit device control data, timecode, video, and audio over a single FireWire cable.

If you are using Pinnacle Systems Targa equipment, device control and timecode signals are transmitted over one cable while video and audio data use another set of cables depending on the type of video source connection you choose. See your Targa manual for details.

You can also connect camcorders or decks that do not support device control to capture video clips and export edited sequences. To print to video or edit to tape, the card must have video out capabilities. To connect these devices, you need a QuickTime-compatible video capture card. Go to the Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro) for a list of vendors and qualified products.

## Connecting Video Devices to Your Computer

Devices can be connected to your computer through a dedicated video capture card or FireWire connection. It is recommended that you connect and turn on the device before opening Final Cut Pro so the application can detect the device.

If you are connecting devices to your computer with video and audio cables:

- Connect the video and audio cables to the output jacks of your camcorder or deck.
- Connect the other ends of the cables to the corresponding input jacks of your capture hardware.
- Connect an appropriate device control cable between your camcorder or deck and the serial port of your computer.

If you are connecting a DV device to your computer with FireWire:

- Use a 2-meter, 6-pin to 4-pin FireWire cable to connect the DV device to your computer.



*4-pin 1394 (FireWire) connector    6-pin 1394 (FireWire) connector*

- Plug the 6-pin connector into the computer's FireWire port and the 4-pin connector into the device's DV port. (FireWire ports on external devices are sometimes labeled IEEE 1394 or DV IN/OUT.)

The Apple FireWire port on your Macintosh is a 6-pin port.



**Warning** Do not attempt to force the 4-pin connector into the computer's 6-pin FireWire port. 4-pin connectors and ports can be especially fragile. Before connecting a 4-pin connector to its corresponding port, be sure it is aligned properly by matching an indent on the connector to the indent in the port. Do not force the two together.

Both connectors snap into place when properly engaged.

Once you have connected a camcorder or deck to your computer, turn on the device. If you are using a camcorder, switch it to VCR mode (sometimes labeled VTR.) In VCR mode, the camcorder operates as a playback/record deck and uses the video and audio connectors or FireWire for input and output. In Camera mode, the camcorder acquires video and audio through the CCD sensor and built-in Mic, not through the input connectors or FireWire. Final Cut Pro cannot record to the camcorder while it is in Camera mode.

## Controlling Video Devices With Your Computer

Final Cut Pro can control devices through a serial or FireWire cable. If your camcorder or deck supports one of the following device control protocols, Final Cut Pro can transmit and receive timecode and transport control data to and from the device. Search mechanisms within some decks can also be controlled by Final Cut Pro.

**Note:** If your computer does not have a serial port, but does have a USB port, you can use a third-party product such as the Keyspan USB Serial Adapter, which allows you to attach serial devices to the USB port.

The following device protocols are supported:

- Apple FireWire or Apple FireWire Basic
- JVC RS-232
- Panasonic RS-232 or RS-422
- Sony RS-422 or RS-232
- Sony VISCA or LANC

**Note:** The Panasonic RS-422 and Sony RS-422 protocols require special cables. For more information about the various protocols and their cables, see the Final Cut Pro Read Me file in the Final Cut Pro application folder or visit the Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro)

For full functionality of Final Cut Pro, your video device needs to support auto editing VTRs and protocols.

**Note:** An auto editing VTR is a device that can take In Point and Out Point timecode, along with an Edit mode, and perform the edit accurately, regardless of the state of the controlling device or its software.

## About Apple FireWire

Apple FireWire is designed to work with digital video camcorders and decks that have a FireWire port and use the DV format. With Final Cut Pro and a FireWire connection, you can control external DV devices and capture DV movie clips to your hard disk. You can then view, edit, and apply effects to the DV clips and render movies in the DV format. Final Cut Pro can also play the movies to your camcorder or deck through the FireWire connection where the output can then be recorded on tape.

## Apple FireWire Basic

FireWire (IEEE 1394) is a serial bus currently supported by many professional and consumer level camcorders and decks. However, there is a wide range of functionality and adherence to the FireWire specifications among these devices. For this reason, two versions of the FireWire protocol (Apple FireWire and Apple FireWire Basic) are provided in Final Cut Pro's Device Control preferences.

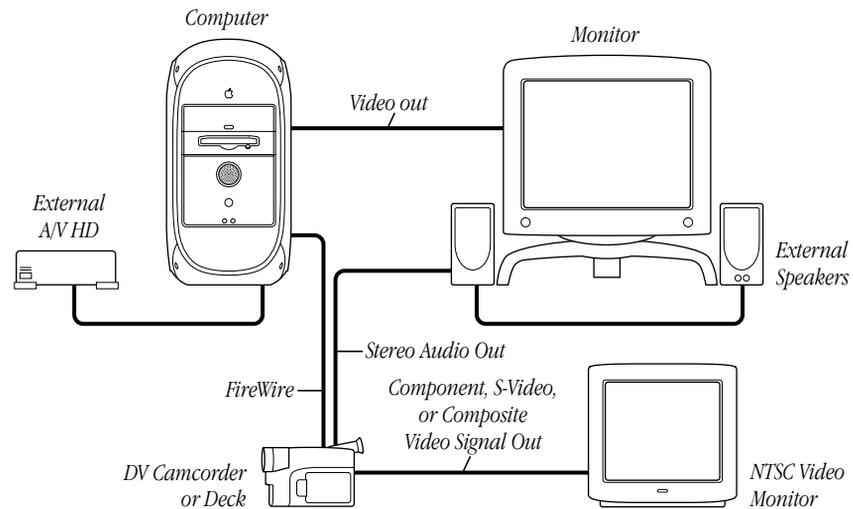
If your deck or camcorder uses FireWire, begin by using the Apple FireWire protocol. This is the default protocol if you selected DV during the installation setup. While all decks and camcorders support the most basic functions like returning timecode and accepting basic transport commands, other commands may not be supported. If you find that the device does not accurately go to specified timecodes or fails to execute special commands, try the Apple FireWire Basic protocol.

To switch between FireWire protocols in Final Cut Pro:

- Choose Preferences from the Edit menu and click the Device Control tab.
- Choose Apple FireWire or Apple FireWire Basic from the Protocol pop-up menu.

## System Configurations

Final Cut Pro works best with the following hardware configuration:



A basic configuration includes a computer, a high-resolution monitor, and a video camcorder or deck. Your source footage will be sampled to the internal hard disk of the computer via FireWire or other video/audio connection. Footage can then be edited on the computer with Final Cut Pro and output back to tape through FireWire or other video/audio connection.

A recommended setup also includes an Ultra Wide A/V hard disk drive, an external set of speakers, and an NTSC or PAL monitor:

- An Ultra Wide A/V hard disk drive provides a dedicated, high-throughput storage medium where video and audio can be recorded or rendered. The benefit of using a dedicated drive for your media is that the drive contains no operating system software or other applications and files that can fragment the disk. Fragmentation can interfere with the continuous data flow of video and audio to and from the disk. You can add an internal drive to your existing SCSI bus or you can install an Ultra Wide SCSI card to support an external A/V drive.
- External speakers allow you to hear audio output from your video camcorder or deck. Many camcorders come with a built-in speaker, but external speakers will provide you with higher quality audio output.

Audio is output through the camcorder or deck

- when playing back video with audio in the Viewer, Canvas, or Timeline
- when printing or editing video to tape

**Note:** When playing video in the Canvas, audio output through the external speakers will be slightly out of sync with the video. Audio from the external speakers will, however, be in sync with video displayed on an NTSC or PAL monitor.

- An NTSC or PAL monitor is highly recommended for previewing video output from your hard disk if you intend to output to videotape or broadcast on television. Final Cut Pro outputs video to the NTSC or PAL monitor through the camcorder or deck. Many video camcorders have built-in LCD displays that can also be used for this purpose. An NTSC or PAL monitor can also be used to view the playback from your video device when you are searching for edit points. Connect the NTSC or PAL monitor to your video deck or camcorder using the Component, S-Video, or Composite output jacks.

### **Ultra Wide SCSI Hard Disk Drive and PCI Card Specifications**

Digital video and audio demands high data throughput to and from the hard disk drive. For the best performance when working with digital media, use a high-capacity, Ultra Wide SCSI drive. Depending on your system configuration, you may be able to add an internal drive if you have an existing Ultra Wide SCSI bus. If you do not have an internal Ultra Wide SCSI bus, install an Ultra Wide SCSI card in one of your computer's PCI slots. Refer to the Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro) for a list of vendors and qualified products.

### About the Internal Ultra Wide SCSI Bus

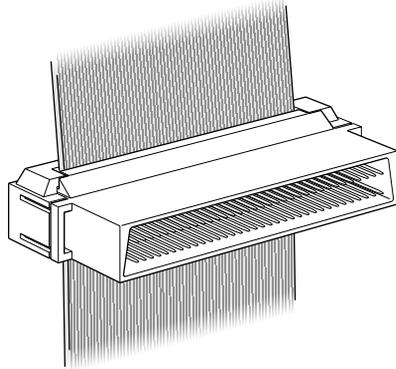
If your computer came with an Ultra Wide SCSI card, all devices on the same SCSI bus must have unique ID numbers. However, devices on different SCSI buses may use the same SCSI ID number. (For example, you can have a removable media drive with ID number 3 connected to the computer's built-in regular SCSI bus and a hard disk with ID number 3 connected to the Ultra Wide SCSI bus.)

**Important** Hard disks installed in your computer at the factory and the SCSI card have reserved certain SCSI ID numbers on the Ultra Wide SCSI bus. Other ID numbers are available for assignment to SCSI devices that are added later, as described in the following table.

Ultra Wide SCSI ID Number	Device
0	Factory-installed hard disk drive (terminated)
1 through 6	Available <sup>1</sup>
7	SCSI PCI card (terminated)
8 through 15	Available

<sup>1</sup> If your computer came with two or more Ultra Wide SCSI hard disk drives, use the System Profiler program (available in the Apple menu) to find out the SCSI ID numbers of your drives.

If you want to install an internal SCSI-3 drive, use the internal ribbon cable with the 68-pin connector to connect the device to the Ultra Wide SCSI bus.



*68-pin connector*

**Warning** Do not connect any SCSI devices to the external 68-pin SCSI-3 connector or to the internal 50-pin SCSI-2 connector on the PCI card that supports the internal hard disk. Connecting even one external SCSI device to the external 68-pin connector extends the overall cable length of the SCSI bus beyond the limit for which error-free operation can be guaranteed; the combined length of the internal cable and the external cable reduces the reliability of all the devices connected to the Ultra Wide SCSI bus. Connecting a device to the internal 50-pin SCSI-2 connector will cause your Ultra Wide SCSI devices to transfer data at the slower, SCSI-2 rate.

## Optimizing Performance

These tips will help you to get the best from Final Cut Pro:

- When a project is finished and archived, delete all files from the disk you used to create the project. Defragment the drive with a disk-optimizing utility. This helps prepare the disk for the next project you work on.
- Make sure that windows displaying video are not obscured or overlapped.
- Don't place windows so that they overlap monitors.
- Defragment disk drives regularly, especially those used for capturing.
- Store your project files on your startup disk. Store your media and rendered files on another disk.
- Turn off virtual memory in the Memory control panel. (This is required.)
- Keep your disk cache as small as possible.
- Turn off all applications and processes that run in the background, such as networking (which you can turn off by making AppleTalk inactive using the Chooser).

- Attempting to open clips or media over a network will cause poor performance in Final Cut Pro. Copy files from the network to your local disk before importing them.
- Do not set Final Cut Pro's memory allocation to an amount higher than the currently available RAM.

## Troubleshooting

If you encounter problems after installing Final Cut Pro and configuring your hardware, the following tips may help.

### **My camcorder or deck is not recognized.**

- Make sure your device control cable or FireWire cable is properly connected.
- Verify that the camcorder is set to VCR mode.
- Turn on the device and restart Final Cut Pro.
- Make sure the appropriate protocol for your device is selected in the Device Control tab in the Preferences window. See “Setting Device Control Preferences” on page 99 for more details.

### **Video is not visible on an external NTSC or PAL monitor.**

- Make sure your cables are properly connected.
- Verify that the camcorder is set to VCR mode.
- Make sure the appropriate hardware setting is selected in the “View External Video Using” pop-up menu in the General preferences tab. See “Setting General Preferences” on page 96 for more details.
- Choose Rendered Frames from the “View External Video Using” pop-up menu in the General preferences tab to view rendered frames before they are output to NTSC or PAL video.
- Choose “All frames” or “Single frames” from the External Video submenu in the View menu.

### **I noticed dropped frames on my NTSC or PAL monitor during DV playback from the Timeline.**

- Reduce the Canvas or Viewer view size to 50%.
- Turn off “Mirror on desktop during Playback” in the General preferences tab.
- Disable View As Sq. Pixels in the View pop-up menu.
- Reduce monitor bit depth from millions to 16-bit (thousands).

**Video does not play through to the computer screen.**

- Make sure your cables are properly connected.
- Check your QuickTime video settings in the Capture preferences tab. For details on QuickTime source and compression settings, see “Specifying Capture Preferences” on page 101.

**I am experiencing poor playback and stuttering video when trying to edit.**

- Make sure you are not editing with media using keyframe compression such as Sorenson or Cinepak.
- Recompress the media with Final Cut Pro or Media Cleaner without keyframes.

**I don’t hear audio on my computer’s speakers when playing video from my camcorder or deck.**

- Make sure your audio cables are properly connected.
- Check your QuickTime audio settings in the Capture preferences tab. For details on audio sample and source settings, see “Specifying Capture Preferences” on page 101.

**I don’t hear audio through my camcorder speakers.**

- Make sure your cables are properly connected.
- If you are scrubbing audio in the Viewer’s Audio tab, increase the volume of your computer’s audio output.

**I can’t control certain functions of my camcorder or deck.**

- Make sure your device control cable is properly connected.
- Make sure the appropriate protocol for your device is selected in the Device Control tab in the Preferences window. See “Setting Device Control Preferences” on page 99 for more details.
- If you are using a device with FireWire, try switching the device control protocol from Apple FireWire to Apple FireWire Basic.

# Final Cut Pro Tutorial

This tutorial is designed to give you a hands-on introduction to Final Cut Pro. Working through the step-by-step procedures in the tutorial, you will create a short video using a variety of the editing, effects, and compositing features of the application. You will

- create a Final Cut Pro project and sequence
- play clips and mark edit points
- perform several types of edits
- add special effects to your sequence
- render and play the sequence you've put together
- output your final sequence to videotape or a QuickTime file for use on the World Wide Web or in multimedia

The tutorial should take about one hour to complete.

## Getting the Tutorial Files and Starting the Program

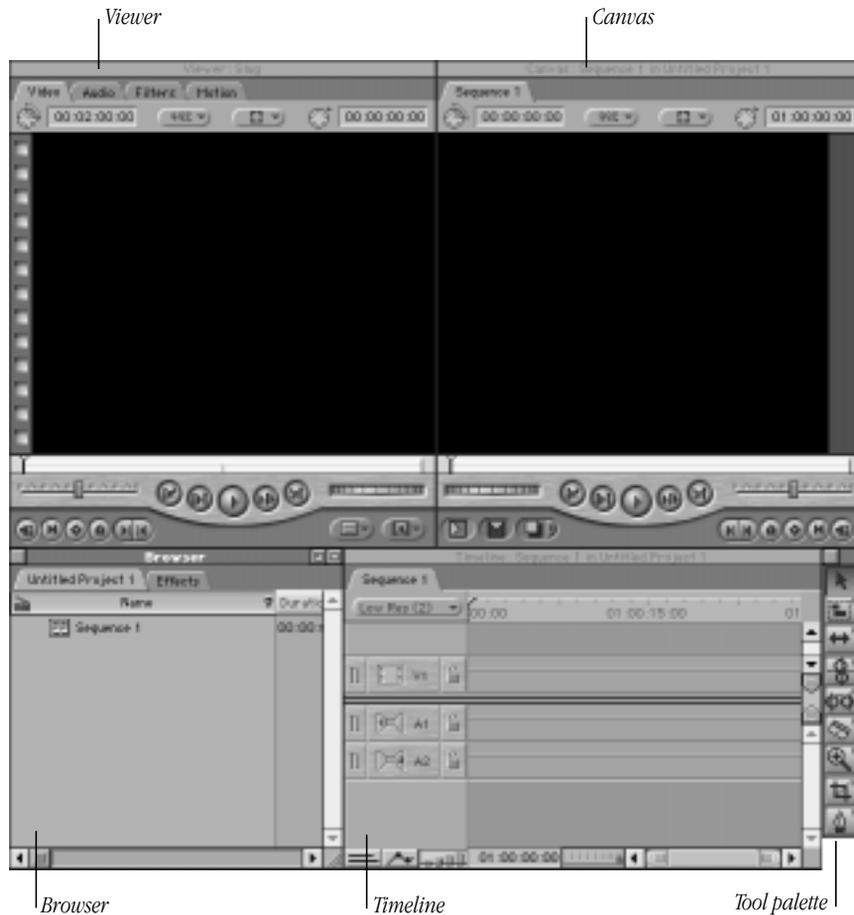
If you haven't installed Final Cut Pro, follow the instructions in Chapter 1, "Getting Started," on page 17. Next, consult the Read Me file installed with the program for the location of the tutorial files on the Final Cut Pro CD-ROM disc. Then copy the necessary files from the CD and open the project you will use for the tutorial.

**Note:** The tutorial files require about 90 megabytes (MB) of free space on your hard disk.

- 1** If necessary, clear 90 MB of space on your hard disk.
- 2** Copy the Tutorial folder from the Final Cut Pro CD to your hard disk.
- 3** Double-click the Final Cut Pro icon to start the program.

## The Final Cut Pro Workspace

In Final Cut Pro, you work in four main windows: the Viewer, Canvas, Timeline, and Browser. These windows open the first time you start the program. In addition, the Tool palette opens with the program.



Each of the four main windows has multiple functions. Functions are grouped by tabs within the windows. You can drag tabs out of their parent windows to customize the workspace for your individual needs. (When you drag a tab, its content opens in a new window.)

**Note:** In some instances, the windows on your screen may look slightly different from the pictures in this tutorial.

## Setting Up Your Environment

When you install Final Cut Pro, you provide information about your system that the program uses to establish its basic settings. You don't have to change those settings for this tutorial.

Before you begin working, however, you should specify a scratch disk for storing video, audio, and render files.

To specify the scratch disk and file type:

- 1 Open the Edit menu and choose Preferences.
- 2 Click the Scratch Disks tab and specify a scratch disk for your video, audio, and render files.

**Note:** You can specify that these files be stored on a single disk, on separate disks, or in folders within a disk.

- 3 Click the Sequence Presets tab and choose Software Preset.
- 4 Click the Set Default button.

If the button is dimmed, that option is already the default.

- 5 Click OK.

Now you're ready to begin editing in Final Cut Pro.

## Editing in Final Cut Pro

This section gives you practice with the basic editing features of Final Cut Pro, including adding clips to a sequence, trimming, slip editing, match frame editing, using transitions, and audio manipulation.

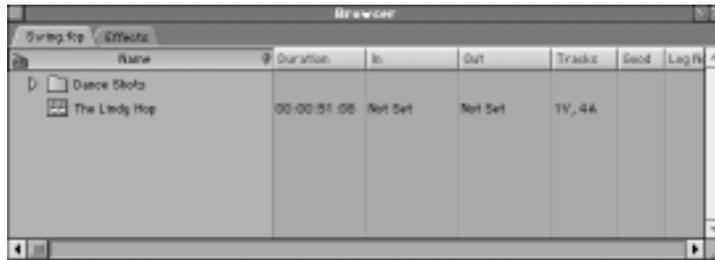
"The Lindy Hop" sequence in the project "Swing.fcp" is a section of a documentary about swing dancing in the 1990s. This sequence introduces you to the power and productivity of Final Cut Pro. In the tasks that follow, you will recreate this video segment and learn some of the ways the program facilitates the creative process.

## Creating Your Own Project

To begin, open the program, create your own project, and play the sequence named "The Lindy Hop." This sequence is the model for the learning tasks in the tutorial.

- 1 Choose Open from the File menu, locate the Tutorial folder on your hard disk, open the Projects folder inside it, select the file "Swing.fcp" (one of the tutorial's project files), and click Open.

A tab named “Swing.fcp” appears in the Browser, and the Timeline and Canvas windows close.



The Browser is the central storage area for all media. It provides management features, such as sorting and finding, and allows for complex organization of media combined with quick access to files. The program organizes clips, sequences, and other data in a project. Projects are represented by tabs in the Browser.

- 2 Open the File menu and choose Save Project As, type “My Project 1.fcp,” and click Save.

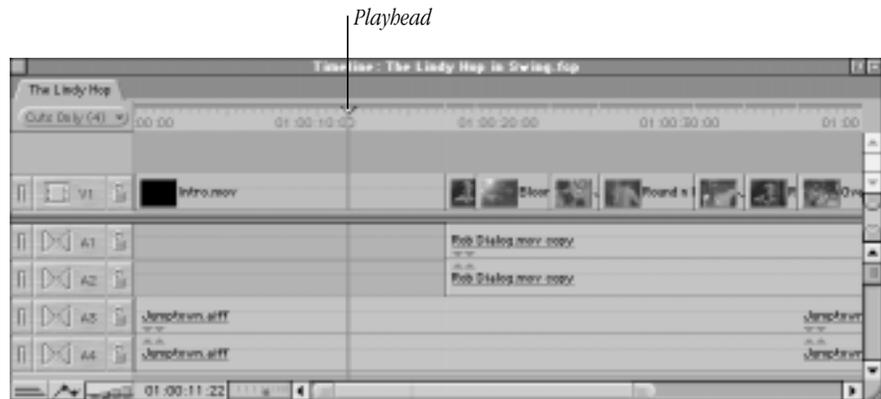
It’s a good idea to save your project with a new name to be sure that your work is saved in a separate file and to prevent inadvertent changes in the model project, “Swing.fcp.”

- 3 In the Browser, expand the Dance Shots folder, called a “bin,” to view its contents.
- 4 Double-click “The Lindy Hop” to open it.

The Canvas and Timeline windows open, with “The Lindy Hop” displayed.



The Canvas is analogous to a “record” monitor; it displays edited material. The Canvas has the same transport controls as the Viewer and the two windows work in a similar way.



The Timeline displays clips and sequences over time. Each open sequence is displayed on its own tab in the Timeline. You can customize the appearance and functions of the Timeline and perform editing tasks in this window.

- 5** Click in the Canvas to make it active.
- 6** Press the Home key to move the playhead to the beginning of the sequence.
- 7** Press the Space bar to play the sequence in the Canvas.

### **Creating a New Sequence**

Next, create a new sequence and open a clip to use in it.

- 1** Open the File menu and choose New, then choose Sequence from the submenu.  
The new sequence appears in the Browser as Sequence 2.
- 2** Double-click “Sequence 2” in the Browser to open it.

- 3 In the Canvas window, choose 100% from the zoom level pop-up menu at the top center of the window.



- 4 Double-click the clip named "Rob Dialog.mov" in the Browser to open it in the Viewer. The clip opens in the Viewer window.



When you open a clip in Final Cut Pro, it appears in the Viewer, which is analogous to your "source" monitor. The Viewer provides features for viewing and marking source clips; customizing transitions; and viewing and editing effects, filters, and special-effect clips called generators.

## Adding the Base Track for Your Sequence

The base track is the primary set of media—clips, audio, still images—for the sequence. Many times, the base track may be the only one used in a sequence; at other times, you may want to add other tracks to make multiple layers, creating a finished sequence that might show one clip playing inside another clip or a changing collage of still images playing over a clip.

This tutorial creates a sequence with multiple layers. The next several tasks create the primary layer—the base video and audio tracks for the sequence.

## Adding a Clip to Your Sequence

- 1 Click in the Viewer window to make it active (if necessary).
- 2 Play “Rob Dialog.mov” by pressing the Space bar or clicking the Play button. Press the Space bar or click the Play button again to stop play.



- 3 Add “Rob Dialog.mov” to the sequence by dragging it from the Viewer to the Canvas window. The Edit Overlay appears in the Canvas window, and the Overwrite section is highlighted when you drag the image into the window. (Overwrite is the default edit.)



When you release the mouse button, an image from “Rob Dialog.mov” appears in the Canvas, and the clip’s one video track and two audio tracks appear in the Timeline.

- 4 Click in the Canvas window to make it active (if necessary).
- 5 Press Home and then press the Space bar to play the new sequence.

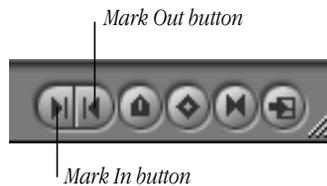
**Note:** Final Cut Pro provides several ways to add clips to a sequence. These include drag-and-drop (used in step 3 above); a source/record metaphor using the Viewer and the Canvas; an assembly timeline/film metaphor using the Viewer and the Timeline; and keyboard commands to execute specific types of edits. All these methods of moving clips are detailed in later chapters of the *Final Cut Pro User's Manual*. This flexibility makes Final Cut Pro easy to use and lets you choose the work flow that best suits your needs and work style.

### Identifying Part of a Clip for Use

In this sequence, you don't want to show Rob's "talking head" for the entire sequence, but you want to use all of his speaking in the clip. You can set In and Out points to mark the starting and ending points for a section of the clip and then substitute other video for Rob's image in that section, or even eliminate the section between In and Out points. (The clip itself is not changed by marking In and Out points.)

Next, you'll set In and Out points on one clip and then overwrite that section of the clip with part of another clip.

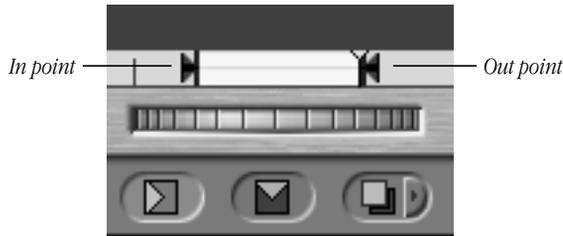
- 1 Click in the Canvas window to make it active.
- 2 Press Home to position the playhead at the beginning of the clip.
- 3 In the Canvas window, press the Space bar to begin playing the clip.
- 4 When you hear Rob say "the Lindy Hop," press the Space bar to stop the clip.
- 5 Click the Mark In button or press I to mark the In point. The current time in the upper-right corner of the Canvas should be approximately 1:00:01:23.



Don't worry if you didn't mark the point immediately after the phrase "the Lindy Hop." You can adjust the point later (in step 10, below).

- 6 Press Home to reposition the playhead at the beginning of the clip.
- 7 Press the Space bar to play the clip.
- 8 When you hear Rob say "constantly moving," press the Space bar to stop play.
- 9 Click the Mark Out button or press O to mark the Out point. The current time should be approximately 1:00:05:20.

- 10 In the Canvas, drag the indicators for the In and Out points in the ruler (just above the row of buttons) to match them to the desired timecodes.

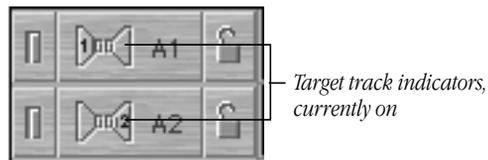


When you drag the In or Out point's indicator, the current time is displayed for that point. Get the points as close to 1:00:01:23 and 1:00:05:20 as you can.

### Targeting Audio Tracks

In an upcoming task, you will overwrite the part of “Rob Dialog.mov” that you marked with another video clip. But you want to hear Rob’s voice continuously as the original and overwritten sections of “Rob Dialog.mov” are playing. So you should protect Rob’s voice in this clip by turning off the audio targeting in “Rob Dialog.mov.”

- In the Timeline, click the audio targeting icon (a double speaker) for tracks A1 and A2 to turn off targeting.



When you click the side of the speaker containing a numeral, targeting is turned off and the numeral and color in the icon disappear. Clicking a speaker icon that contains no numeral turns targeting on for the track.

### Setting In and Out Points for Another Clip

In the next two tasks you will set an Out point for another clip and then perform an overwrite edit to replace the marked section of the original clip (“Rob Dialog.mov”). You’ll be using “three-point editing,” Final Cut Pro’s system for calculating the boundaries of an edit from the information it has. In this case, you mark the Out point for the new clip and the program calculates the In point for that clip, based on the In and Out points you set previously for “Rob Dialog.mov.”

For the new clip, “Bloomies.mov,” you’ll mark the Out point in the Viewer.

- 1 Double-click “Bloomies.mov” in the Browser to open it in the Viewer.
- 2 Press Home to position the playhead at the beginning of the clip.

- 3 Type +500 and press Return to go to the frame 5 seconds into the clip.

As you type, the number appears in the current time box at the upper-right corner of the Viewer.

- 4 Press O to set the Out point at the position you entered.

### Performing an Overwrite Edit

Now you'll replace the marked section of "Rob Dialog.mov" with the section you just marked in "Bloomies.mov" with an Overwrite edit.

- 1 Drag the "Bloomies.mov" clip from the Viewer to the Overwrite section of the Edit Overlay in the Canvas.
- 2 Select the Canvas window, press the Home key, and play the sequence.

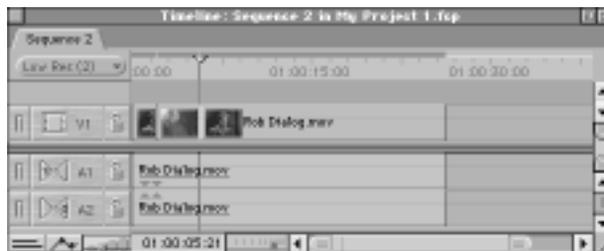
### Finishing the Rough Edit

Final Cut Pro allows you to add multiple clips in one step. For this tutorial task, you'll add two more clips to your sequence.

### Positioning the Playhead to Add More Clips

To make sure the added clips appear in the right place, use the Timeline to check or adjust the position of the playhead in the sequence. The Up and Down arrow keys move the playhead from one edit point to another; Up moves the playhead to the previous edit point, Down moves the playhead to the next edit point. In this sequence, the edit points are the points where the sequence begins and where each clip meets another clip.

- 1 Click in the Timeline window to make it active (if necessary).
- 2 Use the Up Arrow (backward movement) or Down Arrow (forward movement) to position the playhead at the end of "Bloomies.mov," the clip you just added to the sequence.



### Adding Multiple Clips at One Time

Now add the two additional clips to your sequence.

- 1 In the Browser, click the Name field so that the sort arrow at the right is pointing down. This sorts the contents of the Browser in alphabetical order by name.

- 2** Select the following clips: “Johnny n Cari.mov” and “Round n Round.mov.”  
Command-click to select separated items.
- 3** Drag the selected clips from the Browser to the Overwrite section of the Edit Overlay in the Canvas.
- 4** In the Canvas, position the playhead at the beginning and then play the sequence.  
Your sequence now begins and ends with Rob talking onscreen, and there are three different clips of dancers in between.

### **Adding One More Clip**

To provide a greater focus on the dancers at the end of the sequence, add one more clip at the end.

- 1** In the Canvas, type 01:00:20:00 and press Return.  
As you type, the numbers—a timecode—appear in the Current Timecode box at the upper-right corner of the window. When you press Return, the playhead moves to the position corresponding to the timecode you typed.
- 2** Select the clip “Overhead.mov” in the Browser and drag it to the Overwrite section of the Edit Overlay in the Canvas.  
The clip covers the last portion of “Rob Dialog.mov.”
- 3** Press Home to position the playhead at the beginning of the sequence.
- 4** Press the Space bar to play the sequence.
- 5** Choose Save Project from the File menu to save your work.

### **Advanced Editing Techniques**

Final Cut Pro includes advanced editing features such as moving In and Out points (slip and slide techniques), trimming in the Trim Edit window and in the Timeline with the Ripple and Roll tools, and Match-Frame editing. The program is designed to let you refine edits quickly, so that you can focus on the timing and rhythm of your work.

#### **Slipping**

Use slip editing when you want to simultaneously change the In and Out points of a placed edit (one already in the sequence) without changing the duration of the edit or its location in the final program. For example, you can use a slip edit to indicate a different part of a clip if you have unwanted content in the section currently in use.

In the “Bloomies.mov” clip that you’ve included in your sequence, you discover that the dancers do not catch hands for a moment when they both turn at one point. You want to eliminate that small error but not change the clip’s duration or its location in the sequence.

To make a slip edit that avoids the dancers' missed hands:

- 1 In the Timeline, use the Up or Down Arrow to position the playhead at the beginning of "Bloomies.mov" (the second clip in the sequence).
- 2 Press the Space bar to play the clip.

Notice that the dancers are not clasping hands as they swing around at the very beginning of the clip. (You can see the man's empty hands as he faces the camera while turning.) They clasp hands again—right hand to right hand—at approximately 1:00:02:20.

If you have trouble seeing the missed hand clasp, use the Shuttle control in the Canvas to move slowly through the clip, or move frame by frame using the Right and Left arrow keys.



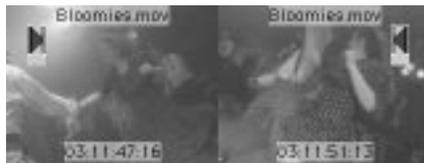
- 3 Click the Slip tool in the Tool palette to select it.



- 4 Choose Snapping from the View menu to turn snapping off. (No checkmark should appear next to Snapping.)

With snapping off, the playhead won't snap to the nearest edit point, so small movements are easier to make.

- 5 In the Timeline, press and hold down the mouse button on "Bloomies.mov" with the Slip tool. The Canvas window displays the head (left) and tail (right) images from the clip, with their times in that clip.



- 6 Using the images as a reference, slip the edit past the point of the mistake by dragging to the left. The mistake will be fixed when the dancers' hands meet in the left (head) reference image. Release the mouse button when you have finished the slip operation.

Pressing the Command key as you drag provides more precise control.

You can check your edit with the numbers for the head and tail frames displayed in the Canvas when you hold down the mouse button with the Slip tool. The times in the head and tail reference windows should be approximately 03:11:47:16 and 03:11:51:13.

- 7 Press Home and then press the Space bar to play the sequence.
- 8 Choose Save Project from the File menu to save your work.

### Trimming an Edit

To make precise adjustments where two clips meet, you can trim one or both clips. Trimming fine-tunes the In or Out point of a clip within a sequence.

Final Cut Pro offers many ways to trim an edit. These include using the Trim Edit window, the Ripple and Roll tools, and keyboard commands.

In this task, you'll trim some frames from one clip to eliminate a moment in which the male dancer in the clip "Johnny n Cari.mov" looks upward, directly into the camera.

To trim an edit using a Trim tool:

- 1 Click the Zoom In tool in the Tool palette or press Z.

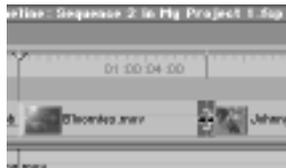


- 2 In the Timeline, double-click on "Bloomies.mov" to zoom in on that area of the sequence.

Zooming in makes the view of each clip longer in the Timeline, providing a better view of the clips and the points where they meet.

- 3 Click the Arrow tool in the Tool palette or press A.
- 4 In the Timeline, click once on the edge between the second and third clips ("Bloomies.mov" and "Johnny n Cari.mov") to select the edit. The pointer changes to indicate that it is over an edit point.

Be careful not to double-click, because this will open the Trim Edit window.



- 5 Click the Roll tool in the Tool palette (or press R). (The Roll tool affects both clips; the Ripple tool adjusts only one side of the edit.)



- 6 In the Timeline, press and hold down the mouse button on the selected edit and drag the Roll tool to the right.

The edit is represented in the Canvas as a small window for each clip that displays the frame points and adjustments.

- 7 Trim the edit by dragging to the right until the male dancer's eye contact with the camera is edited out of "Johnny n Cari" in the right window (about five frames).
- 8 Press A to select the Arrow tool in the Tool palette.

**Note:** You can also trim an edit by double-clicking a clip in the Timeline to open it in the Viewer, then dragging the In and Out point indicators in the Viewer to adjust those points. In this method of trimming, you don't see the changes in the adjoining clip, as you do when using the Roll tool in the Timeline.

### Match-Frame Editing

Final Cut Pro provides powerful tools to perform sync-point editing—edits in which you need a visual to match an audio cue. Audio cues can easily be marked using Final Cut Pro's markers.

When a clip is already in a sequence, the Match Frame button cues the original version of the clip in the Viewer with the playhead. Then you can use the Replace edit mode to select the video frame that will synchronize to the playhead in the sequence.

In your sequence, you'll mark frames and use the Match Frame command to align the voiceover at the point where Rob says "stops" with a frame in the sequence where a dancer actually stops.

To create a Match-Frame edit that matches a dancer's movement to a specific phrase in Rob's narration:

- 1 Select the Zoom Out tool from the Tool palette.

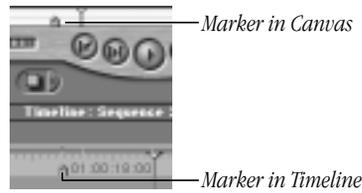


To locate the tool, press on the Zoom In tool.

- 2 Click once in the Timeline to zoom out.
- 3 Press A to select the Arrow tool.
- 4 Press Home to go to the beginning of the sequence.
- 5 Play through the sequence until Rob says "there's a lot of stops" (approximately 13 seconds in).

Notice the male dancer jumps to a stop at a different point from where Rob says "stops."

- 6 Play the sequence again and press M to place a marker where Rob says “stops.”  
A green marker appears in the Timeline at the point you marked and a yellow marker appears in the Canvas.



**Note:** When the sequence is not playing, you can jump to the next marker (moving forward) by pressing Shift-M or to the previous marker (moving backward) by pressing Option-M.

- 7 Position the playhead on the marker you just added (by pressing Shift-M or Option-M).
- 8 Choose Markers from the Mark menu, then choose Edit from the submenu.
- 9 Name the marker “Stops,” add the comment “he says stops,” and click OK.
- 10 Click the Match Frame button in the Canvas.



The Match Frame button opens a copy of the marked clip in the Viewer and cues it to the frame displayed in the Canvas window.

- 11 If the image in the Viewer appears jagged, make sure the zoom level is set to 100% (using the pop-up menu above the image).
- 12 In the Viewer, use the Jog control to locate the frame where the dancer lands from his jump.  
The timecode in the Viewer is approximately 00:00:07;00 when the dancer lands.



- 13 Drag the clip from the Viewer to the Replace section of the Edit Overlay in the Canvas.



Notice that the image in the Canvas now matches the Viewer. Replacing the clip with the playhead at the marker (after using the Match Frame button) aligns the frame showing in the Viewer with the marker in the Timeline.

- 14 Select the Canvas window, press the Up Arrow to go back one or two edits, and press the Space bar to play the completed edit.

### Applying and Editing a Dissolve Transition

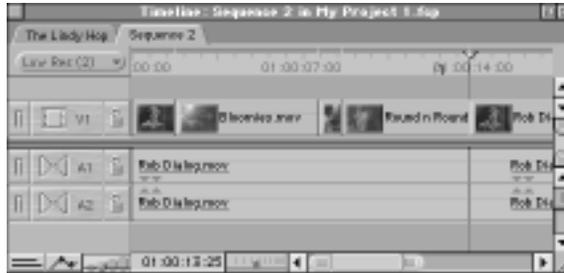
You can make the transition between clips less abrupt—and more interesting—by adding a transition, one type of special effect provided in Final Cut Pro. You can see a list of the video and audio transitions in the Effects tab of the Browser.

Transitions can be applied automatically using either of the “Edit with Transition” buttons in the Canvas. You can edit transitions in the Timeline.

### Adding a Transition Along With a Clip

In the next task, you'll add a transition at the same time you add a new clip to the sequence.

- 1 In the Browser, double-click the clip “Jeremy Solo.mov” to open it in the Viewer.
- 2 In the Timeline, position the playhead at the end of “Round n Round.mov.”



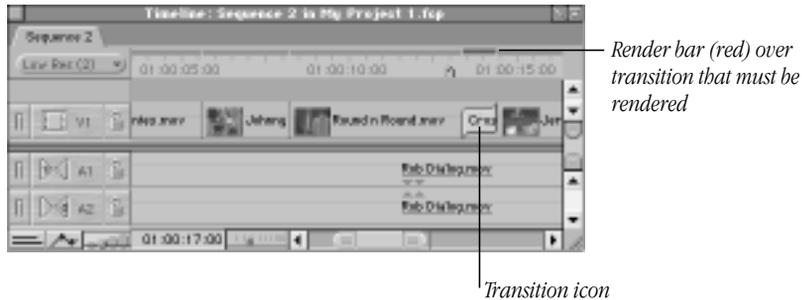
You may want to turn Snapping on to help position the playhead. If so, press N.

- 3 Drag the clip “Jeremy solo.mov” from the Viewer to the “Overwrite with Transition” section of the Edit Overlay in the Canvas.



The icon for a transition appears in the Timeline between the clips “Round n Round.mov” and “Jeremy Solo.mov.”

**Note:** This edit uses the default transition, in this case, a cross dissolve. If you position the playhead over the transition in the Timeline, you can see the effect in the Canvas.

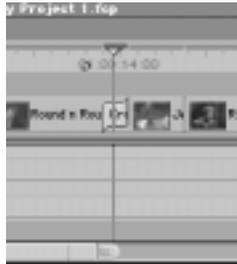


The render bar over the transition is red, indicating that this part of the sequence must be rendered before you can play the transition.

### Replacing the Transition

Now you can replace the current transition with one of the other video transition effects available in Final Cut Pro.

- 1 In the Timeline window, drag the playhead to position it anywhere in the transition.



- 2 Choose Video Transitions from the Effects menu, choose Wipe from the submenu, and then choose Center Wipe from the second submenu.

- 3 Position the playhead over the transition to see the change.



- 4 Choose Save Project from the File menu to save your work.

#### **Editing the Transition**

Once you've replaced the transition, you can edit it by changing its length and type.

To edit the transition in the Timeline:

- 1 Click the transition to select it in the Timeline.
- 2 Control-click on the transition to open the shortcut pop-up menu, and then choose Duration.



- 3 Type “.25” in the Duration dialog box and click OK to change the duration of the transition to 25 frames.

You can also edit a transition in the Viewer by double-clicking it in the Timeline.

#### **Rendering the Transition**

To play the transition in the sequence, you need to render it.

- 1 In the Timeline, click the transition to select it (if necessary).
- 2 Choose Render Quality from the Sequence menu, then choose Hi Res from the submenu.
- 3 Choose Render Selection from the Sequence menu.

A status bar shows the progress of rendering.

- 4 Position the playhead to the left of the transition and play through the transition.

### Performing an Insert Edit

To perform an Insert edit in the Timeline:

- 1 In the Timeline, press Home to move the playhead to the beginning of the sequence.
- 2 In the Browser, drag the clip named “Intro.mov” to the Insert section of the Edit Overlay in the Canvas.

The clip is inserted at the location of the playhead (the beginning of the sequence). All the items to the right of the playhead are moved further to the right—and further out in time.

- 3 In the Timeline, press Home to move to the new starting point for the sequence and press the Space bar to play the title section.
- 4 Choose Save Project from the File menu to save your work.

Now you’re ready to add sound to the sequence’s new opening.

### Audio Editing

Final Cut Pro can use up to 99 tracks of audio, which you can edit and adjust without leaving the application. A minimum of eight tracks can be manipulated and mixed in real time, and some computer models permit working with 24 or more audio tracks in real time.

The program includes audio pitch shifting, which mimics how audio sounds when played at a variety of speeds using analog tape. In addition, Final Cut Pro displays separate waveforms for left and right audio tracks, and offers independent fade controls, panning controls, and a variety of audio filters.

### Adding an Audio Introduction

You can give this Swing Dance sequence a lively introduction by adding a music file. Then you’ll adjust the music’s volume so that it fades to the background when Rob begins speaking.

- 1 In the Browser, double-click “Jumptown.aiff” to open it into the Viewer.

Notice that when you open an audio file, audio controls become available in the Viewer.



*Shuttle control*

- 2** Using the Shuttle control, move the shuttle button to various locations.  
You should hear the audio playing at different speeds. This is pitch-shifting at various levels depending on the speed.
- 3** Press the Tab key to select the duration (in the upper-left corner of the Viewer), type “43.” (the number 43 and a period), and press Return.  
Entering the new duration sets an Out point for the audio clip at 43 seconds past the In point.
- 4** Click in the Timeline window to make it active.
- 5** Choose Insert Tracks from the Sequence menu.
- 6** In the dialog box, type 2 in the Insert Audio Tracks box, then click OK.
- 7** In the Timeline, click the target track indicator (a dual speaker icon) for tracks A3 and A4 to make them the target tracks.

Click the left side of the dual speaker icon in audio track A3; then click the right side of the dual speaker icon in audio track A4.



*Target track indicators, currently on*

The numeral 1 appears in the left part of the target indicator in A3 and the numeral 2 appears in the right part of the indicator in A4.

- 8 Select the Timeline window (if necessary) and press Home to put the playhead at the start of the sequence.
- 9 Using the Drag Hand (the hand icon) in the upper-right corner of the Viewer, drag the audio clip to the Overwrite section of the Edit Overlay in the Canvas.



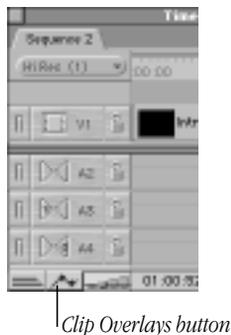
- 10 Select the Timeline window and press Home to put the playhead at the start of the sequence.
- 11 Play the sequence.

Notice that the volume of the music is too loud when Rob starts talking and needs to be adjusted.

### Adjusting the Volume Over Time

To change the music's volume to hear the voiceover:

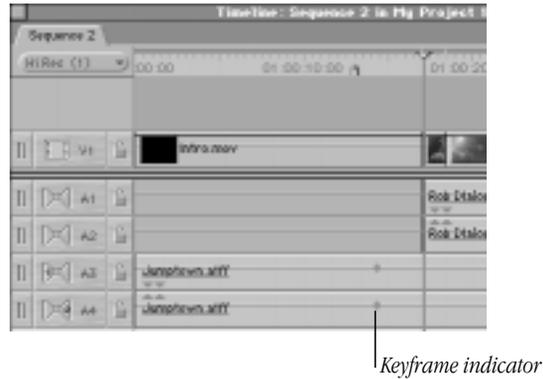
- 1 In the Timeline, find the point where the interview footage starts and move the playhead to that location.
- 2 Click the Clip Overlays button at the lower-left area of the Timeline to display audio volume levels.



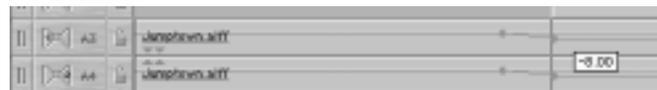
Notice that a thin line, the volume level indicator, appears over the audio tracks.

- 3 Press Option and click the volume level line of "Jumptown.aiff" to set a keyframe about 2 seconds before the "Rob Dialog.mov" audio clip begins (at approximately 15 seconds).

A small diamond appears at the keyframe location.



- 4 Move about 2 seconds further to where the “Rob Dialog.mov” audio clip actually begins and set another keyframe (at approximately 17 seconds).
- 5 Drag the second keyframe’s indicator (the diamond at 17 seconds) down to adjust the volume level to about  $-8$ .



If you can’t set an exact value, choose a number between  $-8$  and  $-10$  if possible. (Holding down the Command key while dragging allows for more precise control.)

- 6 Play back the sequence with the audio mixed in real time.
- 7 Choose Save Project from the File menu to save your work.

You’re now finished with the current project. The concluding section of the tutorial uses a different project.

## Compositing and Special Effects

Compositing is the process of combining multiple layers of video, usually along with special effects such as animation, painting, or retouching images, and a variety of digital alterations using filters.

In this section you will use the introduction piece for the Swing Dance video to explore Final Cut Pro’s special effects and compositing features. The tasks include compositing a background, animating multilayered elements, and applying filter effects to add elements to a composition.

You use a different project, named “Compositing,” for the tutorial’s compositing and special effects.

### **Opening and Saving a New Project**

Next, you’ll open the new project for this part of the tutorial.

To open the files for compositing:

- 1** Choose Open from the File menu, select the project “Compositing.fcp” in the Projects folder, and click Open.
- 2** Choose Save Project As from the File menu, type “My Project 2.fcp,” and click Save.

### **Previewing the Introduction’s Titles**

Next, you’ll open the sequence for this part of the tutorial and preview it.

- 1** Double-click “Intro.mov” in the Browser to open it in the Viewer.
- 2** Press Home to reposition the playhead at the beginning of the sequence.
- 3** Press the Space bar to play the clip.

This is the title portion of the introductory sequence you’ll create.

### **Building the Background**

The background for the introduction is a still image of velvet that you’ll animate by changing its size, or scaling it.

#### **Adding the Background Image to the Sequence**

The first task in preparing the background is to add it to your sequence.

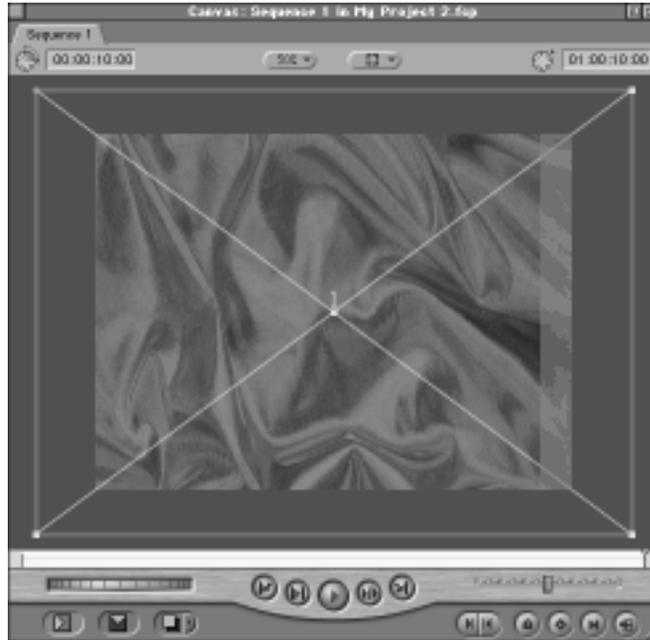
- 1** Double-click Sequence 1 in the Browser to open it.  
The sequence opens in the Canvas and Timeline. No clips are in the sequence yet.
- 2** Double-click “Velvet Background.pict” in the Browser to open it in the Viewer.
- 3** Drag “Velvet Background.pict” from the Viewer to the Canvas.

#### **Scaling the Background Over Time**

Next, you’ll change the size of the background image over time.

- 1** Click the Canvas window to make it active.
- 2** Open the View menu and choose Image + Wireframe to change the display mode for the background image.
- 3** Click the image in the Canvas.

A frame with diagonal crosshairs appears on top of the image. You use this wireframe to scale the image or change its position.



- 4 Press Home to position the playhead at the beginning of the clip.
- 5 In the Canvas, click the Add Keyframe button.

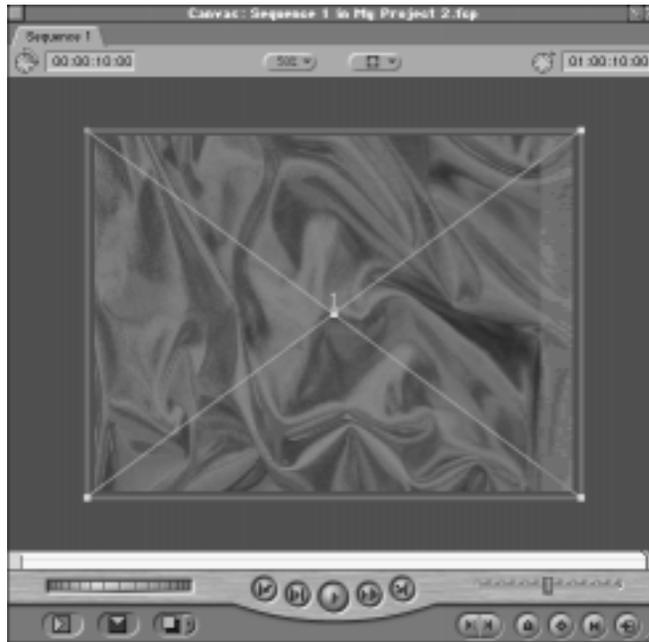


*Add Keyframe button*

The crosshairs in the wireframe turn green when you add a keyframe.

- 6 Press the End key or press Shift-Home to move the playhead to the end of the clip.

- 7 In the Canvas, place the pointer at one corner of the wireframe and drag toward the center until the frame's outline is just outside the edges of the viewable area.



- 8 In the Canvas, drag the playhead through the Scrubber. The wireframe indicates the change in image size between the beginning and end of the 17-second clip.



### Putting Dancers on the Background

Next, you'll add a pair of dancers to the velvet background, add a filter, and add motion.

- 1 In the Canvas, press Home to position the playhead at the beginning of the sequence.
- 2 Type 1:00 to move the playhead 1 second into the sequence.
- 3 Drag "Blue Dance.mov" from the Browser to the Superimpose section of the Edit Overlay in the Canvas.

“Blue Dance.mov” appears on track V2 in the Timeline.



### Adding a Filter to the Clip

Next, you'll add a filter to the dancers.

- 1 Select “Blue Dance.mov” in the Timeline.
- 2 Open the Effects menu and choose Video Filters, then choose Key from the submenu and Blue and Green Screen from the second submenu.

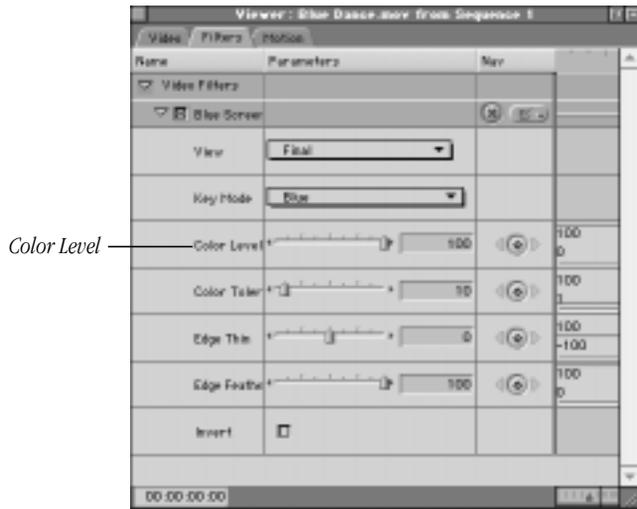
You can use a blue and green screen key to isolate a subject that was shot against a specially lit blue or green background.

### Editing the Filter

Once you've applied a filter, you can change its parameters.

- 1 Double-click “Blue Dance.mov” in the Timeline to open it in the Viewer.
- 2 If the image in the Viewer appears jagged, make sure the zoom level is set to 100% (using the pop-up menu above the image).
- 3 Click the Filters tab.

- 4 Select the Color Level text box, type 40 in it, and press Return.



### Adding Another Filter

Next, you'll add a second filter to the dancers.

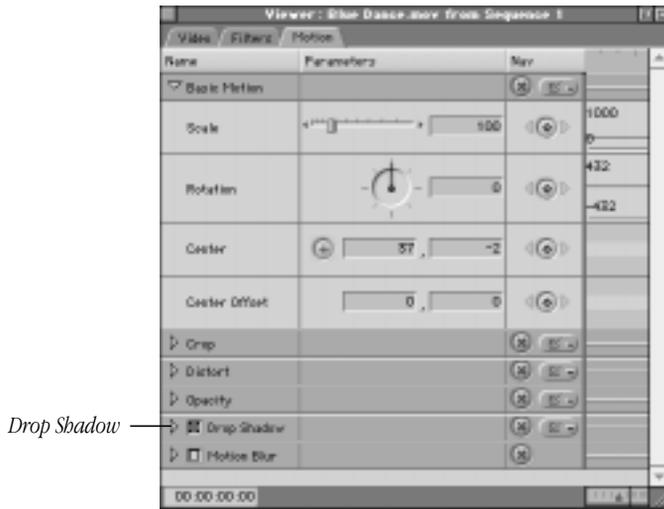
- 1 Open the Effects menu, choose Video Filters, then choose Image Control from the submenu and Desaturate from the second submenu.
- 2 Choose Save Project from the File menu to save your work.

### Adding Motion and a Drop Shadow

To ensure that the titles and dancers are visible in the final sequence, you'll reposition the dancers. Then you'll give them more definition by adding a drop shadow.

- 1 In the Canvas, drag the wireframe to the right until the dancers are just slightly to the right of center.
- 2 In the Viewer, click the Motion tab.

- 3 Click the Drop Shadow checkbox to put an X in it.



### Doubling the Dancers

The introduction uses two images of dancers in slightly different positions on the screen. In this task, you'll copy them and reposition the second image.

- 1 In the Timeline, select "Blue Dance.mov" (if necessary).
- 2 Open the Edit menu and choose Copy.
- 3 Create a new video track (V3) by Control-clicking in the gray area above track V2 and choosing Add Track.
- 4 In the Timeline, click the filmstrip icon in track V3 to make it the target track.



- 5 Position the playhead at the beginning of "Blue Dance.mov" (if necessary).
- 6 Choose Paste from the Edit menu.

A copy of "Blue Dance.mov" appears on track V3 in the Timeline.

### Stretching the Dancers

Next, you'll stretch one of the images of dancers and reposition it.

- 1 In the Timeline, position the playhead over the “Blue Dance.mov” clips.
- 2 Select “Blue Dance.mov” on track V2.
- 3 In the Canvas, press the Shift key and drag upward from a top corner of the wireframe to stretch the image of the dancers.

Elongate the image so that the dancers' heads are just below the edge of the image area.



- 4 Drag the dancers to the right a short distance to offset them from the second image.



### Changing the Opacity of an Image

Next, change the opacity of the pair of dancers you stretched to add yet another effect in the introduction.

- 1 In the Timeline, click the Clip Overlays button at the lower-left side of the window.



Clip Overlays button

- 2 Select “Blue Dance. mov” on track V2 (if necessary).
- 3 Drag the overlay (a white line) on track V2 downward to a value of approximately 40.  
As you drag, numerical values appear next to the overlay. (Press the Command key as you drag to make more precise adjustments.)
- 4 Choose Save Project from the File menu to save your work.



Overlay and numeric value

### Adding Circles Around the Dancers

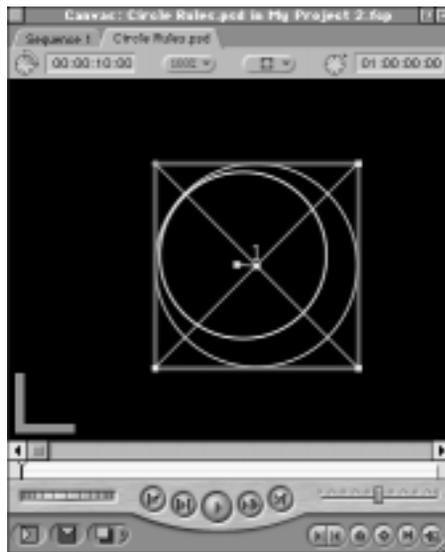
In this task you'll work with two circles that move with the dancers.

- 1 Double-click “Circle Rules.psd” in the Browser.  
This file is an Adobe™ Photoshop file, which opens as a new sequence with video tracks for “circle 1” (V1) and “circle 2” (V2).
- 2 In the Timeline, select “circle 1.”
- 3 Choose Image + Wireframe from the View menu (if necessary).

- 4 In the Tool palette, press the Crop tool, then select the Distort tool from the pop-up menu.



- 5 Click the center point of the wireframe and drag to the left about one-fourth of an inch.



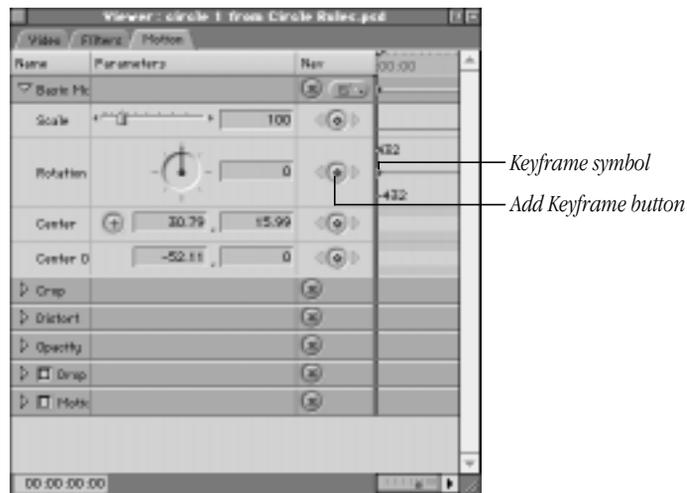
This movement offsets the point around which the circle rotates.

## Changing a Circle's Rotation Over Time

Next, add rotation to the circle.

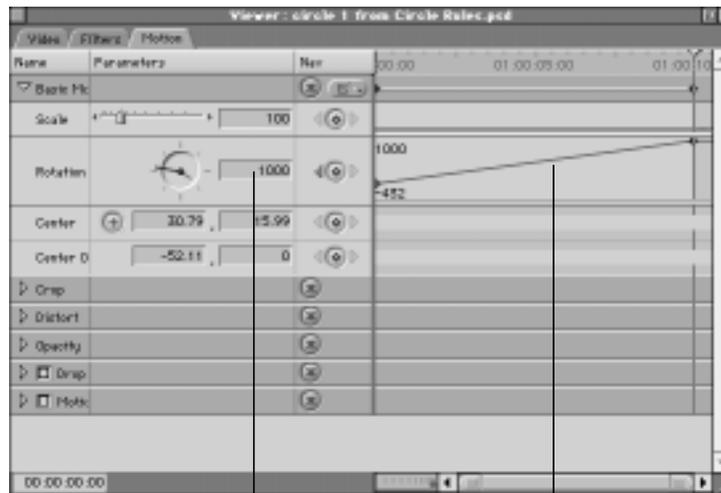
- 1 Press the Home key to position the playhead at the beginning of the sequence.
- 2 In the Timeline, double-click “circle 1” to open it in the Viewer.  
One circle appears in the Viewer, against a checkerboard background.
- 3 In the Viewer, click the Motion tab.
- 4 Click the Add Keyframe button for Rotation to add a motion keyframe at the beginning of the clip.

A diamond-shaped keyframe symbol appears at the left edge of the graph area in the Viewer. (You may want to enlarge the Viewer's window to see the entire graph area.)



- 5 Press Shift-O to move the playhead to the end of the clip.
- 6 Click in the Rotation text box, type 1000, and press Return to set a new value for rotation.

The program adds a motion keyframe at the end of the clip and displays a graph of the rotation values at the right side of the Viewer window.



*Rotation text box*

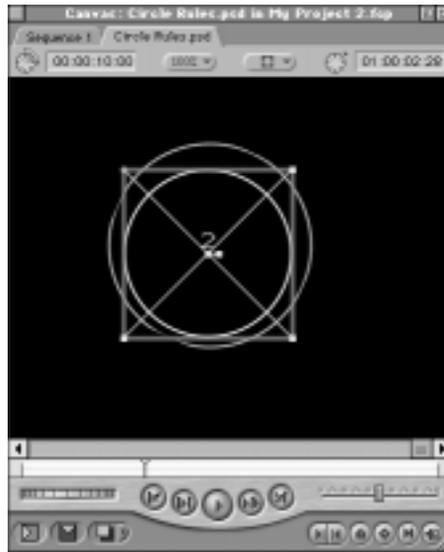
*Rotation graph*

### **Rotating the Second Circle**

Next, you'll rotate the other circle around a different center point.

- 1** In the Timeline, select "circle 2."
- 2** Select the Distort tool from the Tool palette.

- 3 In the Canvas, click the center of the wireframe and drag to the right about one-eighth of an inch.



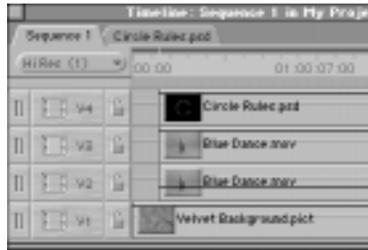
- 4 In the Timeline, double-click "circle 2" to open it in the Viewer.
- 5 Click the Motion tab.
- 6 Press the Home key to position the playhead at the beginning of the clip.
- 7 Click the Add Keyframe button for Rotation.
- 8 Press Shift-O to position the playhead at the end of the clip.
- 9 Click in the Rotation text box, type "500," and press Return.

#### **Adding the Circles to the Sequence**

Next, you'll add the circles to the sequence with the dancers.

- 1 In the Timeline, select the Sequence 1 tab.
- 2 Choose Snapping from the View menu to turn it on.  
A checkmark appears next to Snapping to indicate that it is turned on.
- 3 Drag "Circle Rules.psd" from the Browser to the blank area above video track V3 in the Timeline, aligning it with the beginning of "Blue Dance.mov."

A track (V4) is added automatically and “Circle Rules.psd” appears on it in the Timeline.



- 4 Select “Circle Rules.psd” in the Timeline.
- 5 Select the Arrow tool in the Tool palette.
- 6 In the Canvas, drag the wireframe to place the circles around the dancers.



If you don't see the wireframe, choose Image+Wireframe from the View menu.

### **Adding Titles for the Introduction**

To finish the introduction, you'll animate several titles.

- Double-click “Dance Names.psd” in the Browser.  
Because it's an Adobe Photoshop file, “Dance Names.psd” opens as a new sequence in the Timeline.

## Animating One Title

First, you'll add motion to one of the titles.

- 1 Select the “Dance Names.psd” tab in the Timeline.
- 2 Press the Home key to position the playhead at the beginning of the sequence.



- 3 Open the View menu and choose Image + Wireframe.
- 4 In the Canvas, drag the BOOGIE WOOGIE image to the lower-left corner of the screen.



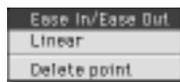
- 5 In the Timeline, double-click “BOOGIE WOOGIE” to open it in the Viewer.
- 6 Click the Motion tab in the Viewer.
- 7 Click in the Scale text box, type 0 (zero), and press Return.
- 8 Click the Add Keyframe button for Scale.

- 9 Click the Add Keyframe button for Center.
- 10 Click the arrow to expand the Opacity section, then click the Add Keyframe button for Opacity.
- 11 Press Shift-O to position the playhead at the end of the clip.
- 12 Press the Left arrow once to move the playhead back one frame.
- 13 Click in the Scale text box, type 150, and press Return.
- 14 In the Canvas, drag the wireframe and title image to the middle of the screen.  
If you don't see the wireframe, choose Image + Wireframe from the View menu.



A motion path appears to show the movement of the image.

- 15 Control-click at the beginning of the motion path (a green circle) and choose Ease In/Ease Out from the pop-up menu.



A tiny purple dot appears on the motion path.

- 16 Place the pointer on the purple dot and drag it up and to the left to create a curved motion path.

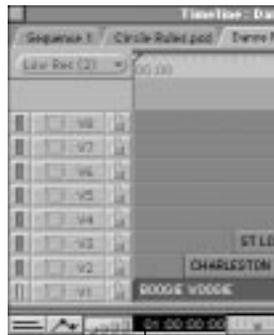


- 17 In the Canvas, scrub through the part of the sequence with “BOOGIE WOOGIE” to see the title’s motion.

#### **Fading a Title In and Out**

Next, you’ll change the title’s opacity so that it fades in and out as it moves across the screen.

- 1 In the Timeline, press Home to position the playhead at the beginning of the sequence.
- 2 Press the Tab key to select the Timecode box at the lower-left side of the Timeline window.

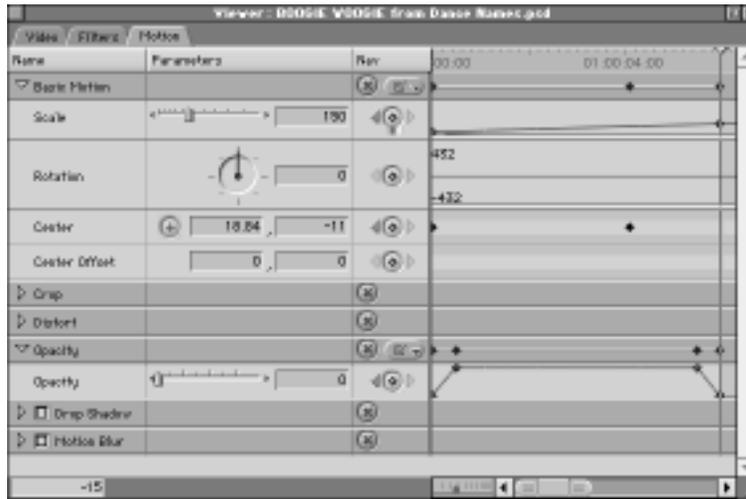


*Timecode*

- 3 Type +15 and press Return.  
The playhead moves forward 15 frames.
- 4 In the Timeline, double-click “BOOGIE WOOGIE” to open it in the Viewer.
- 5 Click the Motion tab.
- 6 Click the Add Keyframe button for Opacity.
- 7 In the Viewer, click the previous keyframe indicator in the opacity graph to move the playhead to it.
- 8 Click in the Opacity textbox, type 0 (zero), and press Return.

- 9 Press Shift-O to move the playhead to the end of the clip.
- 10 Click in the timecode field in the bottom-left corner of the Viewer.
- 11 Type -15 and press Return.
- 12 Click the Add Keyframe button for Opacity.
- 13 Press Shift-O to move the playhead to the end of the clip.
- 14 Click in the Opacity textbox, type 0 (zero), and press Return.

The opacity graph in the Viewer shows the fade in-fade out effect you created.

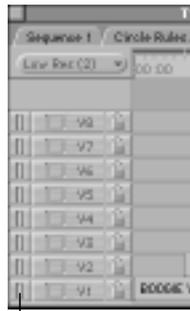


### Copying a Title's Attributes to Other Titles

In Final Cut Pro you can copy and paste attributes from one clip to another. In this task, you'll copy the motion and fade effects from "BOOGIE WOOGIE" to the other title images in the introduction.

- 1 In the Timeline, select "BOOGIE WOOGIE."
- 2 Open the Edit menu and choose Copy.

- 3 Option-click the visibility indicator for track V1 in the Timeline (the bright green bar at the left edge of the track) so that all tracks' indicators are turned on.



*Visibility indicator*

When visibility for other tracks is off, Option-clicking the visibility indicator of the visible track turns on visibility for all tracks.

- 4 In the Timeline, select the clips in tracks V2 to V6 above “BOOGIE WOOGIE.”  
Command-click clips individually or drag across the clips to select them.
- 5 Open the Edit menu and choose Paste Attributes.
- 6 Select Basic Motion and Opacity in the Paste Attributes dialog box, then click OK.
- 7 In the Canvas, drag the playhead through the Scrubber to see the titles in motion.

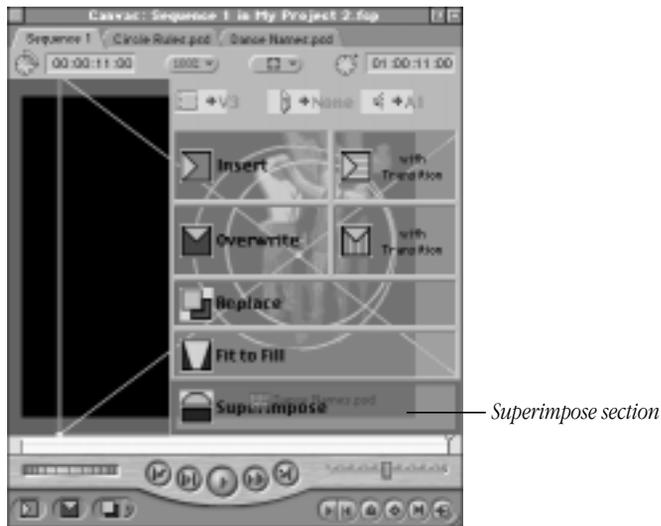
### **Adding the Titles to the Introductory Sequence**

The final task in preparing the introduction is to add the titles to the dancers and background.

- 1 In the Timeline, click the Sequence 1 tab.
- 2 Click the target indicator (filmstrip) in video track V1 to make it the target track.
- 3 Position the playhead over the clip on track V1 (if necessary).
- 4 Open the Mark menu and choose Mark Clip.

This sets In and Out points at the boundaries of the clip on track V1.

- 5 Drag “Dance Names.psd” from the Browser to the Superimpose section of the Edit Overlay in the Canvas.



## Rendering the Sequence

Now it's time to render the introductory sequence so you can play it with all the new effects. The Timeline indicates which sections of the sequence need to be rendered by displaying a red bar above the Ruler.

Depending on the computer you're using and size of the media files, rendering can take a few minutes or longer. Rendering time for this sequence is approximately 10 minutes.

To render and play the sequence:

- 1 Choose Render All from the Sequence menu.  
A status bar reports the progress of rendering.
- 2 When rendering is complete, press the Space bar to play the sequence.

## Finishing a Project

When you've completed the editing for your project, you have several options for saving your work in the format that's best suited to the way you'll use it. The formats available in Final Cut Pro include printing or editing on videotape; saving as a QuickTime movie, a digital video stream, a still image, or a series of still images; and saving as an audio file.

## Printing to Video

Use the Print to Video command to print a sequence or clip to video tape. You can use the Print to Video command without device control. If you have device control, the Edit to Tape command (in the Tools menu) lets you perform insert and assemble edits to tape.

**Note:** You must have a videotape recorder (VCR) connected to your computer and operating before you can actually print a sequence on videotape. You can follow the steps in this procedure without having a VCR connected, however.

To print a sequence on videotape:

- 1 Click the tab for “My Project 1.fcp” in the Browser.
- 2 Double-click “Sequence 2” in the Browser to open it.
- 3 Select the Sequence 2 tab in the Timeline.
- 4 Choose Print to Video from the File menu.
- 5 In the dialog box, specify the Print to Video options and click OK.

(For this tutorial, use the default settings. For more information on Print to Video, see Chapter 14, “Creating Final Output,” on page 249.)

- 6 The sequence is rendered if necessary and a message appears, prompting you to start recording on your VCR.
- 7 Start recording and press OK.

## Exporting a Sequence for Multimedia or the Web

Final Cut Pro offers several ways to export your work. You can create a QuickTime movie, a format that is widely used and has relatively small files. Or you can export an Edit Decision List (EDL), a record of all the files, edits, effects, and other essential details of the project in text format. An EDL is especially useful for projects in which several people are working with the media.

For this task, you’ll export a sequence as a QuickTime movie. These files are quite popular for delivering video on Web sites and in multimedia presentations.

To export a sequence as a QuickTime movie:

- 1 Select the Sequence 2 tab in the Timeline.
- 2 Choose Export from the File menu, then choose Movie from the submenu.
- 3 In the dialog box, specify the options for the exported file, type a name for it, and click Save.

(For this tutorial, use the default settings. Or experiment with changing options if you prefer, and view the changes when you replay the video.)

## **Moving Forward With a New Project**

Before you start working on your own project, complete the following steps to close the tutorial and create a new project with sequence presets appropriate for the format you will be working in.

- 1** Close the Browser window and save your project if necessary.
- 2** Open the Edit menu and choose Preferences.
- 3** Click the Sequence Presets tab and select the particular format (such as DV or Targa) you will be working in, then click the Set Default button and click OK.
- 4** Open the File menu and choose New Project.

# Understanding Final Cut Pro

## The Working Environment

You use four windows for most tasks in Final Cut Pro. You also use the Tool palette to make selections, navigate, and perform edits in the Timeline and Canvas.

## The Viewer

The Viewer is analogous to a source monitor. You use it to watch individual clips, mark edit points, and apply effects. You can also load clips from the current sequence into the Viewer to refine details such as edits, effects, and audio volume. For more information on the Viewer, see Chapter 7, “Working With Clips and the Viewer,” on page 143.



Viewer

## The Canvas

The Canvas window is analogous to a record monitor and looks like the Viewer. It displays the composited results of the edited sequence as you are creating it. You also use the Canvas to edit clips in relation to one another in the sequence. For more information on the Canvas, see Chapter 9, “Working in the Timeline and Canvas,” on page 177.



Canvas

## The Timeline

The Timeline displays a chronological view of a sequence. As you drag the playhead along the Timeline ruler, the current frame of the sequence is updated in the Canvas window and vice versa. Video tracks are displayed in descending order. Track V1 is the base layer. Clips placed on track V2 are composited onto the clips in track V1, and so on. For more information on the Timeline, see Chapter 9, “Working in the Timeline and Canvas,” on page 177.





## The Tool Palette

The Tool palette contains tools for selecting and manipulating items in the Timeline and Canvas. These tools are explained in more detail later in the manual.



The Tool palette contains the following tools:

Tool Name	Icon	Function
Arrow <sup>1</sup>		Selects individual items
Edit Selection		Selects an edit point
Group Selection		Selects multiple contiguous items
Range Selection		Selects a range across multiple contiguous items
Select Track Forward		Selects all the contents of the track after the selection point
Select Track Backward		Selects all the contents of the track before the selection point
Track Selection		Selects the entire contents of a single track

Tool Name	Icon	Function
Select All Tracks Forward		Selects the contents of all tracks after the selection point
Select All Tracks Backward		Selects the contents of all tracks before the selection point
Roll		Rolls edit points
Ripple		Ripples edit points
Slip		Slips a clip's In or Out point
Slide		Slides a clip in a sequence and creates an edit point
Razor Blade		Cuts a single clip into two sections
Razor Blade All		Cuts clips on all tracks at the selection point into two clips
Zoom In		Zooms in on an image, or in the Timeline
Zoom Out		Zooms out from an image, or in the Timeline
Hand		Moves the Timeline or image view from side to side. This can be used to move around a zoomed-in view of a video image.
Crop		Crops a selection
Distort		Distorts a selection by click-dragging corner points
Pen		Adds a keyframe

Tool Name	Icon	Function
Pen Delete		Deletes a keyframe
Pen Smooth		Smooths a curve by adding bezier handles to the selected keyframe

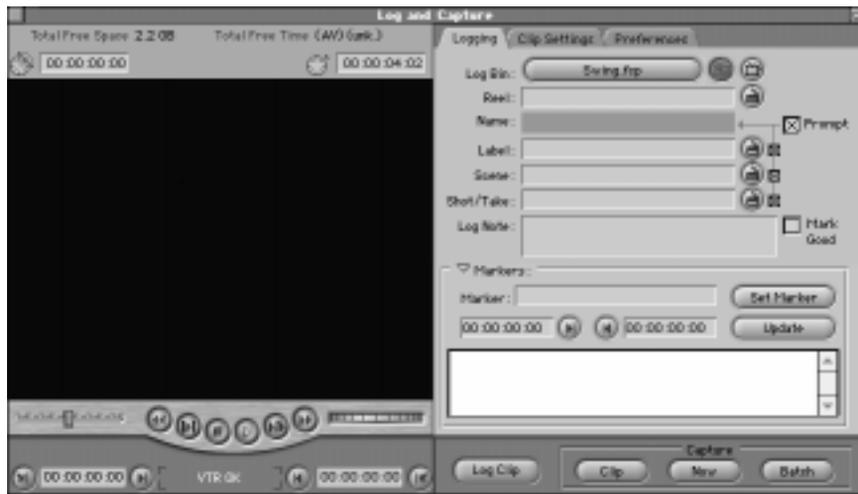
<sup>1</sup> This arrow may sometimes function as a custom “wait” cursor during render processes. It will be hollow and gradually fill with black as rendering takes place.

## Other Windows You Will Use

Although you do most of your work in Final Cut Pro’s four main windows, you also occasionally use several other windows to perform other important tasks.

### Log and Capture

To collect your source material together and store it on disk, you use the Log and Capture window. Log and Capture functions are explained in detail in Chapter 5, “Getting Media Into Final Cut Pro,” on page 113.



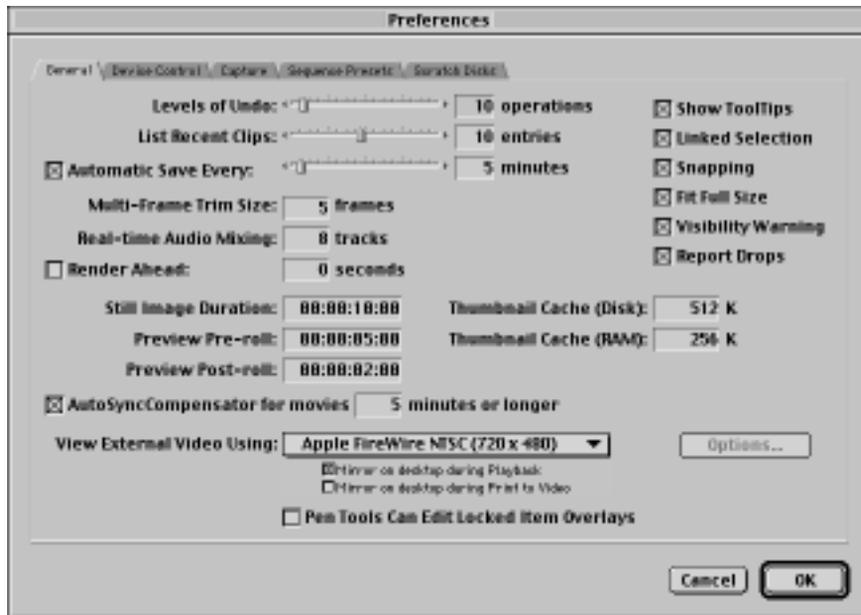
## Edit to Tape

Some projects involve editing directly onto videotape. You do this using the Edit to Tape window, available in the Tools menu. For details on the Edit to Tape window, see “Editing to Tape,” on page 251.



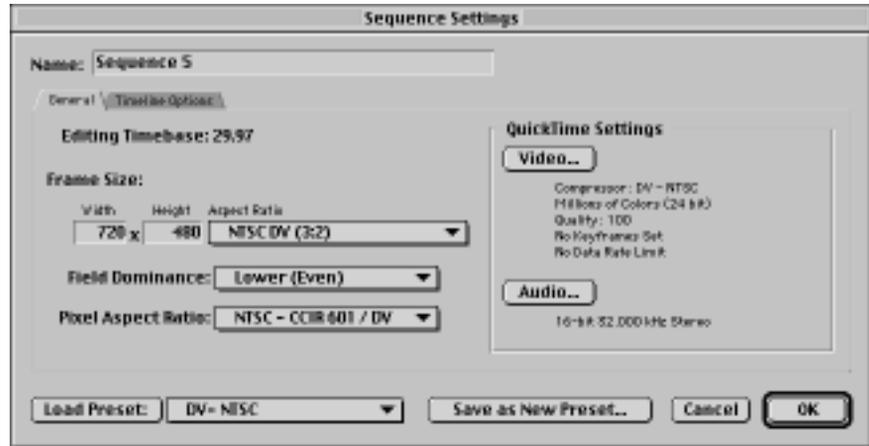
## Preferences

When you need to change various options and settings in Final Cut Pro, use Preferences, available in the Edit menu. Preferences are explained in detail in Chapter 4, “Preferences and Presets,” on page 95.



## Sequence Settings

You can modify the group of settings specific to an individual sequence by choosing Sequence Settings from the Sequence menu. For more information on Sequence Settings, see, “Creating, Editing, and Deleting Presets,” on page 107.



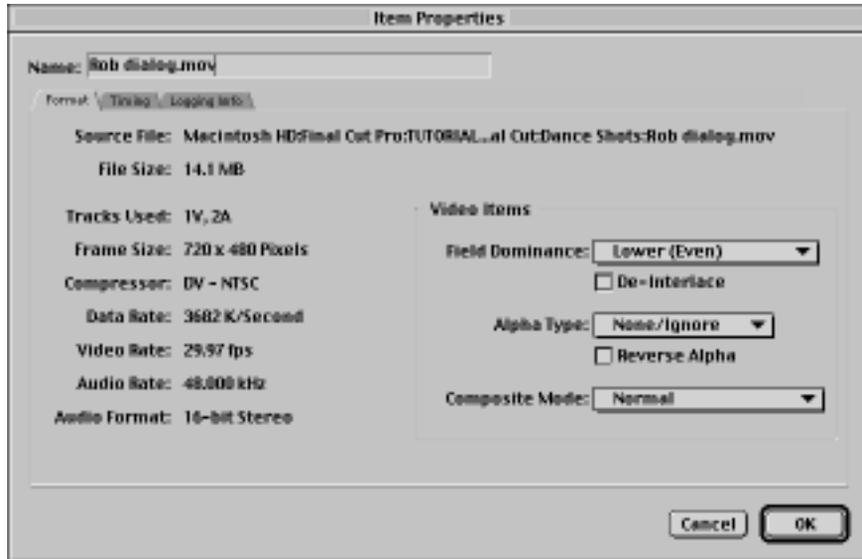
## Project Properties

This window allows you to view or change information about a project. The Project Properties window is explained in detail in the section “Changing the Properties of a Project,” on page 141.



## Item Properties

This window allows you to view or change information about media within a project. The Item Properties window is explained in detail in the section “Getting Information About the Properties of Clips,” on page 160.



## Trim Edit

The Trim Edit window shows a specific edit point. You use it to refine or trim an edit in detail. For more information on Trimming edits, see Chapter 10, “Trimming Edits,” on page 201.



## Using Menus, Shortcuts, and Controls

Final Cut Pro offers several methods for performing video editing tasks. Experiment to find out which control methods work best for you. Some people work fastest using keyboard shortcuts; others prefer to use the menu bar or shortcut menus as much as possible.

**Note:** When working with multiple windows in the Viewer, Timeline, Canvas, or Browser, menu commands and keyboard shortcuts apply to the default, or labeled, window. To use commands and shortcuts in other windows, you must drag the desired window to one of the main labeled windows.

Apart from the menu bar and window buttons, there are several other ways to access Final Cut Pro's functions.

### Shortcut Menus

These contain functions relevant to the location of the pointer on the screen. They exist in almost every window.

To use shortcut menus:

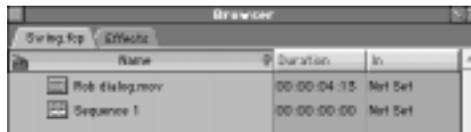
- Control-click to make a shortcut menu appear.

## Keyboard Shortcuts

These are listed in Appendix C, “Keyboard Shortcuts,” on page 339. You may find that these shortcut keys help you work more efficiently.

## Tabbed Windows

In the Viewer, Preferences, and other windows, tabs give you access to functions within the window. In the Canvas, Timeline, and Browser, tabs give you access to the same functions or information, but for a different sequence or project. You can drag the tab out of the Browser, Viewer, Canvas, and Timeline windows to display the tab in its own window independently. This is useful when you are working on more than one sequence or project at a time. You can also put a tab back into its original window by dragging the tab to the tab header of the parent window.



## Other Important Controls

- *Target track controls in the Timeline:* You can have a maximum of one video and two audio tracks selected as the target tracks for new edits. You can change any of the target tracks by clicking the target track controls in the Timeline.



- *Track Lock and Unlock controls in the Timeline:* The track Lock/Unlock controls are located in the Timeline. You use them to stop tracks from being changed. Locked tracks can still be viewed in the Canvas window, and can be rendered, but you can't make any changes to any clip on a locked track.



- *Track Visibility controls in the Timeline:* The Track Visibility controls are located in the Timeline. You use them to show or hide individual tracks. This allows you to view selected tracks in the Canvas, and is useful when compositing. An invisible track will not be shown when the sequence is viewed in the Canvas. If you make a track invisible after rendering a sequence, rendered files will be lost.

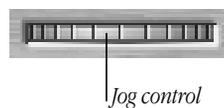
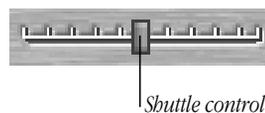
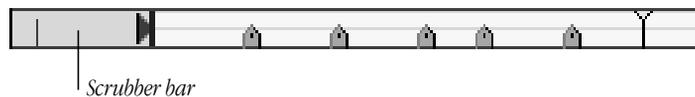


- *Zoom Slider:* The Zoom Slider is in the Timeline and the Audio, Filters, and Motion tabs of the Viewer. You use it to scale and scroll part of a window at the same time. To scroll, drag the slider from side to side. To expose more of the window's contents on either side, drag one of the thumb controls from side to side.

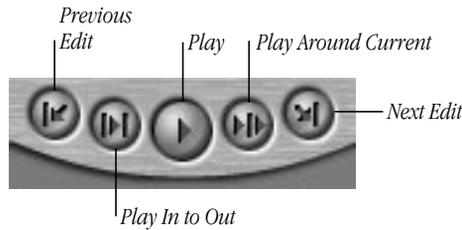


- *Scrubber bar, Shuttle, and Jog controls in the Viewer and Canvas:* These three controls are used to locate different parts of a clip easily. To scrub rapidly through a clip, you move the playhead back and forth across the Scrubber bar in the Viewer or Canvas, or the ruler in the Timeline. This is useful for moving back and forth through a clip rapidly. To shuttle clips at different speeds, use the Shuttle control. This is useful for playing clips at different speeds while shifting the pitch of audio. To move forward or backward a few frames at a time, use the Jog control in the Viewer or Canvas. This is useful for visually locating a specific frame.

**Note:** In the Viewer, Final Cut Pro distinguishes clips that have been opened from the Timeline by displaying two lines of dots in the Scrubber bar. Clips that have been opened from the Browser have a plain Scrubber bar.



- *Transport controls:* You use the transport controls to move the playhead within a clip.



- *Play:* Plays the clip from the current location of the playhead
- *Play Around Current:* This is based on the Preview Pre-roll and Preview Post-roll settings in General Preferences. When you press this button, play begins before the current playhead position at the Pre-roll setting and continues through the amount of time specified by the Post-roll setting.
- *Next Edit:* Jumps the playhead forward from its current position to the next edit in the Canvas or to the next point (In, Out, or end) of a clip in the Viewer.
- *Previous Edit:* Jumps the playhead backward from its current position to a preceding edit in the Canvas or to a preceding point (start, In, or Out) of a clip in the Viewer.
- *Play In to Out:* Resets the position of the playhead to the current In point of a clip and proceeds to play forward from that point straight through to the Out point of the clip.

### **Customizing the Screen Layout**

Several screen layouts are available in the Arrange submenu of the Window menu. You can also configure a customizable screen layout.

To customize a screen layout:

- 1** Arrange the four main windows in the layout and sizes you want.
- 2** Hold down the Option key and choose one of the two Custom Layouts from the Arrange submenu of the Window menu.
- 3** The next time you open Final Cut Pro, you can choose the layout you created from the Arrange submenu of the Window menu.

## Undoing Changes

You can undo every action you do in your projects, sequences, and clips. You can also redo actions that you have undone. Up to 99 changes can be undone. You set the number in the Levels of Undo preference.

**Important** The Undo feature does not distinguish sequences or projects from one another. If you are working with more than one sequence or project, be sure you are in the correct sequence or project when you choose Undo. The change you undo may not occur in the current project, so take care when undoing multiple changes.

To undo the last action:

- Open the Edit menu and choose Undo.

To redo the last undone action:

- Open the Edit menu and choose Redo.

To specify the number of actions that can be undone:

- 1 Open the Edit menu and choose Preferences.
- 2 Click the General tab.
- 3 Set the Levels of Undo to any number between 1 and 99.

**Note:** More levels may require more memory and disk space.

## Working With Timecode

Timecode is essential to navigation and accuracy when working with video, and it allows you to locate specific frames quickly. Final Cut Pro uses standard timecode, which follows the format

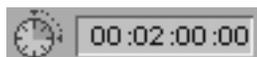
Hours: Minutes: Seconds: Frames

Typing “01221419” sets the timecode to 01:22:14:19.

You can copy the timecode from one field and paste it into another if the timecode is valid in the location where it is being pasted. You can also drag a timecode from one field to another by pressing Option while dragging.

The types of timecode boxes in the Canvas and Viewer are

- *Duration:* This appears in the upper-left corner of the Canvas or Viewer. It displays the duration between the In and Out points of a clip or sequence. The Browser has a corresponding duration column for clips and sequences.



- *Playhead position:* This appears in the upper-right corner of the Canvas or Viewer. It displays the current position of the playhead. You can change the playhead position by entering a new timecode in the box.



### Navigating by Entering New Timecodes

You can move the playhead around in a clip by entering a new timecode into the right-hand playhead position box in the Canvas or Viewer. You don't need to click in the box to begin entering a new timecode, just type the numbers.

You only need to type the numbers that change to go to a specific point. Numbers that don't change, like the hour or minute, don't need to be entered.

You can also change the Out point for a clip or sequence by entering a new timecode in the Duration box, in the upper-left corner of the Canvas or Viewer.

In the Browser, you can change the In, Out, and Duration timecodes to change the length of time between a clip's In and Out points.

**Note:** Typing a partial timecode keeps numbers that don't change in the playhead position box only. In the duration and other timecode fields, the entire timecode is reset. For example, if you have a timecode of 01:22:05:23 and you type 1612 in the position field, the playhead moves to 01:22:16:12 and this timecode appears in the playhead position box. In the duration field, 00:00:16:12 appears.

The following examples are based on an original timecode of 01:22:05:23.

- To go to timecode 01:22:08:10, type 810 (for 8 seconds, 10 frames) and press Enter. The timecode moves to 01:22:08:10. The hour and minutes do not change in the new timecode location, so there is no reason to re-type the hour or minute entries.
- To go to 01:22:16:12 (same hour and minute, but 16 seconds, 12 frames), type 1612. The time moves to 01:22:16:12.
- To go to timecode 01:25:22:18, type 252218.  
If you leave out 25, the time changes to 01:22:22:18 instead.

### Moving to a New Time by Adding or Subtracting Frames

When you type a timecode, entering the timecode value preceded by the + (plus) or – (minus) key changes the current time by that amount.

You can move to a different time with the + (plus) and – (minus) keys in two ways: using time (hours: minutes: seconds: frames) or using the total number of frames, which can be converted to time plus frames.

- Typing –209 moves the time back 2 seconds and 9 frames.

- Typing +101223 moves the time ahead 10 minutes, 12 seconds, and 23 frames.

### **Moving to a New Time by Entering Numbers That Are Converted**

If you enter a number that is greater than the maximum for a position in a timecode, the number is converted so that whole units (seconds, minutes, or hours) are “carried over” into the next position to the left.

- *Hours*: For the hours position in a timecode, a 2-digit number less than 24 is treated as a valid entry for that position. Numbers between 24 and 99 are converted, for example:  
A timecode of 24 hours, 0 minutes, 0 seconds, and 0 frames (24:00:00:00) is equivalent to 00:00:00:00.  
A timecode of 25 hours, 0 minutes, 0 seconds, and 0 frames (25:00:00:00) is equivalent to 01:00:00:00.
- *Minutes and seconds*: For the minutes and seconds positions in a timecode, each 2-digit number less than 60 is treated as a valid entry for that field and does not have to be converted. So, entering 00006700 results in a timecode of 0 hours, 1 minute, 7 seconds, and 0 frames (00:01:07:00).
- *Frames*: In the frames position in the timecode, any 2-digit value between 30 and 99 is converted to the correct number of seconds (30 frames = 1 second). Entering 00000032 results in a timecode of 0 hours, 0 minutes, 1 second, and 2 frames (00:00:01:02).  
Entering -87 frames moves back 87 frames, which is 2 seconds and 27 frames.  
Entering +33 frames moves ahead 1 second, 3 frames, or 33 frames.

### **Using Both Systems Together**

You can use either system or a combination to enter timecodes. The values are automatically converted to the correct timecode, as shown in these examples:

- Entering -199 moves back 4 seconds and 9 frames. The 1 provides one second in the seconds position. The 99 frames translates into 3 seconds and 9 frames, making the total 4 seconds and 9 frames.
- 71:23:00 becomes 1:01:23:00.
- With a current time of 01:00:02:02, entering 29 changes the timecode to 01:00:02:29.
- With a current time of 01:00:02:02, entering 30 changes the timecode to 01:00:01:00.

### **Separators for Timecode Entry and Logging**

- A colon (:) indicates a non-drop frame timecode. A semi-colon (;) indicates a drop frame timecode. You can use either when typing timecode. The base timecode of the clip is either drop frame or non-drop frame timecode. The field converts the separator to the correct one.

**Note:** Drop frame timecode is only applicable to NTSC format and is not applicable to PAL.

Drop frame timecode is a frame-labeling scheme used to compensate for the difference between the NTSC rate of 29.97 frames per second (fps) and the common 30 fps rate. No actual video frames are dropped. Numbers in drop frame progress in this fashion:

01:08:59;28

01:08:59;29

01:09:00;02 (frame labels 01:09:00;00 and 01:09:00;01 have been dropped)

.  
.  
.

01:09:59;29

01:10:00;00

01:10:00;01

01:10:00;02

01:10:00;03

- Periods (.) and commas (,) can also be used as separators and are automatically converted to the appropriate separator in the timecode field (based on what the type of timecode is).
- Any separator can be used. The drop/non-drop state is controlled by the field. Separators are not required when entering timecode. You can enter numbers without separators and let Final Cut Pro convert them to timecode.

### **Timecode Keyboard Shortcuts**

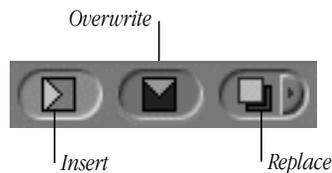
To avoid typing zeros when moving by larger amounts, type a period instead, as in the following examples:

- To move to timecode 00:00:03:00, type 3. (3 and a period). The period inserts 00 in the frames field automatically.
- To move to 00:03:00:00 from the previous position, type 3.. (3 and two periods). The periods insert 00 in the frames and seconds fields.
- Type 3... to move to 03:00:00:00.
- Use the + and – keys plus a numerical value to add and subtract frames from the current timecode position.

## Editing in Final Cut Pro

Editing video and audio in Final Cut Pro follows an overall rule known as *three-point editing*. There are four possible points that can be specified when editing a clip into a sequence. These are the In and Out points in the source clip, and the In and Out points for where the clip is to be placed in the sequence. When you perform a three-point edit, you specify three of the possible four points for the edit. An exception to the three-point editing rule is Fit-to-Fill editing, which requires four points: In and Out in the source media, and In and Out in the destination sequence.

You use controls in the Canvas to edit clips displayed there. When you perform an edit, you follow the overall rules of three-point editing, and the edit is placed on your chosen target track or tracks. Target tracks are briefly explained on page 94. For more detailed information, see “Setting Up an Edit,” on page 169 and “Target track control,” on page 179.



- *Insert editing*: Places the selected video or audio so that everything after the insertion point, on any unlocked track, is shifted forward in time.
- *Overwrite editing*: Replaces the current video or audio of equal length on the selected tracks with the selected video or audio.
- *Replace editing*: A form of overwrite editing that replaces the current frame in the Canvas with the current frame displayed in the Viewer, together with enough additional frames of video on either side, to replace the entire clip currently displayed in the Canvas. If you have set In and Out points in the Canvas, a replace edit fills the space between these points only. If you have not set In and Out points in the Canvas, a replace edit fills the clip's entire boundary as it appears on the target track in the Timeline.
- *Superimpose editing*: Superimposes by placing the source clip in the Viewer in the marked area in the Canvas, but on the track above it. You can use this type of edit to overlay titles and other text onto video. If you perform several superimpose edits in the same location, each is placed above the previous one.
- *Fit-to-Fill editing*: Inserts and then speeds or slows the selected material so that it fits the available space exactly. You need four edit points: the In and Out points for the material in the Viewer, and the In and Out points where it will be fitted into the Canvas.
- *Transition editing (Insert with Transition and Overwrite with Transition)*: Performs an insert or overwrite edit and places the default transition at the beginning of the clip in the Canvas. To set the default transition, select a transition in the Browser and use the shortcut menu.

## Editing With the Tool Palette Tools

You perform additional types of edits using tools from the Tool palette.

- *Ripple editing*: Ripple editing affects the overall duration of a sequence by moving the In or Out point of a clip. Ripple editing lengthens or shortens the In-Out point of a clip as it is edited into a sequence, without affecting the duration of any other clip or creating gaps in the sequence.
- *Roll editing*: Roll editing moves the Out point of one clip and the In point of the clip next to it, so that the overall duration of the sequence is not affected, but the location of the edit in the sequence is changed.
- *Slip editing*: Slip editing moves both the In and Out points of a single clip simultaneously in the same direction, so that the duration of the clip is unaffected.
- *Slide editing*: Slide editing moves a single clip in relation to those before and after it, so that the durations of the clips on either side are changed, but the In and Out points of the clip on which the slide is being performed remain the same.

## Background Information and Concepts

This information will help you to understand how you work with Final Cut Pro, especially if you are unfamiliar with non-linear video editing. The terms explained in this section are used throughout this manual.

- *Capturing*: Capturing is the process of getting copies of video and audio into Final Cut Pro, in the form of files on one of your disk drives. When you have captured your source media, you can begin to edit it and put it together into a sequence.
- *Channels*: Channels control the color and opacity of a video image. RGB video, for example, has three color channels (red, green, and blue), plus a fourth channel, the alpha channel, which determines opacity.
- *Clips*: A clip is an individual section of video, audio, or graphics files.
- *Effects (Transitions, Filters, and Generators)*: Effects change the appearance or sound of video or audio. In Final Cut Pro, you can apply more than 50 effects using the Viewer (Final Cut Pro also supports third-party After Effects plug-ins). A transition moves from one piece of video or audio into another. A filter changes a single clip in some way. A generator creates video, such as text, that can be composited into a sequence.
- *Favorites*: A favorite is an effect that you use frequently. You can set the parameters for an effect and then choose Make Favorite from the Effects menu to place the effect, together with the parameters you have set, into the Favorites bin in the Browser. This saves time if you want to apply the same effect in the same way to multiple clips.
- *Gap*: A gap is a location in a sequence where there is no media on any track.

- *Importing*: Importing is the process of getting files of various types into Final Cut Pro. Imported files have usually been created in another application. Examples are still images, CD audio files, Edit Decision Lists, Batch Lists, video files, and audio files.
- *In and Out points*: These correspond to the beginning and end of the media as it will be used in a sequence. Often, not all of the media on a disk is needed in a sequence, so you use the In and Out points to specify exactly which frames are needed. An In or Out point is also used for selection and three-point editing.
- *Keyframes*: A keyframe is a special-purpose marker that denotes the change in value in an applied effect parameter. When two keyframes are set in Final Cut Pro, the application calculates a transition between the keyframes based on their values. Video, audio level, and pan change by setting keyframes over time.
- *Logging*: Logging is the process of recording detailed information about source media before you capture it from videotape. In Final Cut Pro, you use the Log and Capture window for this task.
- *Markers*: Markers are used throughout the process of creating a sequence. You use them to mark and make notes about important sections of the media before you begin to make a rough cut. You also use them to pinpoint the locations of In or Out points, edit points, places where effects are to be applied, or any special area of interest.
- *Offline clips*: Offline clips are specifications for clips that have not yet been captured. You can place offline clips into a sequence in the Timeline. Final Cut Pro colors offline clips white in the Timeline.
- *Presets*: A preset is a saved group of settings that can be applied to a sequence when it is created. Presets determine items such as the frame rate, editing timebase, and Timeline options used for creating new sequences or exporting media.
- *Projects*: A project is all of the clips, effects settings, and sequences involved in a single finished product.
- *Rendering*: Rendering is necessary whenever motion or special effects are used. Rendering applies any motion or effects to the media and then copies the result to disk. Rendering can take time depending on the complexity of your project, filters applied, processor speed, and other factors. See Chapter 13, “Rendering,” on page 241 for tips on improving rendering performance.
 

**Note:** Pressing the Caps Lock key temporarily disables rendering. This allows you to adjust all of your settings before rendering a preview. It does not speed up final rendering, but allows you to work faster without the processing overhead of background rendering.
- *Sequences*: A sequence is a series of video and audio clips that are being edited together. A project may consist of several sequences, and sequences can be used as source clips and edited into another sequence.

- *Subclips*: A subclip is a shortened view of a piece of media that can be easier to work with than a full clip. For example, if you have a piece of media that is 10 minutes long, you could create ten 1-minute subclips so you don't have as much media to move through in the Viewer at one time. You mark the In and Out points on a clip to indicate the portion of a clip that is a subclip. Subclips can also be references to other sequences that have been created with the Make Subclips command in the Modify menu. You can use subclips to prepare complex effects, dramatic scenes, or even audio submixes which can be used in other sequences or projects.
- *Target tracks*: The target tracks specify the destination tracks for the edits you perform. When you work with multiple video and audio tracks, you need to choose the track where you want edits to be placed. You do this by using the target track controls in the Timeline.
- *Wireframes*: A wireframe is a view of the outline of a clip's video frame. You use the handles on wireframes to scale, distort, rotate, and move images. In the Canvas and Viewer, you can view an image, its wireframe, or both.

## Preferences and Presets

Final Cut Pro includes many preferences and settings that you can customize to reflect your choice of capture hardware and storage options, and the needs of individual projects and sequences. These options do not need to be changed frequently, but it is important to set them up correctly when you first begin using Final Cut Pro, or if you change your hardware or the type of project you are working on.

To access preferences and presets:

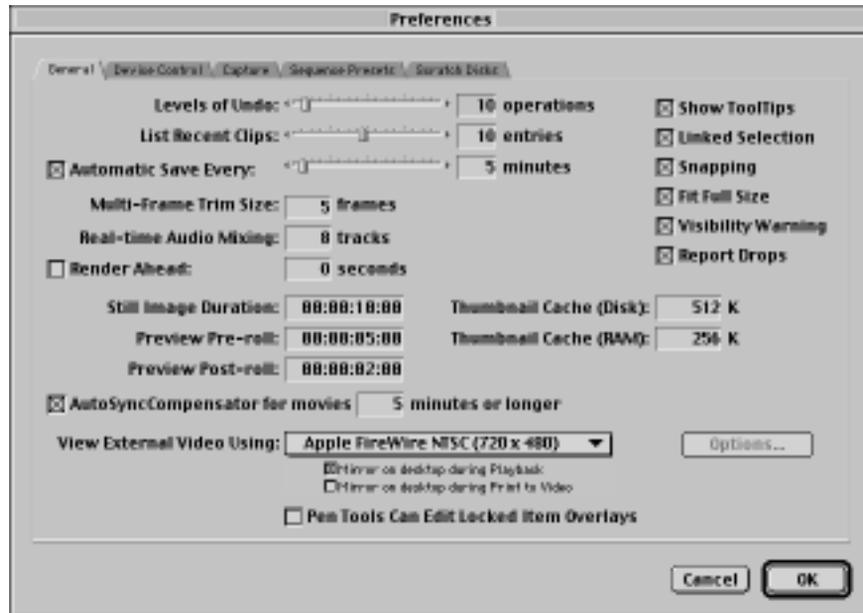
- 1** Open the Edit menu and choose Preferences.
- 2** Click the appropriate tab for the preferences you want to modify.
  - General
  - Device Control
  - Capture
  - Sequence Presets
  - Scratch Disks

## Setting General Preferences

The General preferences tab lets you configure various options for working in Final Cut Pro.

To configure General preferences:

- 1 Choose Preferences from the Edit menu.
- 2 Click the General tab.



- *Levels of Undo*: Adjust this slider to specify the number of actions that can be undone. The total number of undo's depends on how much memory is installed in your system.
- *List Recent Clips*: Adjust this slider to set the number of recently accessed clips available in the Viewer's Recent Clips pop-up menu.
- *Automatic Save Every*: Check this box to save projects automatically at regular intervals. Use the slider to select the desired time interval.
- *Multi-Frame Trim Size*: Enter the desired number of frames in this field to set the multi-frame trim size. The maximum is 9. This number appears in the multi-frame trim buttons in the Trim Edit window as well as the shortcut keys.

- *Real-time Audio Mixing:* Enter a number in this box to specify the number of audio tracks that are mixed in real time. The maximum is 8 tracks. The maximum number of tracks you will be able to mix depends on multiple factors. Your processor's speed, number and types of filters used, data transfer rate of your hard disk, and available memory are all factors which determine the maximum number of tracks that can be mixed in real time.
  - *Render Ahead:* Check this box to enter the number of seconds to render ahead in a sequence in the box. This will pre-render any effects ahead of the current play position when you click the Play button.
  - *Still Image Duration:* Enter a value in this field to determine the duration between In and Out points for imported images. Still images are, by default, imported with 10 seconds of frames between In and Out points.
  - *Preview Pre-roll and Preview Post-roll:* Enter durations into these fields to specify the amount of a clip played when the Play Around Current control is used. This is used for all clips that are files on disk.
  - *AutoSyncCompensator for movies:* Hardware variations occasionally lead to synchronization problems between audio and video. Check this box if you experience A/V sync drifts on long clips. The AutoSyncCompensator analyzes clips and compensates for any audio drift by adjusting the sampling rate of audio to match the duration of video in a clip. This adjustment is only applied to the timing of clips in the Browser or Timeline and does not affect the media on disk. Enter a value in the minutes field to specify a minimum duration limit to trigger the AutoSyncCompensator. The AutoSyncCompensator will only analyze clips longer than this duration. The default duration of 5 minutes is suitable for most circumstances.
  - *View External Video Using:* Choose a setting from this pop-up menu to specify how you will view external video.  
Depending on your hardware configuration, you may need to decompress frames when viewing video on an external monitor. To do this, click the Options button and check the box labeled "Also Decompress."
  - *Mirror on desktop during Playback:* Check this box to mirror video on the desktop when playing back video. Turn off this option if you notice dropped frames in your output during video playback.
  - *Mirror on desktop during Print to Video:* Check this box to mirror video on the desktop when using the Print to Video function. Turn off this option if you notice dropped frames in your output during Print to Video or Edit to Tape.
- Note:** Displaying video on the computer monitor while printing to video or editing to tape taxes the computer's processing power and can cause performance problems. If you notice dropped frames in your output when performing these operations, try reducing your monitors bit depth from millions to 16-bit (thousands of colors) or turn "Mirror on desktop" off.

- *Pen Tools Can Edit Locked Item Overlays*: Check this box to allow modification of overlays in locked tracks or clips.
- *Show ToolTips*: Check this box to show descriptions of interface elements when you move the pointer over them.
- *Linked Selection*: Check this box to link selections. Uncheck the box to unlink selections. Linked selection allows you to select audio and video for a clip together in the Timeline. If linked selection is off, you can select them separately.
- *Snapping*: Check this box to turn snapping on. This feature can also be toggled on and off on the fly by pressing the N key.
- *Fit Full Size*: Check this box to open all clips in the Viewer to “Fit to Window.”
- *Visibility Warning*: Check this box to see a warning about loss of render files when track visibility is turned off.
- *Report Drops*: Check this box to be warned when frames are dropped during playback.
- *Thumbnail Cache (Disk) and (RAM)*: Enter a desired cache size in these boxes to change the sizes of the thumbnail caches.

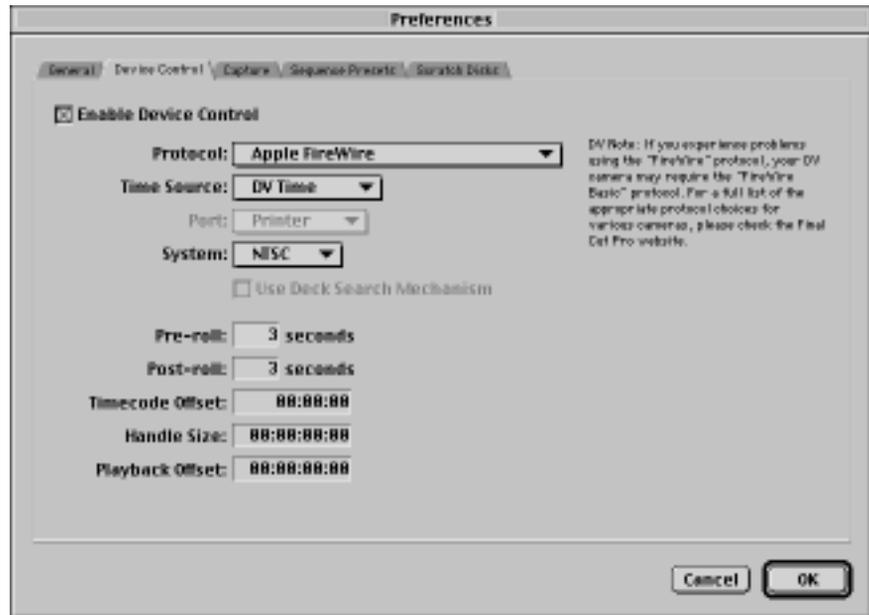
You may want to have large thumbnail caches if you are working with a large number of clips and want to display thumbnails, or if you are using the Browser’s icon view. If you often scrub through thumbnails in the Browser’s icon view, you can optimize the quality of this feature by increasing the thumbnail RAM cache. To set a location for the thumbnail cache, see “Setting Scratch Disk Preferences” on page 110.

## Setting Device Control Preferences

The Device Control tab lets you configure options for external devices so you can begin logging and capturing clips.

To configure device control preferences:

- 1 Choose Preferences from the Edit menu.
- 2 Click the Device Control tab.



- *Enable Device Control*: Check this box to activate device control. Refer to the documentation that came with your camcorder or deck to find out if it supports device control.

- *Protocol:* Choose a protocol from this pop-up menu to specify the protocol your camcorder or deck uses.
  - *FireWire (IEEE 1394):* As FireWire is being adopted for the full range of digital equipment from professional decks down to consumer camcorders, there is a wide range of functionality and adherence to the FireWire specifications among these devices. For this reason, two versions of the FireWire protocol (Apple FireWire and Apple FireWire Basic) are provided in the device control preferences. If your deck or camcorder uses FireWire, begin by using the Apple FireWire protocol. While all decks and camcorders support the most basic functions like returning timecode and accepting basic transport commands, other commands may not be supported. If you find that the device does not accurately go to specified timecodes or fails to execute commands, then try the Apple FireWire Basic protocol.
  - *Other protocols:* Check your deck or camcorder manual for the type of protocol it uses and select the appropriate protocol from the Protocol pop-up menu.
  - For additional information on compatible devices, check the Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro)
- *Time Source:* Choose a format from this pop-up menu to specify the timecode format supported by your deck or camcorder. Refer to the manual that came with your device to determine which format is supported.
  - *LTC:* Longitudinal Timecode is recorded on a linear track of the tape and can be read while the tape is moving.
  - *VITC:* Vertical Interval Timecode is contained in the vertical blanking of a signal and can be read when the tape is paused on a frame.
  - *LTC+VITC:* A combination of Longitudinal Timecode and Vertical Interval Timecode ensures that timecode can be read while the tape is in motion or paused.
  - *Timer:* A clock-based value timecode.
  - *DV Time:* Digital Video Timecode is available for FireWire, Sony VISCA, and LANC protocols and should be selected when using Digital Video formats.
- *Port:* Choose a port from this pop-up menu to specify the computer port that your device control cable is connected to.
- *System:* Choose a standard from this pop-up menu to specify the broadcast standard for your system.
- *Use Deck Search Mechanism:* Check this box to use a deck's internal search mechanism. Turn off this option if your deck has problems moving the playhead to a specified timecode during capture.
- *Pre-roll:* Enter a value in this field to determine the amount of video played before the current position.

- *Post-roll*: Enter a value in this field to determine the amount of video played after the current position. This is applicable when you click the Play Around Current button in the Viewer or Canvas, and when you choose the Preview command in the Edit to Tape window.
- *Timecode Offset*: Enter a value in this field to calibrate your system to your tape deck when using Log and Capture.
- *Handle Size*: Enter a value in this field to determine handle sizes for clips captured in a batch capture. These handles provide “padding” on either end of the capture for editing flexibility.
- *Playback Offset*: Enter a number in this field to compensate for delays between the start of playback and the start of recording on the deck when editing to tape. This is normally set to zero. Enter a positive number to start playback before recording begins. Enter a negative number to start playback after recording begins. If you experience a frame being repeated for the first few frames during Edit to Tape, enter a value into this field equivalent to the number of frames being repeated.

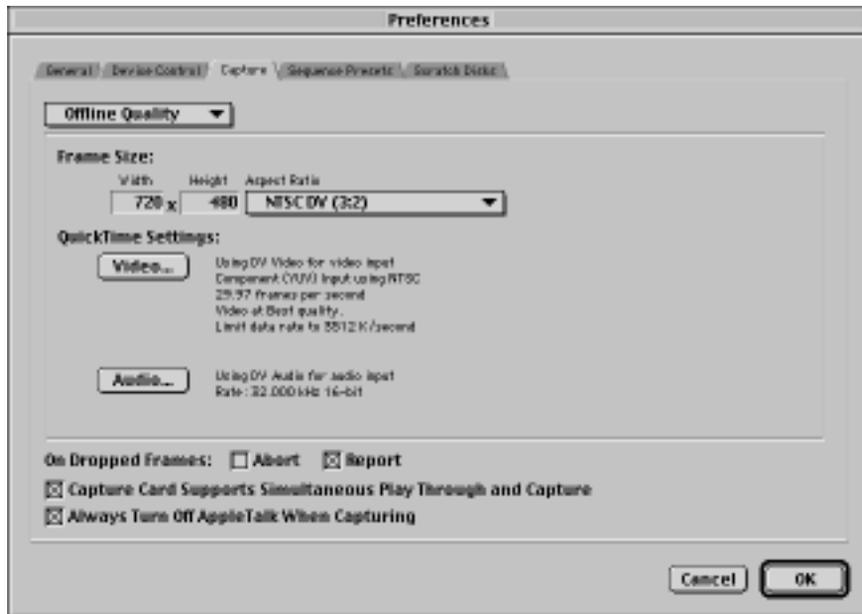
After you’ve specified device control preferences, you should capture some footage from a tape with burned-in timecode to determine if you need to calibrate your system. For more information, see “Calibrating the Timecode Signal You Are Capturing” on page 118.

## **Specifying Capture Preferences**

Capture preferences specify the capture board you are using, the compression method, frame rate, frame size, and audio sampling rate. These capture settings determine the quality at which Final Cut Pro captures video and must be specified before capturing any video. If you always capture at the same quality settings, you’ll need to specify these settings only once. If, however, you occasionally need to capture at different quality settings, you can save up to four different quality settings and then choose the one you want to use before capturing footage.

To specify capture settings:

- 1 Choose Preferences from the Edit menu.
- 2 Click the Capture tab.



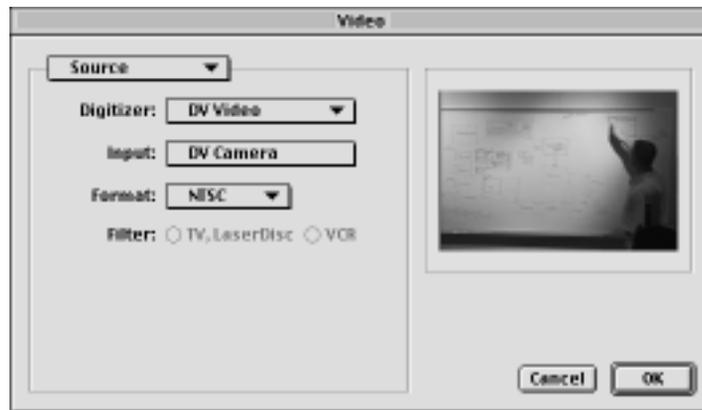
- Use the pop-up menu at the top of the window to choose from a list of four Capture quality presets. Any changes you make are saved with the preset. When you choose a preset, attributes in the panel will change to reflect the new capture quality settings.
- *Frame Size*: This defines the frame size that the media will be captured at. This is dependent on the QuickTime capture hardware. Not all cards support all formats. Choose a preset frame size from the Aspect Ratio pop-up menu or choose Custom from the pop-up menu to enter an arbitrary non-constrained frame size in the Width and Height fields. If you type a number into a field with an Aspect Ratio other than Custom selected, the other field will be automatically calculated using the current aspect ratio displayed in the pop-up.
- *Abort*: Check this box to automatically stop any capture process if dropped frames are detected during a capture session.
- *Report*: Check this box if you want Final Cut Pro to report which frames were dropped after the capture process has completed. Dropped frames will be reported in red in the Browsers Capture column.

- *Capture Card Supports Simultaneous Play Through and Capture:* Some capture cards can display video frames while a window is opened for Video Capture. Check this box if your card supports this feature.
- *Always Turn Off AppleTalk When Capturing:* Check this box to automatically turn off AppleTalk whenever you use Log and Capture or Edit to Tape. AppleTalk will be turned back on after you quit Final Cut Pro.

QuickTime Settings give you access to standard QuickTime Video and Audio input dialogs. Click the Video button to specify QuickTime Source and Compression settings. Details for current video settings are displayed next to the Video button.

To specify video source settings:

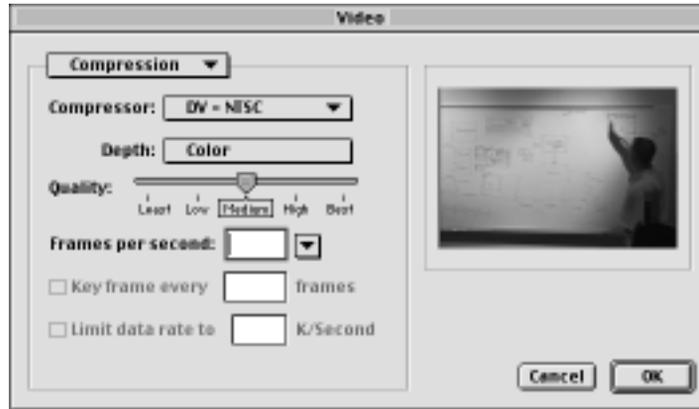
- Choose Source from the pop-up menu in the upper-left corner of the window. A preview shows you whether the video signal is getting through.



- *Digitizer:* Choose a method from this pop-up menu to specify the digitizer hardware to be used.
- *Input:* Choose an input device from this pop-up menu to specify the playback hardware to be used.
- *Format:* Choose a format standard from this pop-up menu to specify the broadcast format to be used.
- *Filter:* Select the type of filter to be used when processing the source video.

To specify video compression settings:

- Choose Compression from the pop-up menu in the upper-left corner of the window.



- *Compressor*: Choose a codec from this pop-up menu to select a compression method for captured video.
- *Depth*: Choose a color depth from this pop-up menu to specify a bit-depth resolution for captured video.
- *Quality*: Adjust this slider to determine the image quality for your video. Least image quality will yield a high data compression. Best image quality will yield the lowest data compression.
- *Frames per second*: Enter a value in this field or choose a preset value from the pop-up menu to specify the number of frames sampled per second.
- *Key frame every n frames*: Check this box to manually assign key frame intervals. Type a numerical value in the field to define the number of frames between keyframes.
- *Limit data rate to n K/Second*: Check this box to manually limit the data rate while capturing video. Type a numerical value in the field to define the data throughput in kilobytes per second.

Click the Audio button on the Capture tab to select input options for your audio capture hardware. Details for current QuickTime audio settings are displayed next to the Audio button.

To specify Source settings:

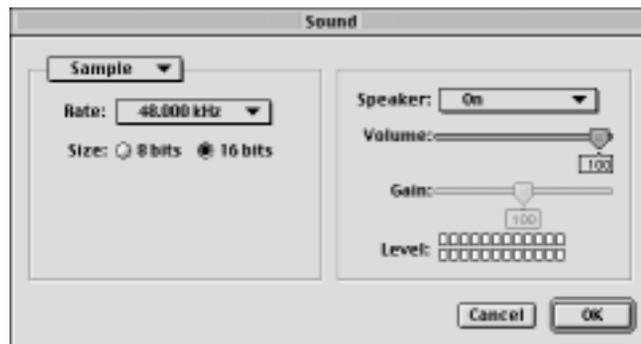
- Choose Source from the pop-up menu in the upper-left corner of the window.



- *Device*: Choose a device type from this pop-up menu to specify the type of audio hardware to be used.
- *Input*: Choose a method from this pop-up menu to specify the input method to be used.
- *Speaker*: Choose Off, On, or Off While Recording from this pop-up menu to specify the state of the speaker.
- *Volume*: Adjust this slider to set the speaker's volume.
- *Gain*: Adjust this slider to set gain levels to be used when recording.

To specify Sample settings:

- Choose Sample from the pop-up menu in the upper-left corner of the window.



- **Rate:** Choose a predefined rate from this pop-up menu to specify an audio sample rate.
- **Size:** Choose a bit size/resolution for the audio sample.

**Note:** Depending on your hardware setup, the audio can turn off around 12 instead of 0.

## Using Sequence Presets

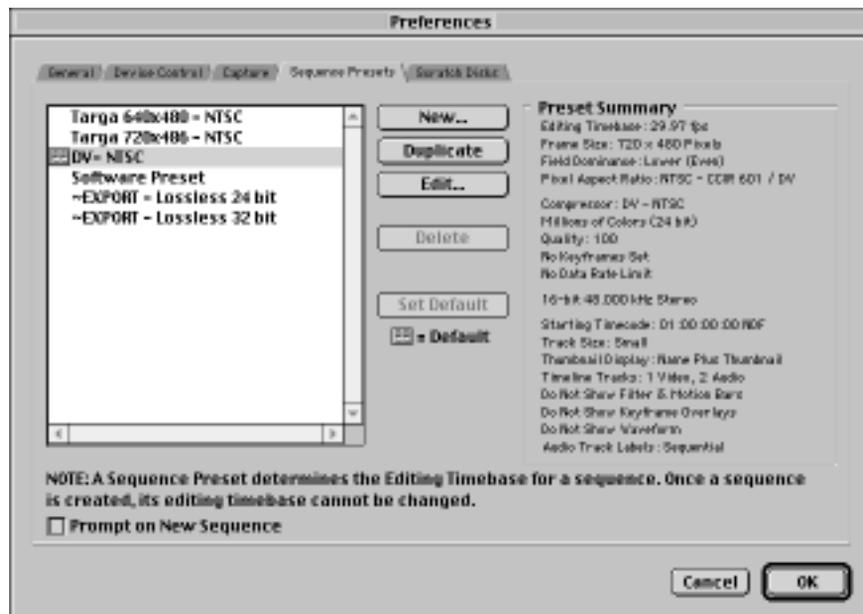
Sequence presets are a group of saved settings that are applied to a specific sequence or to exported files. Final Cut Pro includes several presets that you can choose from, or you can create your own. Normally, you choose a single preset that is always applied to each new sequence. You can also choose to be prompted to specify the preset for each new sequence you create.

To choose a sequence preset:

- 1 Choose Preferences from the Edit menu and click the Sequence Presets tab.
- 2 Select the preset you want.

The default preset is indicated by a sequence icon. The Preset Summary box lists the properties of the selected preset. The preset you choose will be applied to all new sequences until you change it. Existing sequences are not affected.

**Note:** A sequence preset determines the editing timebase for a sequence. Once a sequence is created, its editing timebase cannot be changed.



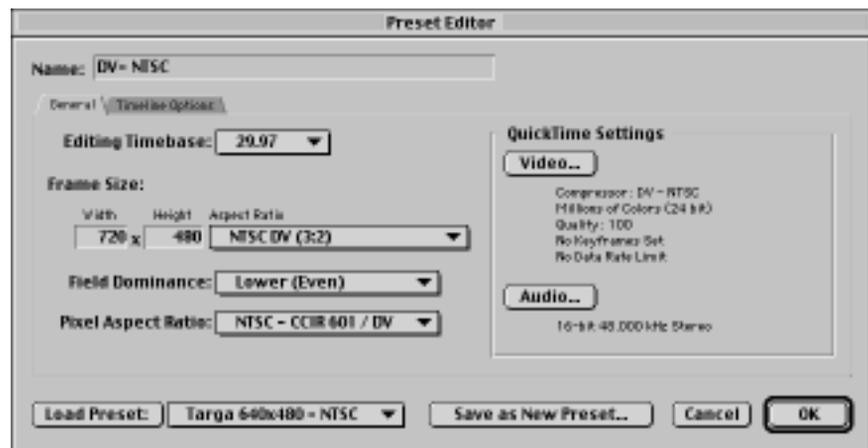
You also use the Sequence Presets tab to create new presets, edit existing ones, or delete presets that are no longer needed.

- Click the New button to open the Sequence Settings window and create an entirely new sequence preset.
- Choose a preset and click Duplicate if you want to create a new preset based on an existing version with minor modifications.
- Choose a preset and click Edit if you want to edit an existing preset.
- Choose a preset and click Delete if you want to delete a preset from the list.
- Choose a preset and click Set Default to make a preset the default for new sequences.
- *Preset Summary*: Displays the details of the currently selected preset.
- *Prompt on New Sequence*: Check this box if you want to see the Preferences window each time you create a new sequence.

### Creating, Editing, and Deleting Presets

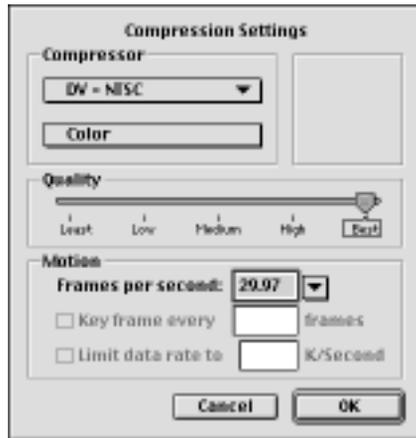
The Preset Editor window allows you to create and edit sequence presets. There are two tabs in this window, General and Timeline Options. When this window is opened from the Sequence Presets tab in the Preferences window, it is labeled Preset Editor.

To edit general settings for a sequence preset, click the General tab.



- *Editing Timebase*: Use this pop-up menu to change the editing timebase. In the Sequence Settings panel, the currently selected editing timebase is displayed.
- *Frame Size*: Enter a custom frame size in the Width and Height fields or choose a predefined frame size in the Aspect Ratio pop-up menu.

- *Field Dominance*: Choose the dominant field in this pop-up menu to specify the field to be drawn first by your video device. Depending on your hardware setup, you may need to change the field dominance if you experience onscreen flicker.
- *Pixel Aspect Ratio*: Choose an aspect ratio for your sequence in this pop-up menu.
- Choose a sequence preset from the Load Preset pop-up menu and click the Load Preset button to load the selected preset into the Sequence Settings window.
- Click the “Save as New Preset” button to save the current settings under a new name.
- Click the Video button to specify QuickTime compression settings.



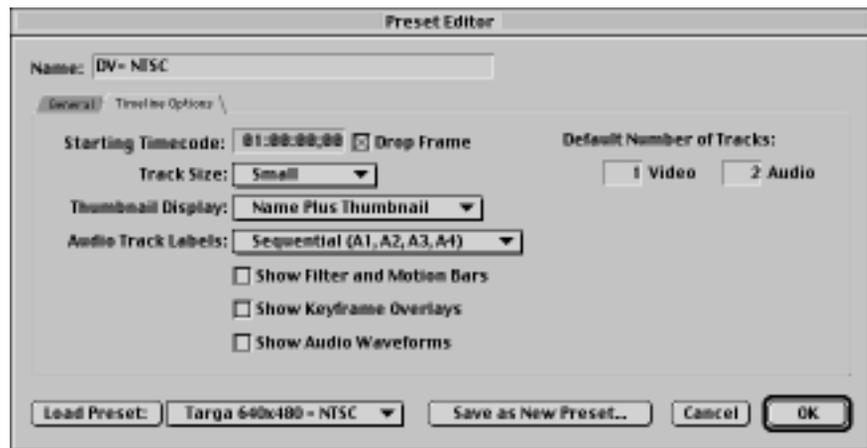
- *Compressor*: Choose a compression method (codec) to be applied to your sequence from the first compressor pop-up menu. The second Compressor pop-up menu may have additional color depth resolutions available depending on the type of codec chosen. Certain codecs display an Option button next to the Cancel button. This button provides access to additional options specific to that codec.
- *Quality*: Adjust this slider to select the visual image quality level. Least yields the highest data compression and Best yields the lowest data compression.
- *Frames per second*: Enter a value in this field to specify the frames per second for your sequence or choose a predefined value from the pop-up menu.
- *Key frames every n frames*: Check this box and enter a value in this field to specify the number of frames between keyframes.
- *Limit data rate to n K/Second*: Check this box and enter a value in this field to specify a data rate limit for your sequence.

- Click the Audio button to specify QuickTime Sound settings.



- *Compressor*: Choose a method from this pop-up menu to select an audio compression method.
- *Rate*: Enter a value in this field to specify the output rate for the audio or choose a predefined value from the pop-up menu to select from a list of standard sample rates.
- *Size*: Choose a bit resolution for the audio.
- *Use*: Choose Mono or Stereo output for the audio in your sequence.
- Other options may be available, depending on the compression method you choose.

To edit timeline options for a sequence preset, click the Timeline Options tab.



- *Starting Timecode*: Enter a value in this field to set the starting timecode for your sequence. The hour value can be used to help you identify sequences.
- *Drop Frame*: Check this box if you want drop frame timecode displayed in the Sequence Timeline. This is only applicable to NTSC format.
- *Default Number of Tracks*: Enter the number of video or audio tracks you want available when opening a new sequence.

- *Track Size*: Choose a setting from this pop-up menu to specify a default track size.
- *Thumbnail Display*: Choose a setting from this pop-up menu to specify how a clip will be displayed in the Timeline.
- *Audio Track Labels*: Choose a setting from this pop-up menu to specify how an audio track will be labeled on the audio target track button.
- *Show Filter and Motion Bars*: Check this box to display filter and motion bars below the clip in the Timeline.
- *Show Keyframe Overlays*: Check this box to display keyframe overlays above the clip in the Timeline.
- *Show Audio Waveforms*: Check this box to display the audio waveform along the audio clip in the Timeline.
- Choose a sequence preset from the Load Preset pop-up menu and click the Load Preset button to load the selected preset into the Sequence Settings window.
- Click the “Save as New Preset” button to save the current settings under a new name.

## Setting Scratch Disk Preferences

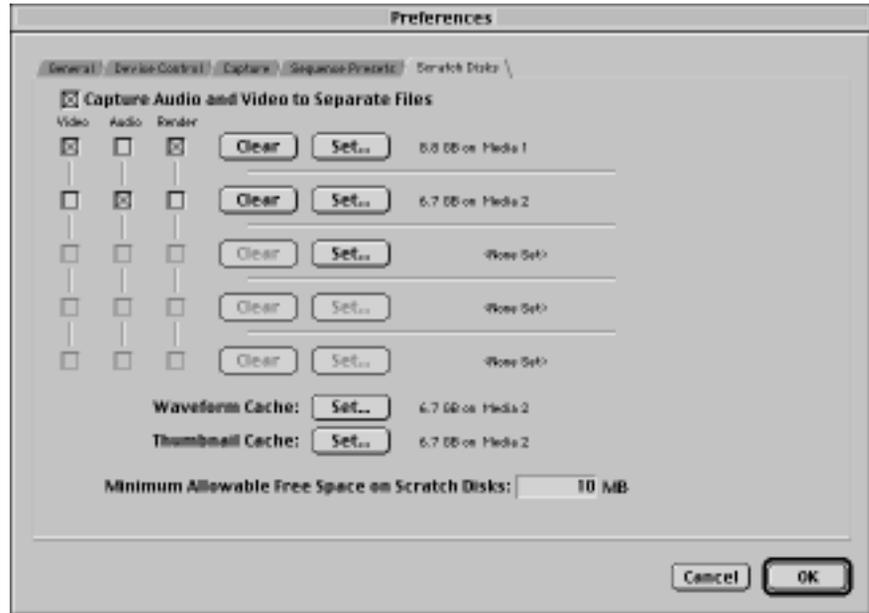
A scratch disk is where Final Cut Pro stores captured or rendered files. By default, Final Cut Pro uses the disk on which the application is installed. Final Cut Pro also uses the disk with the most available space as its storage area for both captured and rendered files. You can have Final Cut Pro store captured clips on specified disks in order. Final Cut Pro uses the next disk in the list when the current disk runs out of space. You can specify separate disks for captured video and audio files for better quality at higher data rates and improved playback performance.

**Note:** There is a file size limit of 2 gigabytes. If a file exceeds this limit during the capture or export process, a second file is created and named with the original name plus v\_0 if it is a video file or a\_0 if it is an audio file. Each time the 2 gigabyte limit is reached, a new file is created and the last digit in the name is increased by 1. The original file contains the first 2 gigabytes of data, but only references the additional files. Playthrough will be seamless in the original file.

To set scratch disk preferences:

- 1 Open the Edit menu and choose Preferences.

- 2 Click the Scratch Disks tab.



- *Capture Audio and Video to Separate Files:* Check this box if you want to optimize playback for QuickTime files with higher data rates. This feature allows you to write the video and audio tracks in a QuickTime movie to separate files on separate disks during the capture process. Video and audio files have the same name with `_v` appended to video and `_a` appended to audio files.
 

**Note:** Separate files must be captured to different disks. The two files cannot be captured to different directories on the same disk.
- *Video, Audio, or Render:* Check these boxes to specify the types of files to be stored on each disk.
- Click the Clear button to remove a disk from the list of available disks.
- Click the Set button to choose a disk or a folder on a hard disk. You can set up to five.
- *Waveform Cache and Thumbnail Cache:* Click these Set buttons to specify directories for either cache.
- *Minimum Allowable Free Space on Scratch Disks:* Enter a limit value in this field. When this minimum limit is reached, the disk will no longer be used as a scratch disk and files will be stored on the next disk in the list.
 

**Note:** When a disk or folder is added to the scratch disk list, subfolders are created (based on the file types selected) named “Capture Scratch,” “Audio Capture Scratch” and “Render Files.”



## Getting Media Into Final Cut Pro

You can bring media files into Final Cut Pro by importing a variety of video, still image, and audio file formats, and by capturing from a videotape or other video source. If you are using a tape deck that can be controlled from a computer, Final Cut Pro can control the deck for you and capture clips from several tapes, in batches that have been previously logged. If your deck can't be controlled from your computer, Final Cut Pro can still capture clips that are logged and manually captured while the tape is playing.

You can use the Log and Capture window to log the media on a tape and then capture clips that you want as a batch. Batch capturing can be performed unattended for the duration of one tape if you have a controllable deck connected to your computer.

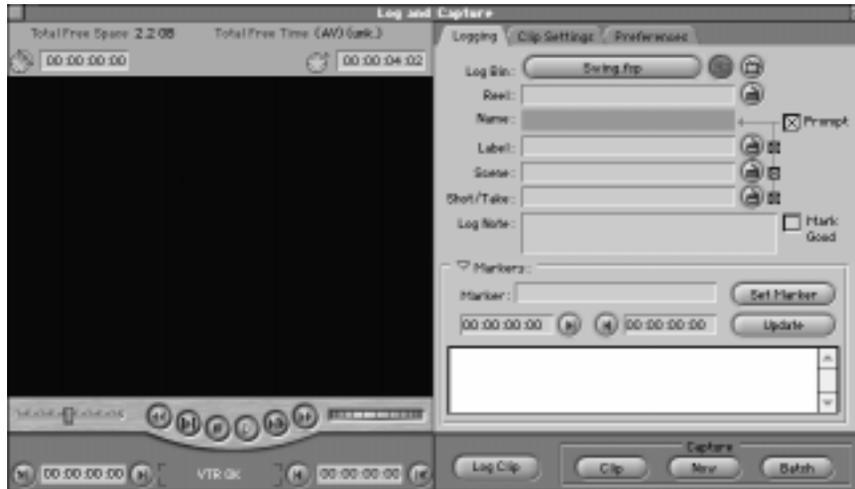
The logging and capturing process consists of the following general tasks:

- Change device control, capture, and scratch disk preferences.  
You only need to do this the first time you use the Log and Capture window, or if you change your deck, capture board, or disks. For more information, see Chapter 4, “Preferences and Presets,” on page 95.
- Calibrate the timecode signal you are capturing.
- Calibrate the capture settings with bars and tone from tape.  
This ensures that the media on disk is consistent with the quality of the video and audio being captured from tape.
- Choose a logging bin for your offline and captured clips.
- Log and mark the clips and make individual clip settings where needed.
- Capture the video.

## Log and Capture Window

To open the Log and Capture Window, choose Log and Capture from the File menu.

The Logging tab is used to enter all the information needed to log a clip into the Browser. You must first specify a Reel name in this tab before capturing a clip. Specifying a Reel name differentiates clips that have come from tape versus clips from other sources such as an animation program for graphics.



- **Log Bin:** Since multiple projects can be open at the same time, it is necessary to designate a Logging Bin. A Logging Bin is the location where all logged clips from the Log and Capture window are saved. By default, the parent directory of the last opened or created project is designated as the Logging Bin. There can be only one Logging Bin at a time no matter how many projects are opened. Logging Bin status is not saved within a project.

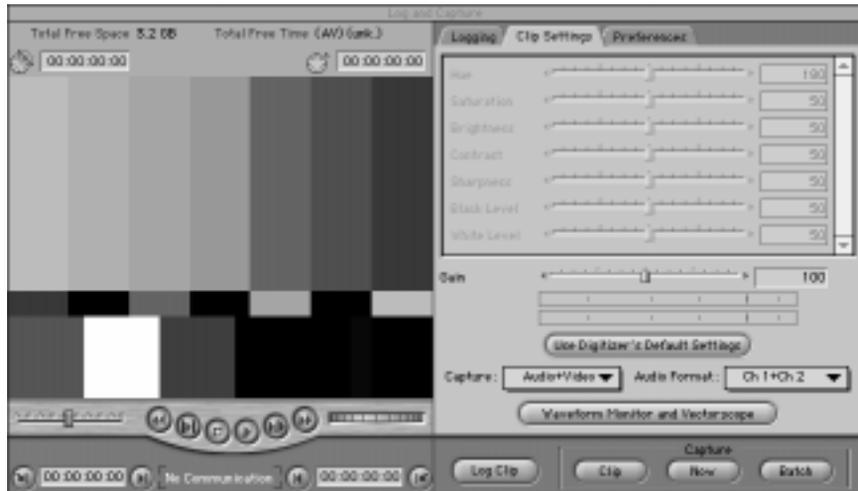
To set a Logging Bin within a project, choose Bin from the New submenu in the File menu then choose the Bin in the Browser. Choose Set Logging Bin from the File menu or choose Set Logging Bin from the shortcut menu by Control-clicking on the selected Bin in the Browser. You will see a Slate icon appear next to the Bin to indicate that it is the Logging Bin.

- Once you have set a Logging Bin, the button next to Log Bin will display the Logging Bin's name. Click this button to open the Logging Bin into its own window. If the project is designated as the Logging Bin, the Browser will come to the foreground on your monitor.

- The first button to the right of the Log Bin button lets you designate the directory above the current Logging Bin location as the new Logging Bin. If the Project is the designated Logging Bin, this button will be grayed out. The second button lets you create a new Logging Bin at your current location.
- *Reel*: Enter the name of the tape in your VCR in this field. The slate button to the right of this field lets you add a number at the end of the name for incremental labeling. Click this button to increment the number by 1. Option-click this button to clear the contents of the field. Control-click in the text field to select from a list of recent reel names.
- *Name*: The name in this field is compiled from information entered in the Label, Scene, and Shot/Take fields. Clip names cannot exceed 25 characters.
- *Prompt*: Check this box for a prompt to name a clip when you click the Log Clip button at the bottom of this tabbed window. You can use this dialog to quickly name your clips as you log them. You can also add log notes or mark the clip good at the same time.
- *Label*: Enter descriptive text in this field. Click the slate button to add an incremental label. Option-click this button to clear the contents of the field. Check the box to the right of this field to add this description to the Name field.
- *Scene*: Enter a scene number or descriptive text in this field. Click the slate button to add an incremental label. Option-click this button to clear the contents of the field. Check the box to the right of this field to add the contents of this field to the Name field.
- *Shot/Take*: Enter a number or descriptive text in this field. Click the slate button to add an incremental label. Option-click this button to clear the contents of the field. Check the box to the right of this field to add the contents of this field to the Name field.
- *Log Note*: This is a special comment field used to append notes to clip while logging. Control-click in this field to get a list of all other Log Note comments in the currently opened project.
- *Mark Good*: Check this box to place a “Yes” marker in the Browser’s Good column for easy sorting. You can also choose Find from the Edit menu while in the Browser to search for clips marked Yes in the Good column.
- *Markers*: Label and define segments between In and Out points of a clip in this part of the Logging tab. Click the triangle next to the Markers label to gain access to the Markers controls. You can name the marker, set In and Out points, and add notes in this area. For more information on adding markers, see “Logging Offline Clips” on page 124.
- *Log Clip*: Click this button to log the current clip into the Logging Bin in the Browser with all the information in the current Logging window.
- *Clip*: Click this button to capture a clip immediately. A log will not be placed in the Browser.

- *Now*: Click this button to capture without setting In or Out points. This is useful if you don't have device control or if you are capturing long clips without knowing the Out point. For more information on capturing without device control, see “Capturing Video Without Device Control” on page 120.
- *Batch*: Click this button to batch capture a series of logged clips within a log bin. For more information on batch capturing, see “Batch Capturing Clips” on page 126.

The Clip Settings tab lets you make adjustments to the incoming video and audio signal.



- The first group of slider controls affect the incoming video signal. They are QuickTime dependent and will only be active if your capture card supports that functionality. They have no affect on a DV signal even though the sliders are moveable.
- *Gain*: Adjusts the gain or audible level of the incoming audio signal. Again, this is only active if your capture card supports this QuickTime feature.
- *Use Digitizer's Default Settings*: Click this button to reset the Video levels and Audio gain back to defaults set by the manufacturer of the card.
- The Capture pop-up menu lets you specify the type of media to be captured.
  - *Audio Only*: Captures only audio. No video will be captured or displayed in the Log and Capture window.
  - *Video Only*: Captures only video. No audio will be played through or captured with the video.
  - *Audio+Video*: Captures audio and video from the source
- The Audio Format pop-up menu lets you specify which channels of audio to capture. This pop-up menu has no affect if Video only is selected in the Capture pop-up menu.

- *Ch 1 + Ch 2*: This sets the two audio channels as separate, linked channels but not an official “Stereo Pair.” Pan is centered for both channels.
- *Ch 1*: Captures only Ch 1 of the source media. Pan is centered.
- *Ch 2*: Captures only Ch 2 of the source media. Pan is centered.
- *Stereo*: This sets the two audio channels as a stereo pair. Both channels of a stereo pair must be the same length and any levels or effects applied to one channel are applied to the other channel.
- *Mono Mix*: Captures both channels of audio but mixes them together. There will only be one channel represented in Final Cut Pro.
- *Waveform Monitor and Vectorscope*: Click this button to open the Waveform Vectorscope monitor to examine an incoming signal. This scope looks at the entire frame of the incoming video signal and displays a graphical representation of where the colors and brightness levels fall on a predetermined scale.

## Changing Device Control, Capture, or Scratch Disk Preferences

To set device control, capture, or scratch disk preferences directly from the Log and Capture window, click the Preferences tab and then click the button for the desired preference.



Device Control preferences let you set appropriate settings for your video deck. Capture preferences let you configure your video input and your QuickTime capture card. Scratch Disk preferences let you define the disk and folder to which you want video files captured.

See Chapter 4, “Preferences and Presets,” on page 95 for details on these preference settings.

## Calibrating the Timecode Signal You Are Capturing

During video capture, the timecode and video signals are sent separately from the video deck to the computer. Because the signals are separate, they can arrive at different times, which causes incorrect timecode values to be recorded. You calibrate your system by entering the amount of time by which the signals are offset from each other. (You need to do this each time you change decks or cables.)

To calibrate timecode:

- 1 Capture video from a tape with the timecode visible in the frame (window dub), or with the timecode display option for your deck turned on.
- 2 Compare the timecode value recorded in the captured movie (the current position timecode field) with the burned-in timecode on the video frame.
- 3 Open the Edit menu and choose Preferences.
- 4 Enter the difference in the Timecode Offset box, in the Device Control tab in the Preferences window.

If the timecode position in Final Cut Pro for a frame in the captured movie is greater than the burned-in timecode value, enter a negative number. If less, enter a positive number.

## Calibrating Capture Settings With Bars and Tone From Tape

Calibrating a tape to bars and tone matches the color and audio level settings for a whole tape to the settings present when it was recorded. The settings you make are saved with each logged clip and applied when you capture the clip.

You can also use the Clip Settings tab in the Log and Capture window to make different settings for individual clips. If you redigitize a clip, the adjustments are re-used.

Final Cut Pro includes a waveform monitor and vectorscope that let you see adjustments and examine the quality of the incoming signal. For ease of use, you should record at least 30 seconds of standard color bars on each tape to use when making baseline adjustments. Adjustments are made in the Clip Settings tab.

To adjust the clip settings:

- 1 Open the File menu and choose Log and Capture.

If you haven't set device control preferences, the Preferences window appears. For more information, see Chapter 4, "Preferences and Presets," on page 95.

Use the transport controls in the Log and Capture window to play the color bar portion of your tape. The tape must be playing for the measurements in the waveform and vectorscope to be accurate.

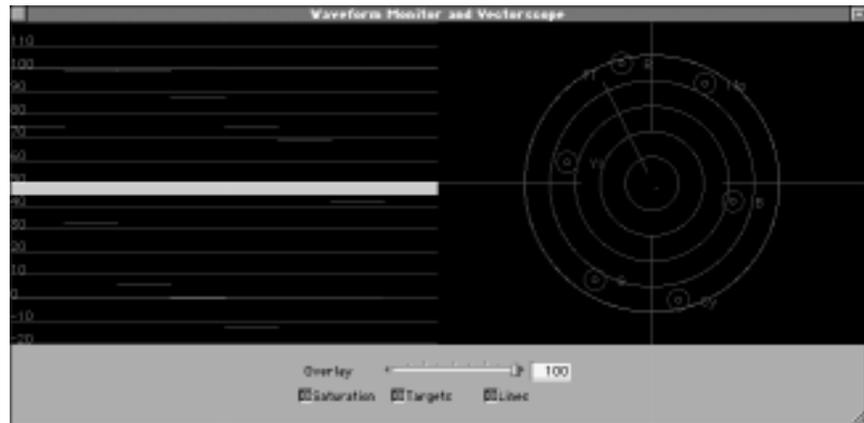
Select the Clip Settings tab and click the “Waveform Monitor and Vectorscope” button. The waveform monitor will only update while the Log and Capture window is active.

- 2 Adjust the black level so that the black reference bar in the waveform monitor is at the desired level (7.5 IRE for NTSC).

The waveform monitor displays the luminance and chrominance values of the incoming signal. The vertical axis displays the dynamic range of the signal from black at the bottom (7.5 IRE) to white at the top (100 IRE).

**Note:** If black level and white level controls are not available, use the brightness and contrast controls for steps 2 and 3.

- 3 Adjust the white level so that the white reference bar in the waveform monitor is at the desired level (100 IRE for a 100 percent white reference bar).
- 4 Adjust the hue so that the ends of the lines in the vectorscope are as near the color target boxes as possible. The diagonal line marker FT is the flesh tone target. All flesh tones should center around this line.



The vectorscope displays the hue and saturation values of the incoming signal. The hue is represented by the angle of a line within the circle (its 12 o'clock position). The saturation is represented by the length of the line from the circle's center point. The vectorscope displays targets for the optimum values for the six primary colors (red, green, blue, yellow, magenta, and cyan) in a standard color bar pattern.

- 5 Adjust the saturation so that the ends of the lines in the vectorscope reach the center of the target boxes as closely as possible.

- 6 Use the transport controls to shuttle the tape to a portion with a 1 kHz audio reference tone and use the Gain slider to adjust the audio signal so that it does not peak into the red areas of the audio meters.

**Note:** You may still need to make adjustments to individual clips when you log them prior to capture.

## Capturing Video Without Device Control

If you do not have a controllable video deck, you capture video by controlling the video source locally, as you monitor the signal and indicate the clips you want to capture. The captured clip opens in the Viewer as an untitled clip that is not associated with any project. If you have entered information about the clip in the Log and Capture window, this will be used for the clip.

When you log clips using a device that you can't control from your computer, you need to enter the clip timecodes and other information by hand while watching the tape. You can't capture previously logged clips unless you have a deck with device control.

To capture video without device control:

- 1 Open the File menu and choose Log and Capture.  
If you haven't set device control preferences, the Preferences window appears. For more information, see Chapter 4, "Preferences and Presets," on page 95.
- 2 If you have color bars recorded on the tape, you can shuttle the tape to the color bars and use them to calibrate the incoming signal. (See "Calibrating Capture Settings With Bars and Tone From Tape" on page 118.)
- 3 If you are capturing the audio signal, select the audio format. You can capture both channels of audio individually. You can also have them mixed into a mono signal or have a single channel split into stereo fields. The available audio formats are
  - *Ch 1*: The audio consists of only the left channel from the tape (Ch 1), with pan centered.
  - *Ch 2*: The audio consists of only the right channel from the tape (Ch 2), with pan centered.
  - *Mono Mix*: The audio consists of both channels from the tape, mixed into a single track.
  - *Stereo*: Both channels have been captured as a stereo pair. Stereo pairs are always linked, and anything that is applied to one track is applied to both.
  - *Ch 1 + Ch 2*: Both tracks have been captured, but are distinct and can be adjusted independently of one another.
- 4 Use the deck's transport controls to shuttle the tape to the portion you want to capture and press the Play button.

- 5 Click the Now button in the Capture window a few seconds before the deck reaches the first frame in your clip.
- 6 To stop recording, press the Escape key. The captured clip appears in the Viewer.
- 7 Save the clip by opening the File menu and choosing Save As, or by dragging it to an open project or into the Timeline for a sequence.

## Choosing a Logging Bin for Offline and Captured Clips

A logging bin is the bin in the Browser where logged clips are placed. A logging bin is set by default to the top level of a project.

To choose a logging bin for your clips, click the Logging tab in the Log and Capture window, and do any of the following:

- Click the Logging Bin button to open a new logging bin.
- Click the Up button to choose the bin hierarchically above the current logging bin.
- Click the New Bin button to create a sub-bin and select it as the current logging bin.

In the Browser, select a logging bin and choose Set Logging Bin from the File menu. A clapstick icon appears next to the current logging bin.



- Open the shortcut menu for a bin in the Browser and choose Set Logging Bin.

## Capturing Video With Device Control

Final Cut Pro has built-in device control that is compatible with professional-quality edit control protocols, including both Sony and Panasonic versions of RS-232 and RS-422. If you have a controllable source deck that is properly connected to your computer through a serial port, you can use Final Cut Pro to control the video deck as you capture clips.

When you capture clips using device control, you must enter both the reel number and the clip name in the Log and Capture window.

Controlling the video deck with Final Cut Pro gives you the ability to mark In and Out points for clips and save the edit points in a log. You can then capture the logged clips you want to capture as a batch. For more information, see “Batch Capturing Clips” on page 126.

To make settings for an individual logged clip:

You may want to save specific settings for some or all of the clips you log and capture. You do this using the Clip Settings tab in the Log and Capture window.

Clip settings that are saved with individual logged clips include

- all video controls for controlling image quality (in the Clip Settings tab)
- audio levels (in the Clip Settings tab)
- capture format (video, audio, or video and audio)
- audio format (Ch 1, Ch 2, Ch 1 + Ch 2, stereo, or mono mix)

To capture a single clip with device control:

- 1** If your deck has a local/remote control switch, set this to remote control.
- 2** Open the File menu and choose Log and Capture.

If you haven't set device control preferences, the Preferences dialog box appears. For more information, see Chapter 4, "Preferences and Presets," on page 95.

- 3** Enter the reel and clip name for the clip you are capturing.
- 4** Click the Clip Settings tab to adjust the incoming video signal using color bars recorded on your tape, if desired. (See "Calibrating Capture Settings With Bars and Tone From Tape" on page 118.)
- 5** Choose whether to capture video, audio, or both.
- 6** If you are capturing the audio signal, select the audio signal format. You can capture both channels of audio individually. You can also have them mixed into a mono signal or have a single channel split into stereo fields. The available audio formats are
  - *Ch 1*: The audio consists of only the left channel from the tape (Ch 1), with pan centered.
  - *Ch 2*: The audio consists of only the right channel from the tape (Ch 2), with pan centered.
  - *Mono Mix*: The audio consists of both channels from the tape, mixed into a single track.
  - *Stereo*: Both channels are captured as a stereo pair. Stereo pairs are always linked, and anything that is applied to one track is applied to both.
  - *Ch 1 + Ch 2*: Both tracks are captured, but they are distinct and can be adjusted independently of one another.
- 7** Use the transport controls in the Log and Capture window to control your source deck and find the clip you want to capture.

You can also enter a timecode in the current timecode field to shuttle the playhead to a location on the tape.

- 8 Do one of the following to mark a clip:
  - Click the Mark In and Mark Out buttons, or press I to set the In point and O to set the Out point (or the / and the \* on the numeric keypad). You can mark points this way when the tape is playing or is stopped.
  - Enter a specific timecode in the In and Out timecode fields at the bottom of the Log and Capture window.
- 9 Click Clip to capture the marked section of tape.

## Troubleshooting Your Video Deck

If you experience problems capturing video or controlling your deck from Final Cut Pro, the following tips may help you.

### **Final Cut Pro monitors the state of controlled devices.**

If your camcorder or deck malfunctions while printing to video or editing to tape, you may receive an error warning. Cancel the operation before proceeding further and consult your camcorder or deck manual for troubleshooting information.

### **If you see “No Communication” in the Deck Status area of the Log and Capture window:**

- Check to make sure that your deck is plugged in, switched on, and properly connected to your computer.
- Check your device control preferences. Make sure that device control is enabled, and that the computer port is selected. Check that you have selected the correct protocol for your deck.
- If the deck’s serial cable is connected after the computer starts up, the device may not be recognized. Connect the serial cable and restart the computer.
- If the deck’s power is not turned on when the computer starts up, the device may not be recognized. Turn on the deck and restart the computer.

### **If you experience problems using a deck or camcorder:**

Not all decks and camcorders support all functions, such as hard recording, high-speed searching, insert editing, assemble editing, preview editing, or accurately moving to timecodes entered. You may need to use a different protocol.

**Note:** The Panasonic and Sony RS-422 protocols require special cables. For more information, see the Final Cut Pro Read Me file in the Final Cut Pro application folder or visit the Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro)

- Check to make sure you’re using the protocol specified for your deck or camcorder. (You choose protocols in the Device Control tab in the Preferences window.)

- If you're using the Apple FireWire protocol, try Apple FireWire Basic instead. Click the Device Control tab in the Preferences window and choose the Apple FireWire Basic protocol.
- If your deck or camcorder supports LANC, try using the LANC protocol.

## Logging Offline Clips

Logging is the process of viewing videotapes and marking clips with reference to their timecodes. You can add notes that can be used to search for the clip later. You can also mark clips as “good,” so that you only have to capture the clips that you intend to use, rather than capturing all the logged clips, or for search later when you begin to edit clips together.

To use all of the logging options in Final Cut Pro, you need a controllable video deck. If you don't have a controllable deck, you can only log the duration and In and Out points for individual clips.

Final Cut Pro logs content by storing offline clips in the Browser bin of your choice. Offline clips specify capture preferences for video or audio you will capture later. When you finish logging, you can select all the offline clips you want on a single tape, and capture them as an unattended batch. Clips logged from different tapes cannot be captured unattended.

To log a series of offline clips:

- 1** Open the File menu and choose Log and Capture.

If you haven't set device control preferences, the Preferences window appears (see Chapter 4, “Preferences and Presets,” on page 95).

If AppleTalk is on, Final Cut Pro prompts you to turn it off. When you quit Final Cut Pro, AppleTalk will be turned back on. You can set this option in the Capture tab in the Preferences window.

- 2** Specify the logging bin for your clips, if necessary.
- 3** Type a name for the reel (a reel corresponds to the name of an individual videocassette).

When you insert a new tape, Final Cut Pro prompts you for a reel name. You can click the slate button next to the Reel name box to add 1 to the reel name.

- 4** Do one of the following to name clips:
  - Turn on the “Prompt for Name” option if you want to enter the name of each clip as you log it. This option is useful if you are using keyboard shortcuts during logging.
  - To append the label, scene, and shot/take fields to create the clip's name, click the checkboxes next to the fields you want to use (Label, Scene, and Shot/Take), and type any text you want to use in the text box. Final Cut Pro's auto-renaming function creates clip names by combining the chosen fields, such as Label\_Scene01\_Take01, into the name field.

- To add 1 to a name field manually, click the slate button next to it. When you do this, the Label or Scene goes to 01 in the Scene field; the Shot/Take field is reset to zero.

You can Option-click the slate button to delete its contents.

- 5 Use the transport controls in the Capture window to control your source deck and find the media you want to log.

You can also enter a timecode in the current timecode box at the top-left corner of the Log and Capture window to move to a location on the tape. (See “Working With Timecode” on page 87.)

- 6 Do one of the following to mark a clip’s In and Out points:
  - Click the Mark In and Mark Out buttons, or press I to set the In point and O to set the Out point. You can mark In and Out points this way when the tape is playing or stationary.
  - Enter a specific timecode in the In and Out timecode fields at the bottom of the Capture window.
- 7 To add a marker to a logged clip, click the triangle next to Markers at the bottom of the Logging tab. Enter the marker’s name, In and Out timecodes, and comment information as desired. When the clip is captured, these markers will be set automatically within the captured clip.



- 8 To log a clip, click the Log button.
  - If the “Prompt for Name” option is selected, you are prompted to enter name information.
  - If the “Prompt for Name” option is not selected, the information you log is saved in the logging bin.

After any clip is logged, the last item included in the name is increased by one.

- 9 Follow steps 5 through 8 until you have logged all the desired clips. For information on capturing the logged clips, see “Batch Capturing Clips,” next.

To log a series of clips back-to-back:

- 1 Set your first In point.
- 2 Play the clip and press F2 at the desired Out point.

This sets the Out point.

- 3 Enter a name and any notes into the Log Clip dialog box and click OK.

Your new In point is the previous Out point.

- 4 Press F2 to set your next Out point and log the clip.

As you log clips, Final Cut Pro stores them in the logging bin you have chosen. The clips are stored as offline clips and are indicated by a red slash through them in the Browser. You can modify the logged clips before you capture them. This is useful if you want to add or alter any comments.

## Batch Capturing Clips

You can batch capture a group of clips you've logged with Final Cut Pro. You can also import a log you've created in another application, or one that you've exported from another Final Cut Pro project, and capture those clips as a batch. See "Importing a Batch List" on page 128. You can also import an Edit Decision List (EDL) and capture the clips used in the EDL sequence. For more information, see "Importing an Edit Decision List" on page 259.

You can also use the batch capture feature to recapture clips at a higher resolution. Recapturing conserves storage space and maximizes system resources by creating sequences using low-resolution clips until you are ready to create your final output using the Sequence Trimmer.

**Note:** Before batch capturing clips, be sure your tape does not have timecode breaks in it. Otherwise logged offline clips will not be able to capture the correct media.

To batch capture clips:

- 1 Open the File menu and choose Log and Capture.

If you haven't set device control preferences, the Preferences window appears. (See Chapter 4, "Preferences and Presets," on page 95.)

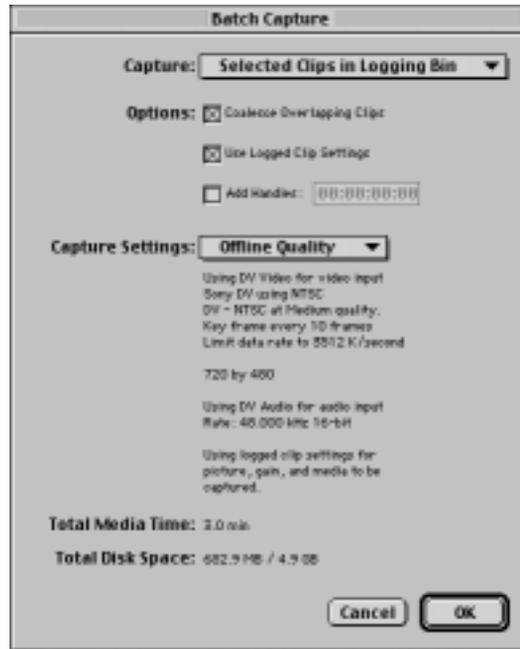
- 2 Specify the logging bin for your clips.

- 3 Do one of the following to select clips to capture:

**Note:** A clip that does not include a reel name can't be captured.

- To capture the offline clips in the current logging bin, click Batch Capture in the Log and Capture window.
- To capture all offline clips in a project, make sure everything in the project's tab in the Browser is selected and choose Batch Capture from the File menu.

- To capture a selection of clips in a project, select the clips in the Browser and choose Batch Capture from the File menu. You can select both online and offline clips.



- 4 Choose what to capture from the Capture pop-up menu at the top of the dialog box. If you are capturing all offline clips in a project, choose Offline Only.
- 5 Choose from the following options:
  - *Coalesce Overlapping Clips*: Check this box if you want to combine the media files for overlapping clips. The captured overlapping clips still appear independently in the Browser, but all reference the same media file. This is useful for saving capture time and disk space. If you want the clips to be captured with separate media files, leave this option unchecked.
  - *Use Logged Clip Settings*: Check this box if you want to capture clips using settings specified in the Clip Settings tab of the Log and Capture window during the initial log and capture process. (See the instructions for making settings for an individual logged clip on page 121.) Leave this box unchecked if you don't want to use the current settings in the Clip Settings tab of the Log and Capture window.
  - *Add Handles*: Check this box if you want to capture additional media before and after the marked duration within a clip. Handles are always relative to the In and Out points of a clip.

When capturing a newly logged offline clip with handles, the In and Out points will be set to the original logged duration. When capturing without handles, the In and Out points will be cleared.

- 6 Choose a capture preset from the Capture Settings pop-up menu. For more information, see Chapter 4, “Preferences and Presets,” on page 95.

**Note:** The Total Media Time and Disk Space calculations that are displayed at the bottom of the dialog box are based on the data rate settings specified in the current Capture preferences. For more information about preferences, see Chapter 4, “Preferences and Presets,” on page 95.

- 7 Click OK.
  - To stop batch capture, press the Esc key.

If you stop a batch capture, Final Cut Pro displays “error” next to all clips that were not captured in the Digitize column of the Browser. You can use the Batch Capture command to automatically redigitize all aborted clips.

### Changing Duplicate Clip Names and Filenames

When you log offline clips, it is possible to create two or more clips with the same name. When you batch capture both clips, one of them must be given a new name, since all clips in the same folder must have unique filenames when they are captured.

If you set up a batch capture that includes two clips of the same name, a dialog box appears to allow you to change the name of one of the clips.

If a clip that is to be captured already exists on disk, a dialog box appears to give you the option of renaming or skipping the new clip, or replacing the old clip with the new one.

### Importing a Batch List

You can import a log that you’ve created with another application to use for batch capture in Final Cut Pro. For example, you can log clips with a field log during production and then export the log to another application. Use your logging application to save the log as a tab-delimited text file. The first record should have field headers that match at least the following column headers in the Browser:

- Name
- Duration
- In
- Out

Column names must match the names in the Browser exactly, but capitalization is ignored. Subsequent records are the tab-delimited data. When you import the file into Final Cut Pro, the logged clips appear as offline clips that you can then capture.

To import a batch list:

- 1** In Final Cut Pro, select a Browser bin for the batch list.
- 2** Open the File menu and choose Batch List from the Import submenu.
- 3** Select the batch list and click OK.

## **Changing a Clip's Source Timecode**

You can change the source timecode of a clip if necessary. This is useful if you have transferred media to a higher-resolution format. For example, it is common to shoot on Hi-8 and then transfer material to Beta-SP for the greater durability of the higher-grade tape stock. In this case, the timecode on the new tape will differ from the original.

Changing a clip's timecode saves the changes on the disk. This changes all references to the clip in all projects in which it is used. You can modify the timecode by changing the value of the clip's starting frame or the current frame displayed in the Viewer. You can also change auxiliary timecodes.

To change a clip's timecode:

- 1** Double-click a clip in the Browser to open it into the Viewer.
- 2** Move the playhead to the frame at which you want to establish the new timecode.
- 3** Open the Modify menu and choose Timecode.
- 4** Choose Current Frame or Starting Frame from the pop-up menu at the top of the dialog box.
- 5** Enter a new timecode value in the source field and click OK. This changes the starting timecode value in the media file on disk.

To change a clip's auxiliary timecode:

- 1** Double-click a clip in the Browser to open it into the Viewer.
- 2** Move the playhead to the frame at which you want to establish the new timecode.
- 3** Open the Modify menu and choose Timecode.
- 4** Choose Current Frame or Starting Frame from the pop-up menu at the top of the dialog box.
- 5** Enter a new timecode value in the AUX field and click OK.

Auxiliary timecodes can only be changed one clip at a time.

## Importing Media

You can import QuickTime-compatible media files as well as Macromedia Flash files into a Final Cut Pro project. You can use commands to import a single file or folder, or you can drag files from folders on your desktop directly into a Final Cut Pro project.

Files you import into a project are not copied into the project file. The clip that appears in the Browser is only a reference to the actual media file on disk.

To import files:

- 1** Select a destination in the Browser.
  - To import files or folders into the root level of a project, click the project's tab.
  - To import files into a bin within a project, double-click the bin to open it.
- 2** Do one of the following:
  - Drag the desired files or folders from your desktop to a project tab or bin within the Browser.
  - Drag the desired files or folders from your desktop to the Timeline of a sequence. This places a reference to the media in the Timeline, but does not place a reference in the Browser.
  - Open the File menu and choose File or Folder from the Import submenu. Select the item and click Open.
  - Control-click in the Browser or Bin window and choose Import File or Import Folder from the shortcut menu.

Folders are imported with their internal hierarchies intact.

## Importing Still Images and Audio Files

When you import still images, they become clips that contain two minutes of identical video frames, with a default duration of 10 seconds between In and Out points.

You can change the duration between In and Out points for a still image in the Viewer, or change the default duration of still images using the Still Image Duration option in the General tab in the Preferences window. For more information about General preferences, see Chapter 4, "Preferences and Presets," on page 95.

**Note:** Still images are not visible on an NTSC or PAL monitor until they are rendered in the sequence containing them.

You can import graphics files in the following formats:

- SGI
- BMP
- GIF
- JPEG
- PICT
- PNG
- PNTG (MacPaint)
- PSD (Photoshop)  
*Note:* For best compatibility with Final Cut Pro, be sure to save Photoshop files as 2.5 compatible.
- QTIF (QuickTime Image)
- TGA (Targa)
- TIFF
- Photo CD
- QuickTake (QuickTake is a PICT format and available only on computers with QuickTake software installed.)

*Note:* This is only a partial list of formats supported. Check the QuickTime Read Me file for a more complete list.

### **Importing Layered Photoshop Files**

Final Cut Pro preserves the layers in a layered Photoshop file, importing the file as a sequence. Each layer in Photoshop corresponds to a video track in the sequence. To view layers in separate video tracks, double-click the clip. The Photoshop clip expands into a tabbed subsequence. Layer opacity settings and layer modes are preserved, but layer masks are not. If a Photoshop layer mode has no corresponding compositing mode in Final Cut Pro, the layer mode is ignored. For more information on compositing modes and compositing images in Final Cut Pro, see Chapter 12, “Compositing and Special Effects,” on page 219.

*Note:* A layered Photoshop file will not be updated if you make changes after it has been imported. To update the sequence, you need to delete the original file from the project and import the updated file.

To import a layered Photoshop file as a clip instead of a sequence, flatten the image in Photoshop before importing it.

## Importing Audio Files From Audio CDs

You can import audio tracks from an audio CD into a Final Cut Pro project. When importing audio tracks, QuickTime converts the audio tracks to digital audio files that can be edited within Final Cut Pro. When converting, you can convert an entire audio track or a portion of it and set audio sampling and bit rates.

**Note:** You cannot import a CD audio track by dragging it to the Browser.

Follow these steps:

- 1** Open the File menu and choose File from the Import submenu, or open the shortcut menu in the Browser and choose Import File.
- 2** Locate the audio track you want to import and click Convert.
- 3** Click Options.
- 4** Do any of the following:
  - To audition the track, click Play. Drag the timecode marker in the slider bar to shuttle the playhead to a different location in the track.
  - To convert only a portion of the track, mark In and Out points by entering starting and ending times in the Start and End text boxes or drag the ends of the sliders to set the start and end times.
- 5** Select an audio sampling rate, bit rate, and audio format (stereo or mono). Click OK.
- 6** Name the audio track and specify a location to save it.
- 7** Click Save.

**Note:** If working with a DV sequence, convert audio CD files from 44.1 kHz to 48 or 32 kHz, matching them to what your DV sequence is set to, using an audio conversion application before importing them into your sequence. If you import audio CD files directly, you may experience audible distortions in the audio.

# Creating and Organizing Projects

A *project* is a Final Cut Pro file that stores references to all of the media files that you use in creating a particular end product. A project file also includes all the information about how you've arranged your material in sequences, including special effects settings you've applied to clips.

## Creating, Opening, Closing, and Saving Projects

To start a new project in Final Cut Pro, you create a project file in the Browser and insert sequences and clips into it. New projects include an empty sequence. You can have multiple projects open in Final Cut Pro. Each project appears in its own tab in the Browser.

When saving projects, Final Cut Pro saves the arrangement of project items in the Browser window, the sequences within the project, and all settings that have been applied to clips. Sequences cannot be saved separately from a project, but they can be exported as movies or clips.

To create a new project:

- Open the File menu and choose New Project.

To open a project:

- Open the File menu, choose Open, and locate the project.

To close a project, do one of the following:

- Click the project's tab to bring it to the front of the Browser and choose Close Project from the File menu.
- Control-click the project's tab and choose Close Tab from the shortcut menu.
- Close the Browser window. This closes all open projects in that tab (others may be open in tabs that have been dragged out of the main Browser window).

To save a project:

- 1 Select the Project tab in the Browser.
- 2 Open the File menu and choose Save Project.

To save a project with a different name:

- 1 Select the Project tab in the Browser.
- 2 Open the File menu and choose Save Project As.
- 3 Name the project and select a destination.
- 4 Click Save.

To save all open projects:

- 1 Open the File menu and choose Save All.
- 2 Name the projects and select destinations.
- 3 Click Save.

### **Autosaving Projects**

Final Cut Pro can automatically save copies of all open projects at a regular interval in the directory with each project. Project files are modified only when you specifically use the Save or Save All command. If your computer fails while working in a project, restart Final Cut Pro. You can open the autosaved version of the project or the original. If you open the original, the autosaved version of the project will not be deleted until you choose Save from the File menu and save over the original project. If you open the autosaved version of the project, Final Cut Pro treats it as a separate project and does not modify the original.

For more information about the autosave option, see “Setting General Preferences” on page 96.

### **Customizing the Browser Display**

You can customize the appearance of the Browser so that items appear as icons or in a list. You can also tidy up the display of icons with the Arrange command, available in the View menu or in the Browser through the shortcut menu.

When items are displayed as a list, the Browser displays information about the items in columns. You can rearrange, resize, hide, and show individual columns, sort by certain columns, and switch between a predefined set of standard columns or a set of columns designed for logging. You can also edit the Comment column names.

To display items as a list or as icons:

- 1 Make the Browser the active window.
- 2 Open the View menu and choose the desired display option from the Browser Items submenu, or Control-click in the Name column and choose “View as List” from the shortcut menu.

To clean up the display of the Browser when items are displayed as icons:

- Make the Browser active and choose Arrange from the View menu.

To display thumbnails in the Browser in list view:

- In the Browser window, Control-click in any column heading other than Name and choose Show Thumbnail from the shortcut menu.
- Control-click in the Thumbnail column heading and choose Hide Column from the shortcut menu to hide Thumbnails.

**Note:** You can scrub through a clip’s thumbnail by clicking it and dragging in the direction you want to scrub.

To rearrange and resize Browser columns:

Do any of the following:

- *To rearrange columns:* Drag the column header to the new location.
- *To resize a column:* Drag the edge of the column header.

To show, hide, or change the display of columns:

Do any of the following:

- *To hide a column:* Control-click in the column header and choose Hide Column from the shortcut menu.

**Note:** You can’t hide the Name column.

- *To display a hidden column:* Control-click in the column header next to where you want to display the column, and choose the column’s name from the shortcut menu.
- *To display standard or logging columns:* Control-click in a column header and choose either Standard columns or Logging columns from the shortcut menu. Use logging columns when you are logging clips.

**Note:** Some Browser columns are hidden by default when you first use Final Cut Pro. Access to these columns is available through the shortcut menu.

To edit the Comment column header, do one of the following:

- Open the shortcut menu in a Comment column header, choose Edit Heading from the Context menu, type a new name in the edit box, and press Enter.

- Choose Project Properties from the Edit menu, type new names in the Comment text boxes, and click OK.

To show the markers for a clip:

- Click the triangle next to the clip's icon. The markers appear below it. If there are no markers associated with the clip, there is no triangle next to the clip.

### Selecting Items in the Browser

You can use several methods to select items in the Browser:

- Click the item.
- Type the first few letters of an item's name.
- Use the arrow keys to move between adjacent items.
- Use the Tab key to move between items alphabetically. Use Shift-Tab to move backward.
- Command-click to add or subtract individual items from a group selection.
- Drag a bounding box around a group to select multiple items.

### Sorting Items in the Browser

You can sort the clips, sequences, and bins in a project by most columns. You can refine the sorted items by performing additional secondary sorts on other columns.

The primary sort column has an indented header and is indicated by a green arrow in the column header. Additional sorted columns are indicated by light blue arrows in the column header.

To sort items in the Browser:

- 1** To specify the primary column by which to sort, click the column header. Click the header again to reverse the sort order.
- 2** To specify secondary columns by which to sort, Shift-click the additional column headers. Shift-click the headers again to reverse their sort orders.

### Organizing Projects With the Browser

The Browser acts as an organizational resource for the clips and sequences you have in a project. You can organize your clips and sequences into folder-like bins. The properties of clips and sequences are displayed in columns. You can search for and sort clips (in most columns) based on any clip property. Some clip and sequence properties can also be modified directly in the Browser using the shortcut menu. The Browser also contains details of any markers that have been placed in clips.

## About the Browser Columns

Most of the Browser's columns are easy to use and understand. Those that follow need additional explanation:

- *Aux TC 1 and 2*: The starting timecode numbers for auxiliary timecodes 1 and 2. These can be used when synchronizing clips.
- *Capture*: The capture state of a clip in the Batch Capture list
- *Duration*: The duration between a clip's In and Out points
- *Good*: Indicates whether a clip has been marked Good in the Log and Capture window
- *Length*: The length of the source media on disk
- *Source*: The pathname of the media file on disk
- *TC*: The timecode displayed in the Viewer. It can be the source timecode or either of the auxiliary timecodes.
- *Thumbnail*: Shows the first frame of the clip. You can click a thumbnail to scrub through the clip.
- *Timecode*: The starting timecode number for the source timecode (the source timecode is for the media on disk)
- *Tracks*: The number of video and audio tracks in the item
- *Type*: The type of each item. This can be clip, subclip, sequence, bin, or effect.
- *Icons*: The table below describes icons found in the Browser.

Icon	Name	Description
	<b>Sequence</b>	A structured collection of media clips, edit information, render properties, and output information
	<b>Clip</b>	A media file containing video, audio, graphics, or any other content imported into Final Cut Pro
	<b>Subclip</b>	A segment of a clip defined by In and Out points. There may be any number of subclips referenced to one master clip.
	<b>Offline Clip</b>	A placeholder clip referencing media not stored on a local hard disk
	<b>Marker</b>	A reference point in a clip
	<b>Audio Clip</b>	A media clip containing audio samples

Icon	Name	Description
	<b>Video Transition</b>	A transition effect that can be applied to a video track
	<b>Audio Transition</b>	A transition effect that can be applied to an audio track
	<b>Video Filter</b>	An effects filter that can be applied to a video clip
	<b>Audio Filter</b>	An effects filter that can be applied to an audio clip
	<b>Generator</b>	An effects utility that generates screens and tones that can create distinctive breaks between live action

### Using Bins to Organize Clips

You can use Browser bins to organize and group files into a logical structure, making them easier to manage. Bins are similar to folders in the Finder. Bins can be organized hierarchically, and they can be opened in their own windows and made into Browser tabs.

When you import a folder into a project, it appears as a Browser bin (see “Importing Media” on page 130). Changes you make to the contents of that bin, such as deleting, moving, and renaming clips, or renaming the bin itself, have no effect on the disk files or folders where the source material is stored. If you delete a clip from a bin, it is not deleted from the disk. Likewise, inserting a bin does not create a folder on your disk. The bin is located only in the project file.

To add a new bin to a project:

- Open the File menu and choose Bin from the New submenu or Control-click in an empty portion of the Name column and choose New Bin from the shortcut menu.

To open a bin and create a tab in the Browser for it:

- 1 Double-click the bin.
- 2 Drag the tab from the bin to the Browser window’s Name column.

To move items between bins in list view:

- 1 Drag the items onto the selected bin.
- 2 With the mouse button pressed down, pause over a closed bin to open it.
- 3 Release the mouse button to drop the items into the bin.

- 4 Click the arrow to the left of the bin to expand it and view its contents.

**Note:** To move an item to the top level of a project, drag the item to the Name column header.

To make a copy of a Browser item:

- Hold down the Option key and drag the item to a new bin.

To remove a clip, sequence, or bin from a project:

- Select the item and press Delete. Deleting clips from a project does not delete them from any sequences in the project or on the disk.

### **Modifying Clip Properties in the Browser**

You can modify the properties of clips directly in the Browser and enter up to four separate comments for each clip. Some properties can be modified by choosing an option from a shortcut menu. Others can be changed by typing directly into the Property column in the Browser.

Changing the properties of clips in the Browser is a convenient way to modify the properties of multiple clips at once. For example, you can set a group of clips to the same composite mode before they are edited into a sequence. For more information about the difference between a clip in the Browser and a clip in a sequence, see “Using Clips in Sequences” on page 143.

To modify the properties of a clip in the Browser:

- Control-click a clip and choose Item Properties from the shortcut menu. See “Getting Information About the Properties of Clips” on page 160.

To make changes to multiple items or column entries in list view:

- When your Browser is in list view, you can change multiple Browser items, or all the entries in one column if it has a shortcut menu. Select the items you want to change, then use the shortcut menu to change them.

### **Renaming Clips, Sequences, and Bins**

You can rename clips, sequences, and bins directly in the Browser. Renaming a clip only changes the clip name in the project. It does not change the name of the media file on your disk. Likewise, changing the name of a bin that corresponds to a folder on your disk only changes the name of the bin in the project, not the folder on the disk or clips in a sequence.

To rename clips, sequences, and bins in a project:

- 1 Select the clip, sequence, or bin.
- 2 Click the name.

- 3 Type a new name.

**Note:** You can have clips with the same name in the same bin, but the names of the media files on the disk must be different.

### Searching for Items in the Browser

You can search for items in a project by any property or combination of properties. The most simple search for a clip is by name, but you can also search for clips by timecode, by audio type, by video type, and so on. You can search in all open projects, or restrict the search to any single tab in the Browser.

You can search for a single item or multiple items. When searching for multiple items in the Browser, Final Cut Pro compiles the list of found items in the Find Results window. The items in this window are references or pointers to the clips in the Browser. You can use the Find Results window to delete found items from a project, move or copy them to another location in the Browser, or edit the items into a sequence. You can also search in the Find Results window itself as a means to narrow a search, and perform additional searches and combine the results in the Find Results window.

To search for items in the Browser:

- 1 Make the Browser the active window.
- 2 Open the Edit menu and choose Find.
- 3 Type the criteria for which you want to search. You can limit the search to a single column by selecting the column name from the Column option.
- 4 Choose a criterion from the search criteria option. For example, you can search for items that start or end with a character string, or that are greater than or less than a timecode value. Options available depend on the search column selected.
- 5 To search for an item based on the contents of multiple columns, click More and specify options as desired. Select an option from the Match option to find items that match all or any specified criteria.
- 6 To search for items by excluding specified criteria, turn on the Omit option for the desired search criteria.
- 7 Specify the search location (project, individual Browser tab, or all open projects) from the Search option.
- 8 Start searching:
  - To search for a single item, click Find Next. Final Cut Pro highlights the found item in the Browser.
  - To search for multiple items, choose a Results option to add all found items to the last results or to replace the last results. Click Find All.

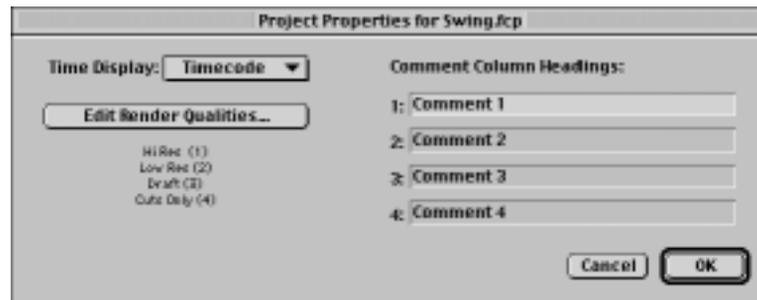
- 9 If you are searching for multiple items, use the Find Results window to do any of the following:
- To delete items from the project, select the desired items and click “Delete from Project.”
  - To move items to another bin, drag them from the Find Results window to the new bin.
  - To copy items to another bin, Option-drag them from the Find Results window to the desired bin.
  - To search in the Find Results window, choose Find from the Edit menu. Specify search criteria as described in steps 3 through 6 and choose Find Results as the search location.

To locate the Browser bin for an item in the Viewer:

- Select the item or click the Viewer tab it is in and choose Browser Bin from the “Go to” submenu of the Mark menu.

## Changing the Properties of a Project

Each project has a set of properties that are saved with it. This set of properties applies to all sequences in a project and is independent of the Sequence preset that has been applied. To view or change the properties of a project, click the Project tab and choose Project Properties from the Edit menu.



You can use the Project Properties window to do the following:

- Display timecode or frames in the Duration column of the Browser’s Project tab.
- Edit render qualities for a project.
- Change heading labels for Comment columns in the Browser’s Project tab.

For more information about render qualities, see “Editing Render Quality Levels” on page 242.



# Working With Clips and the Viewer

A clip is the basic unit of media that you use to create movies in Final Cut Pro. Clips can be movies, still images, nested sequences, generators, and audio files.

When you insert a clip into a project, you are not copying the original media file onto the disk. The clip is actually a reference to that file. Therefore, if you delete the original media file, your clip will still appear in the Browser and Timeline, but it will not show the frames or play. Additionally, when you apply special effects and perform edits on clips, you are not affecting the media file.

If you are working with an individual clip, you use the Viewer window. The Viewer window's tabs let you select specific aspects of the clip to work with: video, audio, motion, and filters.

## Using Clips in Sequences

When you insert a clip from the project into a sequence, you've copied the clip into the sequence. The clip in the sequence is a reference to the actual media file on the disk. It is not a reference to the clip in the project file.

The implications of making changes to clips in sequences or in the Browser are important:

- If you make changes to a clip in the Browser and then insert it into a sequence, the clip that is placed in the sequence includes the changes that have been made in the Browser.
- Once you've inserted a clip into a sequence, changes you make to that clip from the Browser will not be reflected in any sequence where the clip is used.
- Clips that appear in multiple sequences are independent of each other. Changes to one will not affect the others.
- Any changes you make to a clip in a sequence are not made to the clip in the Browser.

**Important** In the Viewer, Final Cut Pro distinguishes clips that have been opened from the Timeline by displaying two lines of dots in the Scrubber bar. Clips that have been opened from the Browser have a plain Scrubber bar.



## The Audio Tab

The Audio tab lets you view the audio waveform channels and has controls to change level and pan or spread settings. You can also use this tab to set In and Out points, markers, and keyframes for audio clips.



The Level slider adjusts the amplitude or volume of the audio clip. The button to the right places keyframe markers at the current playhead location in the clip timeline. These keyframe markers can be used for editing audio levels between two points.

The Spread slider enables stereo panning or swapping of left and right channels. The base setting of  $-1$  outputs the left audio channel to the left and the right audio channel to the right. A setting of  $0$  outputs the left and right audio channels equally to both sides. A setting of  $+1$  swaps the channels and outputs the left audio channel to the right and the right audio channel to the left. The button to the right places keyframe markers at the current playhead location in the clip timeline. These keyframe markers can be used for panning audio output between two points.

The X button next to the Level and Spread marker buttons deletes all marked points in the audio timeline and resets the level and spread values to their original settings.

Drag the hand on the speaker to move the audio clip with edits to another window such as the Browser or Timeline.

## The Filters Tab

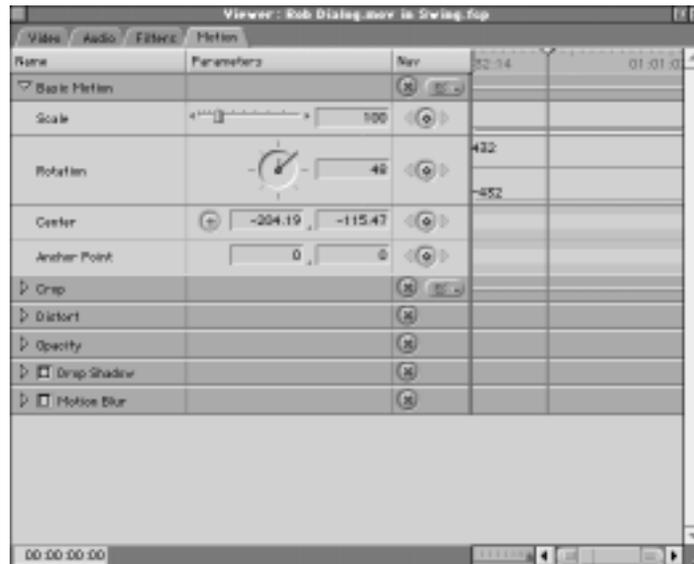
The Filters tab lets you change the settings for any filter effect you have applied to the clip. You can change settings for individual effects and create animated effects by using a combination of keyframes and changes to filter settings. You can navigate with precision within the clip by entering a timecode into the timecode field in the bottom-left corner of the window.



## The Motion Tab

The Motion tab lets you apply and modify motion effects to a clip. You can also apply animated effects by using a combination of keyframes and changes to motion settings. You can make very fine adjustments to motion properties using the Motion settings. You can navigate with precision within the clip by entering a timecode into the timecode field in the bottom-left corner of the window.

To toggle motion effects off when playing clips in the Viewer, check the box labeled “Play Base Layer Only” in the Render Qualities Editor. See “Editing Render Quality Levels” on page 242 for details.



## Opening Clips in the Viewer

When you open a clip, it appears in its own Viewer window with the Video tab selected.

You can open clips from the project tab of the Browser or from the Timeline. You can open single or multiple clips, and any recently viewed clips. You can also open clips from outside an open project.

To open clips in the Viewer, do one of the following:

- Double-click the clip in the Browser or Timeline, or select it and press Enter.

**Note:** The Viewer treats out-of-sync video and audio as separate elements. Even though the out-of-sync video and audio may be linked in the Timeline, the Viewer will only display the track or channel you have selected.

- Select the clip in the Browser or Timeline and choose “Clip in New Window” from the View menu.
- Drag multiple clips from the Browser to the Viewer. The first clip is opened in the Viewer and the remainder are listed in the recent clips control.
- Select a recently viewed clip from the recent clips control in the Viewer.
- Choose Open from the File menu and select a clip.  
Any changes you make to an opened clip, such as marking edit points or creating markers, are not saved with the clip. To save any changes, you have to insert the clip into a project or export the clip.
- Drag a clip from the video frame in the Viewer to the project tab in the Browser to insert a clip from the Viewer into an open project.

**Note:** You can also open generator effects directly from the Browser’s Effects tab in a Viewer window, as if they were clips.

## Playing Clips and Locating Specific Frames

You use the transport controls in the Viewer to play and scrub clips. You can play clips forward, backward, between In and Out points, one frame at a time, looped, and, with the proper video card, on an external NTSC or PAL monitor. You can also move the playhead by jogging, shuttling, and scrubbing.

### To navigate using timecode values:

- To navigate to a specific frame in a clip, open the clip in the Viewer and enter the timecode value in the playhead position timecode box at the top-right corner of the Viewer, then press the Enter key.

The playhead moves to the specified timecode.

For more information, see “Working With Timecode” on page 87.

**Note:** You can change the duration between In and Out points of a clip by changing the timecode in the Duration box in the top left of the Viewer window. This moves the Out point for the clip.

### To play clips in the Viewer:

Do one of the following:

- To begin playing a clip, click the Play button or press the Space bar. To stop playing the clip, click any play button or press the Space bar.
- To play the clip in reverse, press Shift–Space bar, or Shift-click the Play button.
- To play the clip between the In and Out points, click the “Play In to Out” button or press Shift–\ (backslash).

- To play the clip from the current playhead position to the Out point, Command-click the Play button.
- To play the clip footage that is centered around the current playhead position, click the Play Around Current button or press \ (backslash). The duration of video that is played is determined by the pre-roll and post-roll preferences.
- To loop playback, choose Loop Playback from the View menu. All playback methods are looped. Choose Loop Playback again to turn off looped playback.

### **To jog, shuttle, scrub, and move the playhead:**

Do one of the following:

- To jog one frame at a time, drag the jog control. You can drag off the control area if you continue to hold down the mouse button. You can also jog by dragging the playhead in the Scrubber bar.
- To play at various speeds, drag the shuttle control. The shuttle control plays the clip at a variable rate. Drag further from the center to play the clip faster. Drag right to play forward; drag left to play in reverse.
- To scrub through a clip, drag the playhead in the Scrubber bar above the transport controls.
- To move the playhead to a location within the clip relative to the clip's length, click in the Scrubber bar. You can also move to an exact frame by entering a timecode in the Current field.
- To move the playhead frame by frame, use the arrow keys.
- To shuttle playback forward, press the L key. This starts playback at 1x speed. Press the key repeatedly to accelerate forward playback up to four times normal speed.
- To shuttle playback in reverse, press the J key. This starts playback at 1x speed. Press the key repeatedly to accelerate reverse playback up to four times normal speed.

## **Marking In and Out Points**

The In and Out points determine the start and end frames of the clip. This is the portion of the clip that is used when the clip is placed into a sequence, although there may be additional media at either end of the clip. Many editing functions are performed by moving either of these points, either within the clip itself or from within a sequence.

To mark the In or Out point for a clip:

- 1** Open the clip in the Viewer.
- 2** Navigate to the frame where you want to place the In or Out point.
- 3** Click Mark In or Mark Out.

**Note:** You can drag the In or Out point icons along the Scrubber bar to change their location, or drag them off the Scrubber bar to remove them.

You can perform these actions using modifier keys in combination with mouse clicks on interface elements:

- Option-click the Mark Clip button to clear both In and Out points.
- Option-click the Mark In button to clear In points.
- Option-click the Mark Out button to clear Out points.
- Shift-click the Mark In button to go to the In point.
- Shift-click the Mark Out button to go to the Out point.
- Shift-click either the In or Out point to slip the edit.

## Creating Subclips

Subclips enable you to create multiple clips from a single master clip. For example, you can open a 20-minute clip in the Viewer and divide it into as many subclips as necessary at one time. As you create subclips, the master clip remains open in the Viewer. You can then work with the subclips in the same way as any other clip, but independently of the master clip.

Final Cut Pro places new subclips in the same project bin as the master clip, numbering each. For example, if the master clip is named “Long interview,” the first subclip is named “Long interview subclip1,” the second is “Long interview subclip2,” and so on. Once you create a subclip, you can rename it and you can trim the edit points as in any other clip. However, you can’t extend the subclip’s In and Out points to the surrounding media as you can the master clip’s. To do so, you need to open the master clip, change its In and Out points and then create a new subclip.

To create a subclip:

- 1** Open a clip in the Viewer and mark In and Out points.
- 2** Open the Modify menu and choose Make Subclip.

To find a subclip’s master clip:

- 1** Open the subclip in the Viewer.
- 2** Open the Mark menu.
- 3** Choose Master Clip from the Go To submenu.

## Adding and Editing Markers

Markers create points of reference in a clip that let you do the following:

- Align other clip markers, clip boundaries, or transition boundaries to a marker in the Timeline.
- Align the clip marker to a marker in the sequence.
- Align a filter or motion keyframe to the marker.
- Quickly move the playhead to a marker in the clip or sequence.
- Mark a range of the clip to use as you might a subclip.

You can have any number of markers in a clip. You can set markers while a clip is playing or while the playhead is stationary. Marker overlays are displayed in the video frame whenever the playhead is positioned over a marker, and marker icons appear in a clip's Scrubber bar as shown in the picture below.



**Note:** If you add a marker to a clip that you've opened from the Browser, the marker is also displayed in the Browser. This lets you work with the marker as a subclip.

To add markers to a clip or sequence in the Viewer:

- 1 Open the clip in the Viewer.
- 2 Play the clip or sequence and when playback reaches the desired point, press M or click the Add Marker button. Press M a second time to add a custom label or comments to the marker.

To delete a marker:

- 1 Move the playhead to the marker.
- 2 Open the Mark menu and choose Delete Marker from the Markers submenu.

To move the playhead to a marker:

Do one of the following:

- Drag the playhead in the Scrubber bar to the marker location.
- Open the Mark menu and choose Marker from the Previous submenu.
- Open the Mark menu and choose Marker from the Next submenu.
- Open the shortcut menu in the current timecode position field or Timeline ruler and choose a marker.

When you place the playhead on a marker, the marker overlay appears in the Viewer or Canvas. (See “Viewing Overlays” on page 156.)

The following actions are performed using modifier keys in combination with mouse clicks on interface elements.

- Shift-click the Marker button to set a marker and open the Edit Marker dialog box.
- Option-click the Marker button to delete a Marker if parked on one.

### Renaming Markers and Attaching Comments

The default names Final Cut Pro uses for markers only indicate the order in which you've added them to a clip. The first marker you add is named Marker 1, the second Marker 2, and so on. You may want to rename markers to indicate the location they mark.

You can also attach comments. Both the name and the comments appear as overlays in the Viewer whenever the frame containing the marker is displayed.

To rename a marker:

- 1 Move the playhead to the marker.
- 2 Press M, click the Add Marker button, or open the Mark menu and choose Edit from the Markers submenu.
- 3 Type a name and comment in the corresponding text boxes and click OK.

**Note:** You can also rename clip markers in the Browser by opening the shortcut menu on the marker's name, choosing Edit Marker, and typing a new name. (See "Renaming Clips, Sequences, and Bins" on page 139.)

### Moving and Extending the Duration of Markers

You can move placed markers and extend their duration by editing the timecode values with the Edit Marker command. You can also move a marker forward in time and extend its duration.



To move or extend the duration of a marker with the Edit Marker command:

- 1 Move the playhead to the marker.
- 2 Press M, click the Add Marker button, or open the Mark menu and choose Edit from the Markers submenu.
- 3 Do one of the following:
  - To move the marker, enter a new start time.
  - To extend the duration of a marker, enter a duration value.

An extended duration marker appears on the Scrubber bar as a marker icon with a bar extending along the Scrubber bar.

To extend the duration of a marker to the playhead location:

- 1 Position the playhead ahead of the marker.
- 2 Open the Mark menu and choose Extend from the Markers submenu.

The marker's duration will extend from the original location of the marker to the location of the playhead.

To move a marker forward in time:

- 1 Move the playhead to the location where you want the marker to be repositioned. You can only move a marker forward. Final Cut Pro moves the marker nearest the new location. If there are multiple markers, the one immediately to the left of the playhead will be moved.
- 2 Open the Mark menu and choose Reposition from the Markers submenu.

### Using Markers as Subclips

An extended duration marker acts as a subclip, but you can explicitly make subclips from extended duration markers.

To make a subclip from a marker in the Browser:

- 1 Select the marker.
- 2 Choose Make Subclip from the Modify menu.

The subclip appears in the same bin as the master clip, with names of both the marker and master clip appended together.

If you double-click a marker in the Browser, it opens a subclip in the Viewer.

### Viewing Clips

The Viewer controls and the Zoom and Hand tools let you view the current clip or sequence in different ways. You can change the magnification and move a magnified view. You can also view action and title safe zones, and display or hide overlays (visual cues that indicate significant points, such as edit points, in a clip).

**Note:** Changing the magnification alters the display only, not the output resolution.

### Opening Clips From the View Menu

You can select a clip in the Browser, Timeline, or Canvas and open it using the View menu:

- Choose Clip to replace the current contents of the Viewer with the selected clip.
- Choose “Clip in New Window” to open a new Viewer containing the selected clip.

### Opening the Application a Clip Was Created in

You can open the application a clip was created in directly from Final Cut Pro. This is sometimes useful when working with imported still images.

To open the application:

- 1 Open the clip in the Viewer or Canvas.
- 2 Open the View menu and choose Clip Editor.

If the clip was created in Final Cut Pro, a new Viewer window opens for it. Clips created in an application other than Final Cut Pro open in that application. If the application used to create the clip is not on your computer, a dialog box opens that allows you to choose an application to edit the clip in.

**Note:** Opening clips in applications other than Final Cut Pro requires additional memory. Be sure you have enough available RAM installed in your computer.

### Changing Magnification in the Viewer or Canvas

To zoom in, do one of the following:

- Select the Zoom In tool and click inside the Viewer or Canvas, or click in the video image and drag a marquee to zoom in on the desired area of the image.
- Choose a higher magnification level from the Zoom pop-up menu at the top of the Viewer or Canvas.
- Open the View menu and choose the amount you want to zoom in from the Level submenu.

**Note:** Clips will not play smoothly when you have zoomed in on a clip in the Viewer.

To view different parts of a magnified image:

- Select the Hand tool from the Tool palette and drag it over the image to move the view.
- Use the scroll bars to move around the image.

To zoom out, do one of the following:

- Select the Zoom Out tool and click inside the Viewer or Canvas.
- Choose a lower magnification level from the Zoom pop-up menu at the top of the Viewer.
- Open the View menu and choose the amount you want to zoom out from the Level submenu.

To fit the clip or sequence into the window size:

- Choose Fit to Window from the Zoom pop-up menu at the top of the Viewer or Canvas.

To fit all items into view plus a 10% margin:

- Choose Fit All from the Zoom pop-up menu at the top of the Viewer or Canvas or open the View menu and choose Fit All from the Level submenu.

To view at actual size:

- Choose 100% from the Zoom pop-up menu at the top of the Viewer or Canvas.

To shrink the window to the current clip size:

- Make the Viewer or Canvas active, then double-click the Zoom tool in the Tool palette.

To preview any non-square pixel aspect ratio clips on your computer's display in square pixels:

- Choose Show As Sq. Pixels from the Level submenu in the View menu or from the Zoom pop-up menu at the top of the Viewer or Canvas.

### Viewing Title and Action Safe Boundaries

Most NTSC or PAL monitors do not display the entire video image on the screen, obscuring the top, bottom, and sides. This is known as *overscan*. You can ensure that important elements in your work are not obscured by overscanning if you keep them within the title and action safe boundaries.



To view or hide title and action safe boundaries:

- Choose Title Safe from the View menu.
- Choose Title Safe from the View Control pop-up menu at the top of the Viewer or Canvas.
- Choose Title Safe again to remove boundaries.

## Viewing Overlays

Overlays are visual cues that indicate significant points, such as In and Out points, in a clip or sequence. Overlays are displayed on top of the video when the playhead is parked on the significant frame. Overlays only display in the Viewer and Canvas and are not rendered to output. They are displayed by default. Final Cut Pro displays the following overlays:

- *In and Out points*: Show when the playhead is positioned on the In or Out point frame
- *Start and End of media*: A filmstrip symbol along the left or right side of the video frame indicates the start or end of the video media.
- *Start and End of edits*: An L shape at the lower left indicates the start of an edit, and a backward L shape at the lower right indicates the end of an edit. This only appears in the Canvas.
- *Marker*: Marker overlays appear as translucent boxes containing the marker's name and comment text.
- *Title Safe*: The title safe boundaries are rectangular boxes around the edges of the video.

To view or hide overlays, choose Overlays from the View Control pop-up menu at the top of the Viewer or Canvas.

## Viewing With Different Backgrounds

You can choose different backgrounds against which a clip with an alpha channel is viewed to make it easier to edit. Translucent clips or generated text may be more visible if you choose a background that emphasizes them. For example, generated black text is more visible against a white background. When a clip is rendered, the background is always set to black.

To choose a background for viewing a clip:

- Choose the desired background from the View Control pop-up menu at the top of the Viewer or Canvas.
- Open the View menu and choose the desired background from the Background submenu.

## Working With Audio

You use the Viewer's Audio tab to edit the audio for a clip. Because audio is captured in subframes as a continuous waveform, you can edit it in a different timebase from that of video. Video is captured as frames, audio is captured as samples. Audio In points can be set to an accuracy of 1/100 of a frame.

## Understanding Audio Formats

A clip's audio can be in one of several formats. The format appears in the top center of the Viewer's Audio tab.

- *Ch 1*: The audio consists of only the left channel from the tape (Ch 1), with pan centered.
- *Ch 2*: The audio consists of only the right channel from tape (Ch 2), with pan centered.
- *Mono Mix*: The audio consists of both channels from the tape, mixed into a single track.
- *Stereo*: Both channels have been captured as a stereo pair. Stereo pairs are always linked, and anything that is applied to one track is applied to both.
- *Ch 1 + Ch 2*: Both tracks have been captured but are distinct and can be adjusted independently of one another.

## Compressed Audio Formats

Do not use compressed audio as source media when editing in Final Cut Pro. Compressed audio will produce audible distortions during playback and in your final output due to the lower quality of the file.

You can export audio in a variety of compressed formats when exporting a QuickTime movie. See “Exporting Sequences and Clips” on page 261 for more details.

## Turning Off Audio Scrubbing

You can turn off audio scrubbing in the Viewer, so that you don't hear any sound when you scrub the playhead or use the jog wheel.

To turn off audio scrubbing, choose Audio Scrubbing from the View menu.

To turn audio scrubbing back on, choose it in the menu again.

## Using the Viewer to Display Audio Waveforms

When you open a clip with audio into the Viewer, Final Cut Pro displays one or two audio tabs depending on how the audio tracks are formatted in the clip. One tab appears for clips with a single audio track and for clips with stereo audio. Two tabs appear for clips with audio in separate channels.

For clips with stereo audio, Final Cut Pro displays both the left and right audio waveforms on a single tab, enabling you to simultaneously adjust settings for both channels of audio. For clips with a single channel or two separate channels of audio, each channel appears on its own tab, enabling you to individually adjust settings for the two channels.

**Note:** If you do not hear audio from speakers attached to your camera when scrubbing or playing audio in the Viewer's Audio tab, increase the volume on your computer's speakers. You can also configure your system with dual input speakers to hear audio from the camera and computer on the same set of speakers.

## Changing Your Computer's Audio Level

You can change your computer's audio level with Final Cut Pro if you have a QuickTime-compatible video capture card installed. To do this, open the Modify menu and choose the desired level from the Audio Level submenu.

## Adjusting Audio Levels and Pan or Spread for a Clip

Final Cut Pro enables you to control the volume (levels) and placement of sound (pan or spread) using the slider controls at the top of the Audio tab. This changes the settings for the entire clip.

**Note:** You can also make multiple changes to audio levels in a single clip using keyframes. For more information about using keyframes, see “Using Keyframes to Change Effects Over Time” on page 232.

You can change audio level and pan in the Viewer. Pan refers to the distribution of sound between the left and right channels. By adjusting this, you can make the audio sound as if it is coming from the right channel or from the left channel.

For stereo clips, the Pan control is replaced by the Spread control, which enables you to swap the two audio tracks, moving the left track to the right and the right track to the left. As both of these settings change, the correspondingly colored line graphs over the audio waveform change also.

Level adjusts the overall volume or amplitude of a clip. Zero decibels (dB) is the default. You can adjust the level with positive or negative values.

Basic values for spread are

- -1 where the left channel is output to the left and the right channel is output to the right (L = L, R = R)
- 0 where the left and right channels are equally distributed to both sides (LR = LR)
- +1 where the left channel is output to the right and the right channel is output to the left (L = R, R = L)

Level and spread can be adjusted to varying degrees over time using keyframes.



To vary audio levels or spread over time:

- 1 Position the playhead where you want the effect to begin.
- 2 Adjust the level or spread with the slider bar and set a keyframe.
- 3 Move the playhead to the next position where you want a change in the effect.
- 4 Adjust the level or spread with the slider bar and set a keyframe.

Repeat this process at intervals to vary the range of level or spread.

The distinction between editing a clip from the Timeline or from the Browser applies to audio clips as it does to video clips. If you open the clip from the Timeline, you are editing that instance of the clip only. If you open the clip from the Browser before editing it, the changes you make will appear whenever you insert that clip into any subsequent sequences.

### **Synchronizing Audio and Video**

When audio is out of sync with video by a fraction of a frame, you can perform sub-frame slipping to synchronize the audio and video clips. To do this, hold down the Shift key while positioning the playhead along the ruler in the Audio tab. This allows for sub-frame placement of the playhead. Mark an In point while in the Viewer. The video track slips a fraction of a frame to synchronize with the audio.

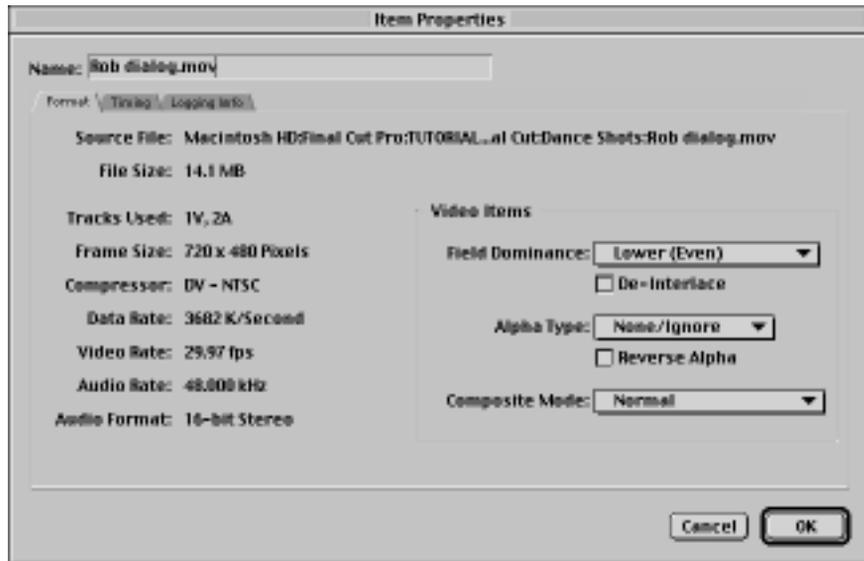
You can also check the AutoSyncCompensator checkbox in the General tab of the Preferences window. See “Setting General Preferences” on page 96.

## Getting Information About the Properties of Clips

Information on a clip is available through the Item Properties command. Select a clip in the Browser or Timeline or open it in the Viewer, then choose Item Properties from the Edit menu. Three tabs in the Item Properties window allow you to view or change properties of a clip.

To get information about the format of a clip:

- Click the Format tab.

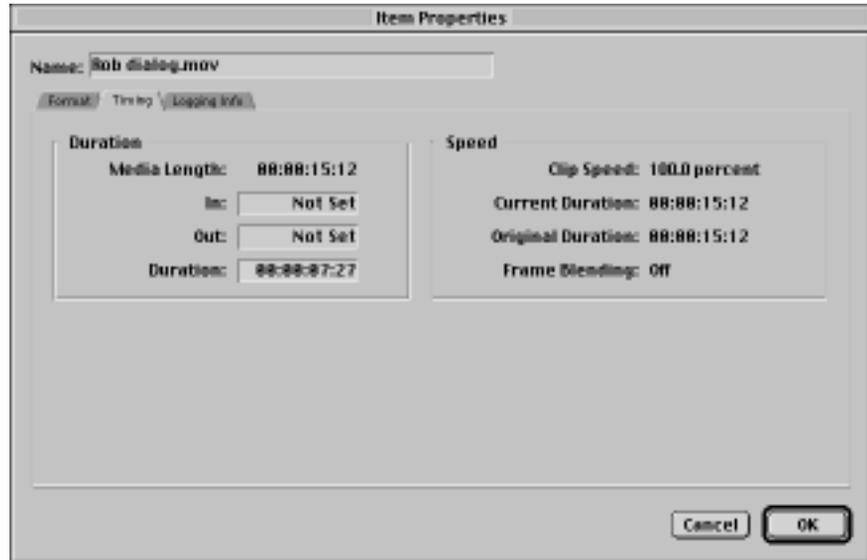


This tab provides information on the clip's location, file size, and format characteristics. Properties that can be changed in this tab are

- *Field Dominance*: Determines the dominant field
- *De-Interlace*: Replaces intermediate fields with duplicates of the dominant field
- *Alpha Type*: Selects an alpha type for the video clip
- *Reverse Alpha*: Reverses alpha of the video clip
- *Composite Mode*: Selects mode to be used when compositing the video clip

To get information about the timing of a clip:

- Click the Timing tab.



This tab provides information on the timing of a clip.

- *Duration*: Specifies the total media length, the location of the In and Out points, and the duration of the clip
- *Speed*: Specifies the current speed, duration, original duration, and frame blending option for a clip. For more information on these settings, see “Changing the Playback Speed of a Clip” on page 194.

Properties that can be changed in this tab are

- *In*: Enter or modify the In point of a clip
- *Out*: Enter or modify the Out point of a clip
- *Duration*: Enter or modify the duration of a clip

To get the logging information for a clip:

- Click the Logging Info tab.



The screenshot shows the 'Item Properties' dialog box with the 'Logging Info' tab selected. The 'Name' field contains 'Rob dialog.mov'. The 'Reel' field contains 'Jump Town'. The 'Label' field is empty. The 'Scene' field is empty. The 'Shot/Take' field is empty. The 'Log Note' field is empty. The 'Capture' dropdown menu is set to 'Not Yet'. The 'Mark Good' checkbox is unchecked. There are four 'Comment' fields (1-4) which are empty. The 'Cancel' and 'OK' buttons are at the bottom right.

This tab provides logging information for a clip.

- *Reel*: Enter or modify the name of the source for a clip
- *Label*: Enter or modify objective detail for a clip
- *Capture*: Specify the status of the clip (Not Yet, Captured, or Queued)
- *Scene*: Enter or modify descriptive detail for a clip
- *Shot/Take*: Enter or modify tracking information
- *Log Note*: Enter or modify a log note
- *Mark Good*: Click the Mark Good checkbox to mark the clip Good
- *Comments 1–4*: Enter or modify additional comments for the clip in these fields

# Creating Sequences and Editing

## About Sequences

When you create a sequence, you place multiple pieces of source media (video, audio, and still images) together to create new content. Sequences are viewed in the Canvas and in the Timeline (the chronological representation of the sequence data). A sequence is part of a project. There can be multiple sequences in one project. To save the changes made to a sequence, save the project that holds the sequence by choosing Save Project from the File menu.

A sequence can be treated like any other piece of clip media. It can be played in the Viewer and manipulated like any other clip in Final Cut Pro. You can also place one sequence into another sequence as if it were a clip, thereby creating a nested sequence. When a sequence is nested, it acts like any other clip in the sequence. For more information, see “Placing Sequences Within Other Sequences” on page 267.

## Working With the Timeline and Canvas

The Timeline and Canvas give you different views of the sequence you’re editing. If you have multiple sequences open, the Timeline and Canvas contain a tab for each sequence. The Timeline shows a chronological view of the sequence and the relationships between the contents of each track, with each clip indicated graphically. The Canvas shows what the sequence will actually look like when it is played (unless you have added effects, in which case you must render the sequence before you can play the results of your work). You edit clips together by taking clips or parts of clips and editing them into the sequence, using the rules of three-point editing. In the Timeline, you can adjust the placement of the In and Out points using the Ripple, Roll, Slip, and Slide controls. You can also create edits using the Razor Blade tools to divide clips, and then perform trimming functions on them as separate clips.

Although the Timeline and Canvas are used together when you are editing, you can work in the Canvas alone and close the Timeline to save screen space. This can be useful when you are doing a rough cut.

**Note:** You can drag tabs out of their original window to display them separately.

Once you have finished assembling your clips in the sequence, you can trim them using the trim functions in the Timeline and the Trim Edit window. For more details about trimming functions such as the Slip, Slide, Ripple, and Roll tools, see Chapter 10, “Trimming Edits,” on page 201.

## About Three-Point Editing

When you edit clips together into a sequence, you use a method called *three-point editing*. An example of three-point editing is choosing your source media by specifying its In and Out points in the Viewer, and choosing a destination for it by specifying the In point for that media in the Canvas. Final Cut Pro then uses the length of the media and the type of edit to calculate the Out point for the destination in the Canvas.

You perform the different types of edits using the edit style buttons or the overlay in the Canvas.

The following rules govern three-point editing in most situations.

- At least three edit points must be set in the Viewer and Canvas to perform an edit.
- If all edit points are specified in both the Viewer and the Canvas, then the Out point of the Viewer is ignored.
- If no In or Out point is set in the Canvas, the playhead is used as the In point.
- If only one edit point (either In or Out) is set for both the Viewer and the Canvas, then the beginning of the media in the Viewer acts as the In point, or the end of the media acts as the Out point, to create the third edit point.

## About Audio in Sequences

Final Cut Pro includes several audio filters that you can use to sweeten the audio tracks in your movies. You can also use transitions to create cross-fades between audio clips. If you use audio effects, you must rerender your sequence before you play back all tracks in a multi-track sequence. For more information about audio filters and transitions, see Appendix B, “List of Audio and Video Effects,” on page 325.

## **Mixing Audio in Real Time**

Final Cut Pro can mix and play back multiple audio tracks in a sequence in real time. You can have more than eight audio tracks in a sequence, but the maximum number of tracks you can mix and play back depends on your computer system's configuration (processor speed, number and types of filters used, data transfer rate of your hard disk, available RAM, and so on). For example, an audio crossfade or transition increases the track count by one. Thus, if a sequence contains eight audio tracks, adding a single crossfade increases the count to nine tracks and requires rendering to preview.

The number of tracks that Final Cut Pro will attempt to mix in real time is determined by the Real-Time Audio Mixing preference (see “Setting General Preferences” on page 96). Increasing the number of tracks is no guarantee that you'll be able to mix as many tracks in real time as you specify. If you set this preference too high, you may experience dropped frames during playback, or dropouts in audio.

One way to reduce audio track overhead is to choose Mixdown Audio from the Sequence menu. This renders all of the audio tracks in a sequence along with their transitions, and filters and consolidates the combined track costs into one render file. This sequence can then be placed into another sequence as a base set of tracks with minimum overhead. Once mixdown audio has been applied to a sequence, the menu item is dimmed and a checkmark appears next to it indicating that the sequence has been rendered. If files are moved within the sequence after being rendered, mixdown audio will again become available in the Sequence menu. Rerender the sequence with mixdown audio to optimize track costs.

The mixdown audio feature is also available in the Nest Item(s) selection in the Sequence menu. For more information on this approach, see “Placing Sequences Within Other Sequences” on page 267.

## **How Tracks Are Composited to Create the Final Sequence**

Sequences can have multiple video and audio tracks. For video tracks, the first track is the base layer. Video frames on track 2 are placed in front of any video frames at the same point in time on track 1. The result appears in the Canvas. Media on a higher-numbered track obscures the media on tracks below it. Use compositing modes and opacity to reveal the tracks underneath.

All audio tracks are mixed together to create the final audio output. Final Cut Pro can mix several tracks together in real time.

## About Presets and Sequence Settings

Every Final Cut Pro sequence has a set of properties that determines the sequence's editing timebase (or frame rate), frame size, compression settings, and various display options. This set of properties is known as a *preset*. When a sequence is created, the chosen preset becomes the sequence settings for the new sequence. Final Cut Pro comes with a collection of presets that you can apply to your sequences. The following rules determine the way that sequence presets are used:

- When you create a new sequence, the default preset is automatically applied to it.
- If you have selected the “Prompt on New Sequence” box in Sequence Presets, you will be prompted to choose a preset from those which have been previously saved.
- You can create, delete, and edit presets. Creating a preset doesn't apply it to any sequences. It just saves it for future use.
- If you want to change the settings for an existing sequence, you use the Settings command in the Sequence menu. This allows you to change everything *except the frame rate* for the sequence. Changing a sequence's settings has no effect on the preset that was applied to the sequence, and changing a preset does not affect any sequences to which that preset was previously applied.

For more information about sequence presets and preferences, see Chapter 4, “Preferences and Presets,” on page 95.

**Important** You don't normally need to change sequence presets unless you change your audio/video input device. Final Cut Pro chooses a preset based on questions you answer at installation time.

## Creating a New Sequence

A new project opens with a new sequence by default. This sequence uses the default sequence preset, unless you opted to select a preset on creating a new sequence.

When you start Final Cut Pro for the first time, a new project with a sequence is created automatically. Likewise, new projects always contain a sequence by default.

To create a new sequence and add it to the current project:

- 1 Open the File menu and choose Sequence from the New submenu.
  - *If the “Prompt on New Sequence” checkbox is selected in the Sequence Presets tab of the Preferences window:* The Sequence Presets tab appears, where you select an existing preset or create a new one.
  - *If “Prompt on New Sequence” is not selected:* The new sequence uses the current default preset. You can still select a preset before inserting the new sequence by pressing the Option key when choosing the New Sequence command.

- 2 A new sequence with a default, highlighted name appears at the top level of the current bin. Type a new name for the sequence to rename it.

The settings associated with the preset are copied into the sequence settings for the new sequence. You can modify most of these settings by selecting the sequence in the Browser and choosing Settings from the Sequence menu.

**Important** For best results, make sure that the sequence's editing timebase matches the frame rate of your source media before editing into the new sequence. If the editing timebase does not match the frame rate of the source media, you will need to render the sequence.

To open a sequence for editing:

- Double-click the sequence in the Browser or select the sequence and choose Sequence Editor from the View menu.

The sequence opens in both the Canvas and the Timeline.

To move the view of a sequence's Timeline:

- 1 Select the Hand tool.
- 2 Drag back and forth in the Timeline.

Alternatively, use the Zoom slider at the bottom of the Timeline to scale and scroll the Timeline view.

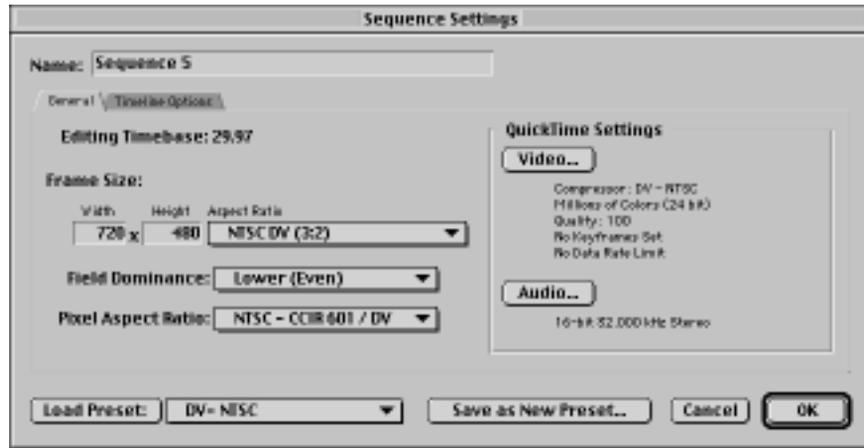
## Changing the Settings for an Existing Sequence

The Sequence Settings dialog box contains all pertinent information on the selected sequence, such as the codec (type of compression/decompression method used), frame size, frame rate (or editing timebase), and so on.

To view and modify the settings for a sequence:

- 1 Select the sequence in the Browser, Timeline, or Canvas and choose Settings from the Sequence menu.

You can also Control-click the sequence in the Browser and choose Sequence Settings from the shortcut menu.



For details on the Sequence Settings dialog box, see “Creating, Editing, and Deleting Presets” on page 107.

- 2 Modify the options and click OK.

## Creating Sequences Using Edit Decision Lists

You can create sequences from Edit Decision List files imported from other applications. For more information, see “Importing an Edit Decision List” on page 259.

## Viewing a Sequence

You can view a sequence that you have selected in the Browser using the View menu:

- Choose Sequence from the View menu to see the sequence in the Viewer window.
- Choose “Sequence in New Window” from the View menu to see the sequence in a new Viewer window.
- Choose Sequence Editor from the View menu to see the sequence in the Canvas and Timeline.

## Copying Sequences

This is a valuable tip if you want to save a project and associated media files after a time-consuming render process.

- 1 Select the sequence in the Browser.
- 2 From the Edit menu, choose Duplicate.
- 3 Rename the new sequence in the Browser with a unique name.
- 4 Open and edit the new sequence in the Timeline.

Changes will not affect the previous sequence or its rendered files.

You can also do this:

- 1 Select the sequence in the Browser and choose Save As from the File menu to save your project with a new name.
- 2 Before any changes are made, use Media Mover to copy rendered files to a new partition. See “Moving a Project and Its Media” on page 269 for instructions on using Media Mover.

New changes will be made on the new copies and the old project will remain intact with its rendered files.

## Setting Up an Edit

To set up an edit in Final Cut Pro, you identify the target track or tracks for the sequence in the Timeline. Then you mark the edit points to specify the source media that will be used in the edit.

### Specifying the Target Tracks for Editing

A source clip in the Viewer may contain a maximum of one track of video and two tracks of audio, but you may want to edit only one or two of the tracks contained in the source clip. The tracks you want to edit are called *target tracks*.

You specify target tracks using the Timeline’s target track controls (the speaker and film icons located on the left of the Timeline). You can specify a maximum of three target tracks at a time: one for channel 1 of audio, one for channel 2 of audio, and one for video.

When you perform an edit using the editing controls in the Canvas, the media will be placed on the specified target tracks, until you change these. If you are editing audio on one track only, select the target audio track in the Timeline.

To select target tracks in the Timeline:

- Click the target track controls to target a track.



When selecting audio target tracks, you can click the left or right speaker of the audio track icon. This determines the channel of the track.

To prevent video or audio from being added to a track when media is dragged directly onto the track:

- Lock the track by clicking the track lock control on the left of the Timeline.



If you lock a target track, you can't place edits on it.

### **Positioning the Playhead at a Specific Edit Point**

To move the playhead to an edit point, use these techniques:

To move the playhead to the In point:

- Press Shift-I, or Shift-click the In point icon in the Canvas Scrubber bar.

To move the playhead to the Out point:

- Press Shift-O, or Shift-click the Out point icon in the Canvas Scrubber bar.

To move the playhead backward or forward to one of the edit points:

- Click the Previous Edit or Next Edit button in the transport controls.

In the Canvas, the playhead moves to the closest edit point, In point, or Out point.

In the Viewer, the playhead moves to the closest edit point, or to the beginning or end of the media.

- Open the Mark menu and choose from the Next or Previous submenu.
- Press the Up or Down Arrow keys.
- Press Control-Shift-E (for the previous edit) or Shift-E (for the next edit).

## Marking Edit Points

The edit points define the In and Out points for the clip in the Viewer that will be added to the sequence.

To define the edit points for a clip:

- 1** Open the clip in the Viewer.
- 2** Click Play or press the Space bar to view the clip.
- 3** While the clip is playing, click the Mark In button on the transport controls to set the In point. You can also choose Mark In from the Mark menu, press I on the keyboard, or press / (backslash) on the keypad to set the In point.

The In point indicator appears in the Viewer if the playhead is parked on the In point frame and overlays are on.

- 4** As the clip continues playing, click the Mark Out button to set the Out point. You can also choose Mark Out from the Mark menu, press O on the keyboard, or press \* on the keypad to set the Out point.

The Out point indicator appears in the Viewer if the playhead is parked on the Out point frame and overlays are on.

Tips for defining edit points:

- You don't have to play the clip to set its In and Out points. You can drag the playhead to locate a particular frame and then set the edit point. This is called *scrubbing*. You can also drag the In and Out points to a new position.
- While video is playing, you can continually set the In and Out points. For example, if you identify a better In point after setting the In point, press I again as the video plays. The In point is reset to the new position.

To modify In and Out points in the Viewer:

- Drag the In or Out point to a new position.

To move the In and Out points simultaneously:

- Press Shift while dragging either point.

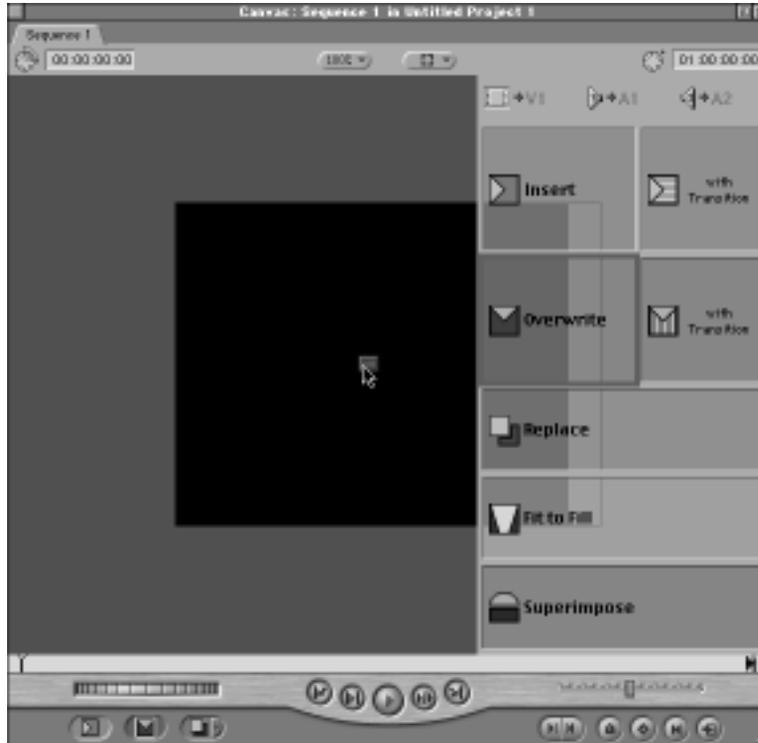
The marked duration of the clip is not changed, but the frames that are included in the marked clip shift forward or backward. This is called *slipping*.

## Performing Edits in the Canvas

Each time you insert or edit a clip in the Canvas, you use one of the Canvas's editing controls to perform the edit. The basic method for performing each type of edit is the same, and follows the three-point editing rules. Edits are placed on the target tracks.

## The Canvas Edit Overlay

All edits in the Canvas can be performed using the edit buttons at the bottom of the Canvas window. You can also drag clips directly into the Canvas video frame. When you drag a clip into the video frame, an overlay appears with fields for each type of edit. You can then select the desired edit type by dragging to it. The default is an overwrite edit.



To perform an edit in the Canvas:

- 1 Set the edit points for the clip in the Viewer, as explained in the previous section.
- 2 Follow the instructions for the desired edit type below.

To perform an Insert edit:

- 1 Position the Canvas playhead where you want the edit to occur.
- 2 Drag the clip from the Viewer to the Insert edit overlay or button in the Canvas.

Clips after the playhead position in the Canvas are moved forward in time to make room for the clip being inserted.

**Note:** If you drag a clip into the Canvas, an overwrite edit is performed automatically.

To perform an Overwrite edit:

- 1** Make sure In and Out points are not set in the Canvas.
- 2** Position the Canvas playhead where you want the edit to start.
- 3** Drag the clip from the Viewer to the Overwrite overlay or button in the Canvas.

The clip overwrites an amount of media after the playhead position equal to its In-Out point duration. No material is moved to make room.

To perform a Replace edit:

- 1** Position the Viewer playhead on the frame you want to match with a frame in the Canvas.
- 2** Position the Canvas playhead on the frame you want to match with that selected in the Viewer.
- 3** Drag the clip from the Viewer to the Replace overlay or button in the Canvas.

To replace a subsection of a clip:

- Set the Canvas In and Out points to that section of the clip.  
If you have edit points specified in the Canvas/Timeline that you don't need, press Control-Shift-X to remove them. (In and Out points take precedence and can sometimes result in an invalid edit.)

Replace editing ignores the In and Out points in the Viewer, and uses the In and Out points for the sequence (in the Canvas and Timeline) to calculate how much material from the Viewer should be added. If the sequence has no In and Out points, the clip boundaries for the clip under the playhead in the Timeline are used.

To perform a Fit-to-Fill edit:

- 1** Set the In and Out points in the Canvas and Viewer to define the part of the sequence you want to fill.
- 2** Drag the clip in the Viewer to the Fit-to-Fill overlay or button in the Canvas.

The material in the Viewer overwrites the material between the specified In and Out points in the Canvas. If necessary, the speed of the material from the Viewer is changed to compensate for any duration difference.

To perform a Superimpose edit:

- 1** Position the Canvas playhead or set In and Out points where you want the Viewer clip to start.
- 2** Drag the clip from the Viewer to the Superimpose overlay or button in the Canvas.

The Viewer clip is placed on the track above the target track, starting at the playhead location. The target track is not changed. If there is no track above the target track, another one is created.

Insert with Transition editing:

- An Insert with Transition edit is exactly the same as an ordinary Insert edit, but it places the default transition for the clip into the Canvas, at the beginning of the clip. This is a quick way to include a frequently used transition in your sequences.

Overwrite with Transition editing:

- An Overwrite with Transition edit is exactly the same as an ordinary Overwrite edit, but it places the default transition for the clip into the Canvas, at the beginning of the clip. This is a quick way to include a frequently used transition in your sequences.

When using either of the transition edit types, make sure that there is enough source media to create the transition. Each source clip must have additional frames outside the defined edit points equal to half of the duration of the transition.

- Open the shortcut menu on the selected effect in the Browser and choose Make Default Transition.

**Note:** When working with multiple windows in the Viewer, Timeline, Canvas, or Browser, menu commands and keyboard shortcuts apply to the default, or labeled, window. To use commands and shortcuts in other windows, you must drag the desired window to one of the main labeled windows.

### Editing in the Timeline

- Drag the clip into the Timeline. Final Cut Pro adds the clip to the Timeline where you drag it in relation to the target tracks. This method performs either an Insert or Overwrite edit, depending on where you drag the clip.

Drag the clip in the upper third of the track to perform an Insert edit. Drag the clip in the lower two-thirds of the track to perform an Overwrite edit. The pointer changes to indicate the type of edit, and the corresponding edit button is highlighted in the Canvas window.

The smallest timeline track size performs an Overwrite edit by default. To perform an Insert edit, hold down the Option key.

**Note:** When you drag multiple clips from the Browser to the Timeline, Final Cut Pro places the clips in the Timeline based on the Browser sort order. Use this technique to create a storyboard in the Browser and then drag all of the clips at once into the sequence. If the Browser tab from which you drag the clips is in icon mode, the clips are placed in left/right order, from top to bottom.

You can also perform all edits in the following ways:

- By loading a clip in the Viewer and clicking the edit buttons in the Canvas

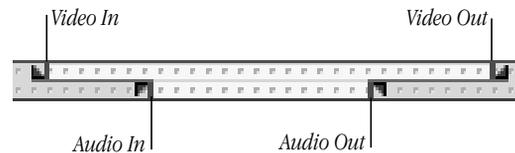
- Through keyboard commands. For more information, see Appendix C, “Keyboard Shortcuts,” on page 339.

### The Canvas Two-Up Display

When you drag a clip from the Browser onto a clip or transition in the Timeline, a two-up display appears in the Canvas. This two-up display shows the frame just before your insert on the left and the frame after your insert on the right. The clip name of the affected incoming and outgoing clip appears at the top of each display. Each frame’s timecode appears at the bottom of the display.

### Marking Split Edits

A split edit, or an L-cut edit, is one where the video and audio edit points are in separate positions. This is useful for editing clips with dialog where the clip’s audio might start or end at a different time from its corresponding video.



To mark a split edit:

- 1 Open the clip in the Viewer. Play the clip or move the playhead to the desired position.
- 2 For each edit point you want to set, choose Mark Split from the Mark menu, and choose a command from the Mark Split submenu.

You can also access these commands from the shortcut menu on the Scrubber bar in the Viewer. The edit point is set at the position of the playhead, so you can open the shortcut menu from anywhere on the Scrubber bar.

To move split edit points:

- Drag either the video or audio In or Out edit point to a new position. The other edit point follows it.  
By default, video or audio In or Out edit points move together.

To move split edit points together:

- Press Shift while dragging any of the edit points. All of the edit points move in unison. The marked video and audio durations do not change, but the frames that are included in the marked clip shift forward or backward.

To move only one edit point in a split edit:

- Press Option and drag the edit point for a video or audio track in the Timeline. A ToolTip pops up as you drag to indicate the number of frames between the edit points. The Scrubber bar in the Viewer updates to reflect the new edit points.

To remove a split edit point:

- Control-click the split edit point and choose an option from the pop-up menu.

### **Setting the Edit Points to the Current Selection**

Use the Mark Clip and Mark Selection commands to set the sequence In and Out points to the boundaries of either a single clip or a selection in the Timeline.

- Place the playhead over a clip in the Timeline, make sure that the track is the target track, and choose Mark Clip from the Mark menu.

The sequence In and Out points are set to the boundaries of the clip.

- In the Timeline, select one or more clips, or part of a clip, and choose Mark Selection from the Mark menu.

The sequence In and Out points are set to the boundaries of the selection. If linked selection is on, linked audio is included in the selection, and a split edit is marked if the audio and video are of different durations.

For more information about linked selection, see “Setting General Preferences” on page 96.

### **Locating a Match Frame**

Use the Match Frame command to quickly open a clip from the sequence in the Viewer and position the playhead at the exact frame you are looking at. This is a useful way to find the source video for a clip. The Match Frame command opens a copy of the source clip for the frame at the playhead position on the target track. If you make changes to this clip, nothing else in the project is affected.

To find a particular frame of video in a clip in the sequence:

- 1** Position the playhead in the Canvas or Timeline at the frame that you want to locate.
- 2** Set the target track to the track that contains the desired frame.
- 3** Click the Match Frame button in the Canvas.

You can also choose Match Frame from the Go To submenu of the Mark menu, or press F on the keyboard.

The source clip (on disk) is opened in the Viewer with the In and Out points set. The current frame in the Viewer matches the current frame on the target track in the Canvas.

## Working in the Timeline and Canvas

When you open a sequence, it is displayed simultaneously in the Canvas and the Timeline. These two windows mirror one another, so that if you move the Timeline's playhead, the Canvas display changes accordingly. You can have multiple sequences in the Timeline. Each sequence has its own tab in the header of the Timeline.

The video that is displayed in the Canvas is not the same as the video that is displayed in the Viewer. You can double-click a clip in the Timeline to open a Viewer window for it, in which case the Viewer Scrubber bar shows two lines of dots. If you change the clip, it may affect the sequence. However, moving the Viewer playhead will not move the Canvas or Timeline playhead, except when you move the playhead in the Filter or Motion tabs of the Viewer.

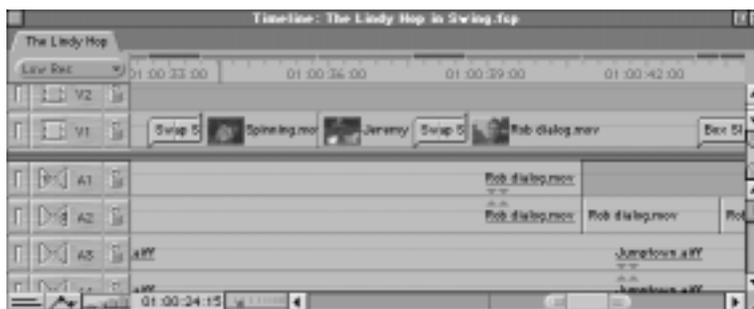
Opening the same clip directly from the Browser into a Viewer window opens a different copy of the clip. Anything you do to a clip in this circumstance is not reflected in the Canvas.

### The Timeline Window

The Timeline displays the layers of video and audio tracks in a sequence along a time axis. You can use it for a variety of editing tasks.

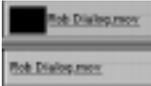
For precision movement of clips, edits, or levels in the Timeline:

- Use “gear down” dragging by holding down the Command key while dragging an item.



## Elements in the Timeline Window

Name	Element	Function
<b>Vertical scroll bars</b>		Scroll the video and audio tracks separately. Use the thumb tabs between the scroll controls to create a static area in the center of the Timeline. Drag the thumb tabs up or down to define static track boundaries. Defining static tracks allows you to scroll through layers without losing view of your base tracks. Use the center tab to move the static area up or down in the window.
<b>Timeline ruler</b>		Displays the timecode for the current sequence as well as the sequence In and Out points.
<b>Playhead</b>		Reflects the chronological position in the sequence of the frame displayed in the Canvas. Dragging the playhead scrubs through the sequence. Clicking in the Timeline ruler moves the playhead to that location. The playhead in the Timeline is equivalent to the playhead in the Canvas. Both playheads move in concert.
<b>Current time indicator</b>		Indicates the position of the playhead. Entering a timecode moves the playhead. This is analogous to the playhead position timecode boxes in the Viewer and Canvas.
<b>Sequence tabs</b>		Appear for each sequence opened in the Timeline. Click the tab to make its sequence active.
<b>Render Quality pop-up menu</b>		Switch between the available render quality settings, which determine the video resolution and other render options for the sequence. You can also edit the render qualities.
<b>Render status bar</b>		Indicates which parts of the sequence have been rendered at the current render quality. Red indicates that the area needs to be rendered.
<b>Clips</b>		Appear as solid bars or as video frames depending on options specified on the Timeline Options tab in the Sequence Settings dialog box. Clips that have clip visibility turned off appear dimmed in the Timeline. Clips on locked tracks are cross-hatched in the Timeline.

Name	Element	Function
<b>Link indicators</b>		Appear as underlined names. They link up to one video and two audio clips on separate tracks. When one is selected, moved, or trimmed, items linked to it are affected in the same way if the linked selection preference is on.
<b>Stereo pair indicators</b>		Appear as two triangles. They indicate that two audio clips are linked as a stereo pair.
<b>Out-of-sync indicators</b>		Appear as red rectangles to indicate the number of frames that a clip's video and audio tracks are out of sync. If the selected track is ahead of its associated video or audio, a + appears in the rectangle. If behind, a – appears.
<b>Target track control</b>		Indicates the target tracks (one video track and up to two audio tracks) for certain edit operations. Click the target track control to make a track the target track. Many edit operations occur on the target tracks at the position of the playhead.
<b>Track visibility control</b>		Determines whether the contents of the track are included in the sequence. When the track is invisible, the contents remain in the Timeline, but are not played or rendered with the sequence. Invisible tracks appear dimmed in the Timeline. Render cache files for a track are deleted if it is made invisible.
<b>Lock track control</b>		Sets a track so that its contents can't be changed. Locked tracks are cross-hatched in the Timeline.
<b>Track size control</b>		Switches among the four track sizes in the Timeline
<b>Clip keyframes</b>		A filter bar is green and a motion bar is blue. They toggle the display of filter and motion bars underneath tracks, which indicate that effects or motion have been applied to a clip, and where any keyframes for filters or motion have been placed.

Name	Element	Function
<b>Clip overlays</b>		Toggles the display of opacity graphs that have been applied to video clips and level graphs showing the audio clips
<b>Zoom control</b>		Lets you zoom in and out on the contents of your sequence in the Timeline
<b>Zoom slider</b>		Scales or scrolls the Timeline. Drag thumb controls on either side to extend or condense the view of the sequence in the Timeline. Drag the center slider to scroll back and forth.

### Colors of Items in the Timeline Window

The following colors can help you identify the various kinds of items in the Timeline window:

Color	Item
Purple	Video sequences
Cyan	Video clips
Aquamarine	Video graphics
Green	Audio clips
Light green	Audio sequences
White	Offline video or audio clips

## Customizing the Timeline Track Display

At the center of the Timeline window are the base layers of video and audio. Additional video tracks extend upward, additional audio tracks extend downward. Audio tracks are one channel. Stereo tracks from source clips are split with the left and right channels going into two separate tracks.

Several options let you customize the appearance of tracks and clips in the Timeline.

- Video tracks can display clips as name (only), name and thumbnail frame, or filmstrip. All video tracks in the sequence share the same display properties. If you are displaying the Timeline in reduced track size view, you can't see thumbnails.
- Audio tracks can be displayed in the Timeline with waveforms turned on or off and audio tracks can be labeled as pairs or as sequential tracks.
- You can change the size of the tracks and toggle the display of keyframe details. These options affect all tracks in the current sequence.

To modify the display of thumbnail images on video tracks for the current sequence:

- 1 When the Timeline or Canvas is active, choose Settings from the Sequence menu and select the Timeline Options tab.
- 2 Select a thumbnail display option.
  - *Name*: Displays the name of the clip and no thumbnail images.
  - *Name Plus Thumbnail*: Displays the first frame of every clip as a thumbnail image and then the name of the clip.
  - *Filmstrip*: Displays as many thumbnail images as possible for the current zoom level of the Timeline.

To modify the appearance of audio tracks for the current sequence:

- 1 When the Timeline is active, choose Settings from the Sequence menu and select the Timeline Options tab.
- 2 Click the Show Audio Waveforms checkbox to toggle the display of waveforms for audio tracks.
- 3 Select the style of audio track labels that you prefer. Paired is useful if you are working with stereo audio tracks; sequential is useful if you are working with independent audio tracks, such as dialogue.

To change the display of track details in the Timeline:

- Click the Track Size control located in the lower-left corner of the Timeline. This slider has four positions corresponding to reduced, small, medium, and large track sizes.
- When the Timeline is active, choose Settings from the Sequence menu, select the Timeline Options tab, and select the desired options.

To modify the time display in the Timeline:

- Choose a time display option from the Timeline ruler's shortcut menu.

## Timeline Scaling and Scrolling

Final Cut Pro provides various methods for viewing the contents of the Timeline.

- You can scale the view of the Timeline to see a representation of several minutes of footage or a very small portion of the sequence, such as every single frame.
- You can quickly scroll to the desired section of the sequence in the Timeline.

### Scaling the Timeline Display

Final Cut Pro provides several methods for scaling your view of the sequence in the Timeline.

- Use the Zoom tools or keyboard shortcuts to scale the view of the sequence by incremental steps.
- Use the center Zoom control to scale the view.
- Use the Zoom slider, situated within the horizontal scroll bar, to scale the view of the sequence.

To zoom the view of the Timeline, do one of the following:

- Choose Zoom In or Zoom Out from the View menu.
- Select the Zoom In or Zoom Out tool and click in the Timeline, or drag to select a particular section to focus on. When the Timeline is zoomed in or out as far as it can go, the plus sign (+) or minus sign (–) does not appear in the Zoom tool's pointer.
- Drag either thumb control on the Timeline's Zoom slider to the left or right.

**Note:** Press Option to toggle the current Zoom tool.

## Positioning the Playhead in a Sequence

The playhead indicates the current sequence time when the sequence is playing or parked on a frame. It always displays the sequence's current frame in the Canvas window. While working in Final Cut Pro, you are constantly moving the playhead to view certain frames in the sequence, edit points, and markers.

The playhead ruler in the Timeline functions in the same way as the Scrubber playhead in the Viewer and Canvas.

To move the playhead to a specific timecode location:

- 1 Make sure the Canvas or Timeline is active. (If the Timeline is active, make sure that all clips are deselected.)

- 2 Type a new timecode and press Enter.

The playhead moves to the new position in both the Timeline and Canvas.

For more information about timecode entry, see “Working With Timecode” on page 87.

To move the playhead to the closest previous or next edit, do one of the following:

- Click the Previous Edit or Next Edit button in the Canvas.  
Final Cut Pro looks for the next or previous edit, In point, or Out point.
- Press the Up Arrow (previous) or Down Arrow (next) on the keyboard.
- Open the Mark menu and choose Edit from the Previous or Next submenu.
- Press Control-Shift-E (for the previous edit) or Shift-E (for the next edit).

The playhead moves in the desired direction and is positioned at the beginning of the edit. If Show Overlays on the View menu is enabled, an icon appears in the lower left or right of the Canvas window, indicating that you are on the first or last frame of the edit.

## Working With Tracks in the Timeline

You can modify tracks in the Timeline to control how they are used in a sequence.

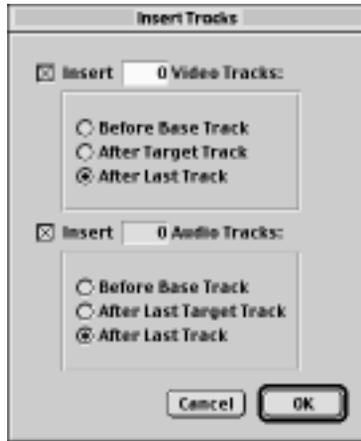
- Any track in the Timeline can be locked using the Track lock control, which means that the items on the track cannot be modified, and nothing can be added to the track. This lets you protect the track from accidental changes. Items on locked tracks are still included in the sequence. All tracks in the sequence are unlocked by default.
- You can temporarily hide a track by clicking the track visibility control at the far left of a track. If the track is made invisible, it acts as if it has been removed from the sequence—its contents do not appear in the sequence when you play it. You can still edit invisible tracks.  
**Note:** Changing track visibility will cause a loss of any render files associated with the track.
- You can also single out a track by making all of the other tracks in the sequence invisible. This allows you to focus on the contents of a single track temporarily. You can single out video and audio tracks separately.
- You can add or delete tracks in a sequence.

To single out a track for visibility:

- Press Option and click the Track Lock or Visibility icon.  
The contents of all of the video or audio tracks except the selected one are hidden from view in the Canvas.

To add tracks to a sequence:

- 1 Open the sequence in the Timeline.
- 2 Choose Insert Tracks from the Sequence menu.



- 3 Choose your options for inserting tracks:
  - Video and audio tracks can be inserted independently. Click the checkbox to select track types.
  - Enter the desired number of tracks for either video or audio. Final Cut Pro supports up to 99 tracks for video and 99 tracks for audio.
  - Choose Before Base Track to insert the desired number of tracks before the first track in the Timeline.
  - Choose After Target Track to insert the desired number of tracks after the last target track for audio or after the current target track for video in the Timeline.
  - Choose After Last Track to insert the desired number of tracks after the last track in the Timeline.
- 4 Click OK to insert the tracks.

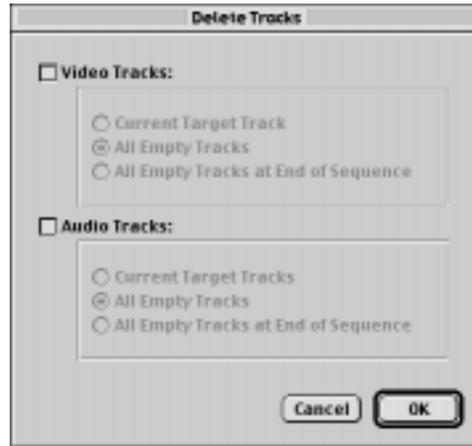
**Note:** You can add a track by dragging a clip to the area above the top video track or below the bottom audio track. Or you can Control-click anywhere on the track header and choose Add Track from the shortcut menu.

To delete tracks from a sequence:

- 1 Open the sequence in the Timeline.

You can delete the current target tracks or several empty tracks from a sequence. When tracks have been deleted, remaining tracks in the sequence are renumbered.
- 2 To delete a specific track, make that track the target track.

- 3 Choose Delete Tracks from the Sequence menu.



- 4 Choose your options for deleting tracks.
  - Video and audio tracks can be deleted independently. Check the box next to Video or Audio to select track types.
  - Choose Current Target Track to delete the current target track in the Timeline.
  - Choose All Empty Tracks to delete any empty track in the Timeline.
  - Choose “All Empty Tracks at End of Sequence” to delete all empty tracks after the last used track in the Timeline.
- 5 Click OK to delete the tracks.

**Note:** You can also Control-click any track header and choose Delete Track from the shortcut menu. Choose Undo from the Edit menu immediately after deleting a track if you want to restore the track.

### Selecting Track Contents in the Timeline

The Track Selection tools provide many ways of selecting the contents of one or more tracks. When selecting the contents of a track, remember that linked items on other tracks will also be selected if linked selection is enabled. (See “Linked Selection” on page 188.)

After selecting the track contents, you can perform basic operations such as moving, copying, or deleting them.

You can deselect an individual item by pressing Command and clicking the item.

To select all of the items on a single track:

- Choose the Select Track tool and click anywhere in the track.

To select all of the items on a single track forward or backward from the selected point:

- 1 Choose the Select Track Forward or Select Track Backward tool.
- 2 Click in the track on the first clip that should be included in the selection. The entire selected clip plus all of the items in front of it or behind it are selected. These tools select entire clips only; they do not make range selections.

To select all of the items on all tracks in the sequence forward or backward from the selected point:

- 1 Choose the All Tracks Forward or All Tracks Backward tool.
- 2 Click a clip on any track that should be included in the selection. All of the contents of all tracks from that point forward or backward are selected. These tools select entire clips only; they do not make range selections.

### **Performing Editing Functions on Selected Track Contents**

To remove selected items without changing the duration of the sequence:

- Press the Delete key.

To remove selected items and adjust the duration of the sequence:

- Press Shift-Delete.
- Choose Ripple Delete from the Sequence menu.  
This removes the selected items and ripples the sequence to close gaps.

To apply a single filter to several clips:

- Select the clips and drag the filter from the Effects tab of the Browser to one of the clips.

### **Working With Markers in the Timeline and Canvas**

You can add markers in the Timeline and Canvas. You can also edit markers by selecting them and choosing Edit from the Markers submenu of the Mark menu.

Final Cut Pro has two types of markers:

- *Clip markers* appear on individual clips in the Timeline. For more information about clip markers, see “Adding and Editing Markers” on page 151.
- *Sequence markers* appear on the Timeline ruler.  
When working with sequence markers in the Timeline, you should not have any items selected in the Timeline.
- If you open a clip from the Timeline in the Viewer, the clip’s markers appear in the Scrubber bar. The sequence markers that fall within that clip appear in the ruler at the top of the Viewer window in the Filter and Motion tabs.

To add a marker to a sequence:

- 1 Make sure no items are selected in the Timeline.
- 2 Move the playhead to the location where you want to add a sequence marker.
- 3 Open the Mark menu and choose Add from the Markers submenu.

To position the playhead on a specific sequence marker:

- Control-click the Timeline ruler and choose the marker from the ruler's shortcut menu.  
The playhead moves to that marker's position.

To move the playhead to the next or previous sequence marker:

- 1 Open the Mark menu and choose Marker from the Previous or Next submenu.
- 2 Press Option-M for the previous marker, or Shift-M for the next marker.

When you choose these commands in the Canvas or Timeline, they look for sequence markers only.

To edit a sequence marker:

- 1 Control-click the Timeline ruler and choose the marker.
- 2 Open the Mark menu and choose Edit from the Markers submenu.

To extend a sequence marker:

- 1 Control-click the Timeline ruler and choose the marker.
- 2 Move the playhead to the desired location.
- 3 Open the Mark menu and choose Extend from the Markers submenu.

To delete a sequence marker:

- 1 Control-click the Timeline ruler and choose the marker.
- 2 Open the Mark menu and choose Delete from the Markers submenu.

## Selecting Items in the Timeline

You can select clips, transitions, and edit points in the Timeline and perform complex editing functions. You can also create, move, and delete keyframes displayed on the keyframe overlays.

**Note:** If you display the selected clip in the Canvas, it appears with a cyan border around it.

These items can be selected in the Timeline:

- Clips, including multiple clips or range clips. For more information, see “Selecting Clips” on page 188.

- Transitions, which can then be trimmed or deleted. For more information, see Chapter 11, “Creating Transitions,” on page 211.
- Edits, which can then be modified in several ways. For more information, see “Trimming Edits in the Timeline and Viewer” on page 206.
- Gaps, which can be closed or filled with media.

These items can't be selected in the Timeline:

- *Filter and motion bars and their keyframes*: Double-click the clip to view filter and motion details in the Viewer. Even though you can't select the keyframes, you can move them by dragging them.
- *Overlay keyframes*: These display opacity information for video clips, and level information for audio clips. You can move these in the Timeline by dragging them. For more information, see “Working With Keyframes in the Timeline” on page 195.
- *Tracks*: Although tracks can't be explicitly selected, the contents of tracks can be selected. For more information, see “Selecting Items Between the In and Out Points” on page 189.

## Selecting Clips

You can select clips in the Timeline in different ways, depending on which tool is used.

- To select an entire clip, click it with the Arrow tool.  
The Canvas indicates the selection by displaying a cyan border around the video.
- To select a portion of a clip, or a range of clips on a track, drag the Range Selection tool to select the desired range.
- To select multiple whole clips, use the Group Selection tool to drag a marquee around all of the desired clips. The entire clip does not need to be inside the marquee to be included in the selection; any clip that is touched is included.
- Command-click to select clips with the Selection tool. This method allows you to select multiple non-contiguous clips. Use the same keys to deselect a selected item.

## Linked Selection

Linked selection tells Final Cut Pro to honor or ignore the status of linked clips for some editing operations and when making selections.

When clips are linked, any action performed on one clip affects the other clips as well. For example, deleting a linked clip will also delete clips it is linked to. When linked selection is turned on, Final Cut Pro treats linked items as a single entity for most operations. When it is turned off, linked items are treated as if they were not linked.

**Note:** If a linked item is on a locked track, it is not modified.

Final Cut Pro automatically links video and audio clips that originated from the same media file. You can also link or relink audio and video clips together regardless of their origin.

To link a group of unrelated clips:

- Select one video and up to two audio clips from different tracks in the Timeline and choose Link from the Modify menu.

To turn linked selection on or off, do one of the following:

- Choose Linked Selection from the Sequence menu.
- Use the General tab of the Preferences window.

To select an item without selecting any that are linked to it:

- Hold down the Option key when you select the item.

To break links to items outside a selection:

- Select an item and choose Link from the Modify menu.

### Selecting Items Between the In and Out Points

Use the “Select In to Out” command to select all of the items on the target track that fall between the marked edit points. This command can select partial clips.

To select all items between the In and Out points:

- 1 Set the In and Out points in the Canvas.
- 2 Specify the target tracks.
- 3 Choose “Select In to Out” from the Mark menu.

To set In and Out points around a selected part of a sequence:

- 1 Use the Group Selection tool to select the desired clips (or use the Range Selection tool to select a range within a single clip).
- 2 Open the Mark menu and choose Mark Selection.

The bounds of the selection become the In and Out points for the clip.

### Moving Clips Into the Timeline

When moving a clip into the Timeline, the pointer changes to an edit pointer. Moving the pointer to the upper or lower section of a track determines whether the clip will be inserted or overwritten.

- When the pointer is in the upper portion of the track it displays a right arrow. If you release the clip with the pointer in the upper section of the track, the clip will be inserted.
- When the pointer is in the lower portion of the track it displays a down arrow. If you release the clip with the pointer in the lower section of the track, the clip will overwrite material in the chosen location.

## Moving Clips Within the Timeline

There are two methods of moving clips within a sequence:

- Drag the clip to a new position. You can move the clip to a new position on the same track or to a different track, and you can do an Insert or Overlay edit to make room for the clip.

**Note:** You can also make copies of clips by dragging them from the Timeline into the Browser. Dragging multiple clips creates copies of each clip.

- Select the clip and enter a timecode to move the clip by that number of frames. There must be a large enough gap to accommodate the new position of the clip. You cannot insert or overlay a clip using this method.

To drag a clip to a new position:

- Select the clip and drag it to a new position.

If you hold down the Shift key when dragging a clip vertically to another track, it maintains the exact time location in the Timeline.

Holding down the Option key while dragging a clip to a new position in the Timeline has the following effects:

- When selecting a clip, hold down the Option key to toggle the link selection state on or off.
- When dragging a clip with the Option key held down, the clip will be copied to the new location.
- When dropping a clip into a new position, press the Option key to perform an Insert edit.

To reposition an item in the Timeline by entering a timecode:

- 1 Select the clip.
- 2 Type the number of frames that the clip should move and press Enter.

As you type, a timecode field appears below the ruler. Use a positive number to move the clip forward in time; use a negative number to move the clip backward.

**Note:** If the Slip tool is used, the clip slips in the direction indicated by the timecode.

For more information on entering timecodes, see “Working With Timecode” on page 87.

**Note:** This moves the item only if there is space for it to move.

## Snapping in the Timeline

When snapping is on, a clip snaps to an edit point when dragged close to it. The playhead snaps to edits, clip and sequence markers, and keyframes (if displayed) on all visible tracks.

- When you drag a clip from the Browser or Viewer, both the In and Out points of the clip can snap to an edit point.
- When you drag a clip from another Timeline tab, or move a clip within a Timeline tab, Final Cut Pro snaps the In and Out points.
- When you drag the playhead, it snaps to items in the Timeline when it encounters them, and a small arrow appears above or below the edit, marker, or keyframe to indicate that the playhead has snapped to this item.
- You can also drag a marker to snap it to other items in the Timeline.

To turn snapping on, do one of the following:

- Choose Snapping from the View menu.  
You can turn snapping off by choosing it again from the View menu.
- Click the Snapping checkbox in the General tab of the Preferences window.

To toggle snapping on and off on the fly:

- Press the N key while dragging.

## Deleting Clips

Deleting in the Timeline follows the basic rule that if an item is selected, then that item is deleted, but if no selection is made, then all material between the Timeline and Canvas In and Out points is deleted on all unlocked tracks.

There are two types of delete operations in the Timeline:

- A ripple delete removes the item and ripples all unlocked tracks, if there is a gap.
- A lift (or “cut”) removes the item and leaves a gap in the track.

To delete a clip and ripple the sequence, do one of the following:

- Choose Ripple Delete from the Sequence menu.
- Choose Ripple Delete from the shortcut menu for the clip.
- Press Shift-Delete.

To delete a clip and leave a space in the track, select the clip and do one of the following:

- Press the Delete key.
- Choose Lift from the Sequence menu.
- Press Command-X.

**Note:** You can also choose Cut from the Edit menu to delete a clip and leave a gap. This places the deleted item on the Clipboard so that you can paste it elsewhere.

## Copying and Pasting Clips and Clip Attributes

You can copy and paste clips between two sequences or within the same sequence. Clips are always pasted at the playhead position as an Overwrite edit, so the duration of the track where the clip is pasted is not changed.

You can also paste the attributes of one clip onto another clip in the Timeline or Canvas. The Paste Attributes command lets you paste some of the settings of a clip onto another clip while leaving other attributes untouched. For example, you can apply the motion settings from clip A to clip B without changing the video frames of clip B. Conversely, you can replace the video frames of clip B without disturbing the filters that have been applied to it by pasting only the contents of a clip.

**Note:** Pasting attributes in clips that have different frame rates will give you erratic results.

To copy and paste a clip into the Timeline:

- 1 Select the clip and cut or copy it to the Clipboard.

You can copy clips from multiple tracks by using the Group Selection tool.

- 2 Position the playhead where you want to paste the clip and choose Paste from the Edit menu.

The clip overwrites the content at the playhead location in the target track. (Press Option while pasting to insert the clip.)

To paste the attributes of a copied clip onto another clip:

- 1 Select a clip whose attributes you want to use and copy it to the Clipboard.
- 2 Select the clip that will inherit the attributes and choose Paste Attributes from the Edit menu.

If you paste into a sequence without selecting a clip in the Timeline or Canvas, the clip contents are included in addition to the attributes you specify.

- 3 In the Paste Attributes dialog box, select the attributes to apply to the selected clip. The attributes you can paste are
  - *Scale Attribute Times*: Shrinks or stretches the keyframes to fit into the duration of the clip inheriting the attributes. If this option is not selected, the keyframes are cropped.
  - *Video Attributes*: Determines which attributes of the video clip are pasted
    - *Content* pastes the video frames only. If the content is pasted onto a selected clip, it is cropped or lengthened to match the duration of the selected clip. The clip speed is not affected.
    - *Basic Motion*, *Crop*, *Opacity*, *Drop Shadow*, and *Filters* apply the parameter values and keyframes you have set for each attribute.
    - *Speed* applies the same speed settings.

- *Capture Settings* pastes all the capture settings that are logged with a clip (using the settings in the Clip Settings tab in the Log and Capture window).
- *Audio Attributes*: Determines which attributes of the audio clip are pasted
  - *Content* pastes the audio waveform only. If the content is pasted onto a selected clip, it is cropped or lengthened to match the duration of the selected clip. The speed is not affected.
  - *Levels* and *Filters* apply the parameter values and keyframes you have set for each attribute.

## Modifying Clips in a Sequence

When a clip from the Browser or Viewer is added to a sequence, Final Cut Pro makes a copy of the clip. Changes made to a clip in the sequence, such as motion effects, filters, and so on, only apply to that copy of the clip. The version of the clip in the Browser or Viewer is untouched.

To modify a clip in a sequence, open the clip from the Timeline by double-clicking it or selecting it and choosing Clip from the View menu.

To set aside a copy of a clip that you have applied effects to after placing it in a sequence, drag it back into the Browser. For more information, see “Using Clips in Sequences” on page 143.

## Making Individual Clips Visible or Invisible

Clips can be temporarily “switched off” with the Clip Visibility command, which is similar to the Track Visibility control in the Timeline. When clip visibility is turned off, the clip still appears in the Timeline, but it is excluded from the sequence so it doesn’t appear in the Canvas. You can still make modifications in the Timeline or Viewer to clips that have been made invisible.

To make a clip invisible:

- Select it in the Timeline and choose Clip Visibility from the Modify menu.
  - The clip appears dimmed in the Timeline and the contents of the clip are never seen in the Canvas.

## Using Offline Clips

An offline clip is a placeholder for an actual media file. A clip is offline because it has been logged but not yet captured, or because the actual media file has been moved or deleted. You can also create an offline clip to use as a stand-in for media that is not yet available.

To create an offline clip:

- Choose Offline Clip from the New submenu of the File menu.

An offline clip is inserted into the Browser.

You can treat offline clips just like regular clips: you can set In and Out points, add transitions and filters, rename them, and so on. Later, you can replace an offline clip by recapturing it or relinking to the original source media. For more information, see “Relinking Offline Files” on page 269.

### Changing the Playback Speed of a Clip

Changing the playback speed of a clip extends or reduces a clip’s duration without losing any content, and creates either a slow-motion or fast-motion effect. When you change the speed of a clip, Final Cut Pro either duplicates or skips frames, forcing the clip’s movement to slow down or speed up.

For example, if you create a slow-motion effect by setting a 1-minute clip to play back at 50 percent, Final Cut Pro duplicates frames so that the clip is 2 minutes long. If you increase the clip’s speed by 200 percent, Final Cut Pro skips frames and makes the clip 30 seconds long. Final Cut Pro can blend frames when a clip’s speed is changed to produce a smooth slow-motion or fast-motion effect.

If you change the speed of a clip that has been opened from within the Timeline, Final Cut Pro performs a Ripple edit to accommodate the new duration of the clip.

**Note:** If you change the speed of a clip, it must be rendered before it can be played.



To change the playback speed of a clip:

- 1 Select the clip in the Timeline.
- 2 Choose Speed from the Modify menu.
- 3 Select the desired speed options.
  - You can modify the clip speed percentage, or the marked duration. Unmodified clips have a clip speed of 100 percent. Changing clip speed or duration automatically changes the other value.
  - The Frame Blending option smoothes motion at slow or fast speeds.

- The Reverse checkbox makes the clip play in reverse.

**4** Click OK.

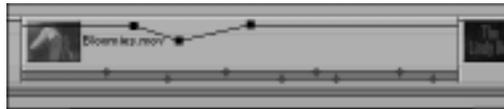
- The clip will be resized based on original In and Out points.

**Note:** The Speed command acts on the entire clip, not on a selected range of a clip. If you want to apply speed effects to only a portion of the clip, use the Razor Blade tool to divide the clip into sections.

## Working With Keyframes in the Timeline

Keyframes indicate that effects parameters are changing over time. Final Cut Pro has two types of keyframes that can be displayed in the Timeline.

- Keyframes appear in the filter and motion bar beneath clips that have filter and motion effects applied to them. Keyframes indicate where parameters change for filter and motion effects. For each filter and motion parameter, you can select which keyframes to display in the filter and motion bar.
- Keyframe overlays show clip opacity for video clips and volume level for audio clips.



The Timeline display of keyframes is useful for getting an overall idea of how effects are changing over time and for aligning keyframes to each other. Because you can have hundreds of keyframes in a sequence, this view is not ideal for adjusting keyframes on a detailed level. For very fine control of keyframes, double-click the clip in the Timeline to open it in the Viewer, then select the Filter or Motion tab. For more information, see “Using Keyframes to Change Effects Over Time” on page 232.

Keyframes in the Timeline are very useful for linking up keyframes for other clips.

## Displaying Keyframes in the Timeline

It is useful to view keyframes in the Timeline to compare how filters affect multiple clips in the sequence. To view filter and motion keyframes, you display filter and motion bars in the Timeline and then specify which keyframe parameters you want to view keyframes for, using the shortcut menu for the filter or motion bar.

To display keyframes for individual effects parameters:

- 1** Use the Show Filter & Motion Bars button in the lower-left corner of the Timeline to show filter and motion bars if they are not currently on.

**2** Toggle the keyframe display by doing one of the following:

- Open the shortcut menu for the filter or motion bar.  
This menu lists all of the parameters for each filter that has been applied to the clip. Select the name of a parameter to toggle the display of its keyframes. Select the filter name to toggle all of its parameters.
- Open the clip in the Viewer, find the effect in the list of filters or motion effects, and toggle the keyframe display for each parameter by choosing it from the pop-up menu at the right of the effect names.

To toggle the display of keyframe overlays in the Timeline for the current sequence:

- Click the Keyframe Overlays button in the lower-left corner of the Timeline.

### **Modifying Keyframes in the Timeline**

Keyframes can be modified in a limited way in the Timeline. You can move effects keyframes, but you can't delete them or change their values. (Effects keyframes can be deleted only from the Viewer.) You can add overlay keyframes directly in the Timeline, adjust their positions and values, and also delete them. For information about modifying effects keyframes in their viewer windows, see “Editing Keyframes in the Viewer” on page 234.

To move keyframes in the Timeline:

- Drag an effect keyframe left or right to move it to a new position in time.
- Press the Command key while dragging overlay keyframes to move them in time.  
If snapping is on, the keyframe snaps to other keyframes and markers to help you align keyframes to particular points in the sequence. To toggle snapping on and off on the fly, press the N key while dragging a keyframe.

### **Adding and Adjusting the Values of Overlay Keyframes**

Overlay keyframes display the opacity level of video clips and the volume level of audio clips. The keyframes are right on the track, not below it, and the position of the keyframe on the track indicates the keyframe's value.

To add an overlay keyframe to a track:

- Select the Pen tool and click where you want to place the keyframe.

To adjust the values of individual overlay keyframes:

- Drag them vertically to adjust their values.  
A ToolTip appears as you drag, displaying the parameter's value.

To adjust the position of the graph line between two overlay keyframes:

- Shift-drag the line to the desired position.

To delete overlay keyframes:

- Drag them off the track completely to delete them.

The keyframes (except for the last one) are removed and the keyframe path is adjusted to reflect the change.

## Searching for Items in the Timeline

Use the Find command to search for clip names, marker text, and clip timecodes in the Timeline. You can search for items forward or backward. You can also search for and close gaps in all tracks in a sequence or in individual tracks.

To search for text or timecode in the sequence:

- 1 Open the sequence in the Timeline.
- 2 Open the Edit menu and choose Find.
- 3 Choose the type of item to search for from the Search pop-up list.
  - *Names/Markers*: Searches for the text in clip names, marker names, and marker comments
  - *Timecode Options*: Searches for any source or auxiliary timecode in a clip
- 4 Choose which tracks to search from the Where pop-up menu.
  - *All Tracks*: Searches all tracks in the sequence
  - *Target Tracks*: Searches only the current target tracks
  - *From In to Out*: Searches between the sequence In and Out points on all tracks
- 5 Click Find to find the item. Final Cut Pro finds all items that match the selected criteria. It searches from the current position of the playhead until the end of the sequence.

**Note:** The Find feature searches for items that begin on or after the position of the playhead. It does not find clips that begin before the position of the playhead, nor does it wrap around to the beginning of the sequence. To find every occurrence of an item, position the playhead at the start of the sequence.
- 6 Click Find All to find all occurrences of clips that match the search criteria.
  - All clips that are found are selected in the Timeline.
  - When a marker is found, the playhead is positioned on the marker. To view the contents of a clip marker, double-click the clip to open it into the Viewer and then open the marker from the Viewer.

To cycle through items in the Timeline that match the criteria:

- After specifying the Find options, open the Edit menu and choose Find Next. You can also press the F3 key.

To search for an item backward from the position of the playhead:

- After specifying the Find dialog box options, press Shift-F3.

## Finding and Closing Gaps

There are gaps and track gaps. Gaps are empty spaces in time in a sequence on all unlocked tracks. Track gaps are empty spaces in time in sequences on individual tracks. Many operations such as Ripple Delete only work with gaps, not track gaps. To close track gaps, you may need to lock the other tracks that contain clips where the track gap occurs.

To find gaps in a sequence:

- Make the sequence active and choose Gap from the Next or Previous submenu of the Mark menu.

The playhead moves to the beginning of the first gap found. (A gap appears on all tracks in the sequence.)

To close a gap, do one of the following:

- Position the playhead anywhere within the gap and choose Close Gap from the Sequence menu.
- Select the gap and press Delete.

To find track gaps in the sequence:

- 1 Determine the track on which you want to search for track gaps and make it the target track.
- 2 Open the Mark menu and choose Track Gap from the Next or Previous submenu.

The playhead moves to the beginning of the first track gap found.

To close a track gap:

- Position the playhead anywhere within the gap and choose Close Gap from the Sequence menu.
- Open the shortcut menu over the gap and choose Close Gap.
- Select the gap and press the Delete key.

**Note:** Sometimes a gap can't be closed because clips on other tracks can't move back. If it is not possible to close the gap, this command is dimmed.

To close a track gap without affecting any other tracks in the sequence:

- 1 Press Option while clicking the Lock Track control. This singles out the selected track.
- 2 Position the playhead anywhere within the gap and choose Close Gap from the Sequence menu.
- 3 Press Option while clicking the track label again to lock the other tracks.

## Making Still Frames From Clips in the Canvas

You can make a still image from the current frame in the Canvas and edit it into a sequence.

To make a still image from a canvas frame:

- 1 Position the playhead on the desired frame.
- 2 Open the Modify menu and choose Make Still Frame.

The new still image has the default duration as specified in the General tab of the Preferences window for stills. It opens in the Viewer window.

**Note:** If you want to make this image into a file, you need to export it using the Export command in the File menu.

## Correcting Clips That Are Out of Sync

Linked items are selected and move together. If linked selection is off, it is possible to move an item out of sync. When a clip is out of sync, a red box appears on the clip, indicating the number of frames that the clip has moved out of sync.

You can move a clip into sync, which repositions the clip so that the sync is corrected. You can slip a clip into sync, which corrects the sync problem by performing a slip edit on the clip (keeping the clip in the same position and shifting the contents of the clip). You can also mark a clip in sync if the sync does not need to be corrected and you don't want to be warned of the sync problem.

For more information about slip editing, see “Trimming Edits” on page 201.

To move a clip into sync:

- Open the shortcut menu on the out-of-sync indicator (the red box on the clip) and choose “Move into Sync.”

**Note:** You can only move a clip into sync if a gap exists.

To slip a clip into sync:

- Open the shortcut menu on the out-of-sync indicator (the red box on the clip) and choose “Slip into Sync.”

To mark a clip in sync:

- Select the clip or clips in the Timeline and choose “Mark in Sync” from the Modify menu.



# Trimming Edits

## Accessing Trimming Functions

You can trim edits in the Trim Edit window, the Timeline, and the Viewer. Each way of trimming offers different capabilities so that trimming a single edit or several edits is flexible and fast.

- For very precise control when trimming, use the Trim Edit window. It displays both sides of the edit—the outgoing clip and the incoming clip—and lets you refine an edit by one frame or many.
- Use the Timeline to perform any trimming actions, either quickly or very precisely. When the Timeline is zoomed out, you can modify edits quickly with trimming tools or by adding or subtracting frames. By zooming in, you can get very fine control of trimming.
- To make simple adjustments to a clip in the sequence, open it into the Viewer.
- Click the Edit Selection tool in the Tool palette and drag a marquee around a group of edit points (one per track). Then open the Trim Edit window to edit all of them.

## Using Trimming Functions With Linked Selection and Snapping

When you select an edit point to trim, remember that edit points of linked items are also selected if linked selection is on. If you find that you can't trim an edit point, there may be conflicts on other tracks.

If you turn snapping on and drag an edit point in the Timeline or Viewer, the edit point will snap to markers, keyframes, the playhead, and edit points on other tracks. This helps to line up edits with other items in the sequence. To toggle snapping on and off on the fly, press the N key while dragging edit points.

## Types of Trimming Operations

Tool Name	Icon	Function
<b>Ripple</b>		Use the Ripple tool to perform a Ripple edit. A Ripple edit affects the overall duration of the sequence. Clips that are to the right of the edit on other unlocked tracks move to accommodate the change and maintain sync in the sequence. The In and Out points of clips can be rippled.
<b>Roll</b>		Use the Roll tool to roll the selected edit. A Roll edit affects the two clips that share the edit point. The overall duration of the sequence is unchanged, but the Out point of the first clip and the In point of the second clip are moved together.
<b>Slip</b>		Use the Slip tool to change a clip's In and Out points simultaneously while maintaining the clip's duration. Surrounding clips are not affected. You can slip a clip in the Timeline or slip either clip displayed in the Trim Edit window.
<b>Slide</b>		Use the Slide tool to move a clip in the sequence, performing a Roll edit on the clips surrounding it (the Out point of the clip before the sliding clip is modified; the In point of the clip after the sliding clip is modified). A slide operation can be performed in the Timeline only, and can only be performed within the limits of the clip's media duration (as opposed to the In-Out point duration).
<b>Group Selection</b>		Use the Group Selection tool to resize a clip in the Timeline by dragging an edit point. You can drag the edit point to create a gap (by making the duration of the clip smaller) or to cover an existing gap. In the Viewer, the group selection tool is current by default. The group selection tool always does a Ripple edit when you drag an edit point of a clip in the Viewer.

## Selecting One or More Edit Points in the Timeline

Whether you want to trim an edit directly in the Timeline or in the Trim Edit window, you need to select one or more edits in the Timeline first. By using a trimming tool to select the edit, you can also define the type of trim to perform at the same time. You can select only one edit per track.

To select one or more edits:

- Use the Edit Selection tool to draw a marquee around the edit point of one or more tracks. As you drag in the Timeline, this tool selects one edit point per track. The edits don't have to be aligned in time. When you release the mouse button, the Trim Edit window opens.
- Use the Arrow tool and click the edge of the clip. Press Command-7 or Control-7 to select multiple edits.

**Note:** If you are zoomed out too far, it may be very difficult to select the edit. Use the Zoom slider to get a more detailed view and select the edit again, or switch to the Ripple or Roll tool, which are more sensitive to the edit points.

To select one or more edit points and assign the editing mode:

When you select an edit point with the Ripple or Roll tool, you also specify the type of trim operation to be performed. When using a Trim tool to select an edit, you cannot accidentally select a clip. Only edit points can be selected with Ripple and Roll tools.

- Use the Ripple or Roll tool and click the edge of the clip.
- Press Command-7 or Control-7 to select multiple edits in the Timeline and identify them as ripple or roll trimming operations.
- This image indicates a Roll edit.



- This image indicates an incoming Ripple edit.



- This image indicates an outgoing Ripple edit.



## Using the Trim Edit Window

You can trim one or more edits very precisely by using the Trim Edit window. This window gives a close-up view of all the trimming functions you can use in the Timeline. You can modify the selected edit by one frame or several frames, quickly switch between Ripple and Roll edits, and play the edit back to make sure it is correct.



The play controls on each side of the Trim Edit window are for viewing only. They don't change the position of any edit.

The multi-frame trim buttons can be configured to trim a different number of frames. Clicking these buttons adds or subtracts frames from the duration between the In and Out points. The  $-1$  and  $+1$  buttons cannot be modified. Values for the  $-5$  and  $+5$  buttons can be modified in the General tab in the Preferences window.



For more information, see Chapter 4, “Preferences and Presets,” on page 95.

To open the Trim Edit window, do one of the following:

- Press Command-7.  
The playhead jumps to the closest edit on the target track and the Trim Edit window opens. The edit is selected as a roll.
- Click the edit in the Timeline with the edit selection tool. The Trim Edit window opens automatically.
- Choose Trim Edit from the Sequence menu.

- Double-click an edit.

To close the Trim Edit window, do one of the following:

- Move the playhead in the Timeline or Canvas away from the edit.
- Click anywhere in the Timeline away from an edit to deselect all edits in the Timeline.
- Close the Trim Edit window.

### **Trimming in the Trim Edit Window**

Use the Trim Edit window to trim one edit or multiple edits at one time. When trimming multiple edits at once, you can perform different edits on each of the edit points. If you change the edit type in the Trim Edit window, this change affects all selected edit points.

- 1** Select one or more edit points to trim.
  - If you used the Edit Selection tool, the Trim Edit window opens automatically.
  - If you used any other tool to select edits, open the Trim Edit window by double-clicking an edit or pressing Command-7.
- 2** In the Trim Edit window, select the type of trim operation by positioning the pointer over the video. The pointer changes to indicate whether you have selected Ripple Left, Roll, or Ripple Right.
- 3** Do any of the following to trim the edit:
  - Use the trim buttons to add or subtract frames from the edit points.
  - Use the playback controls for the clip in either video window to play the clip and set new In and Out points.
  - Add or subtract frames by typing + or – and the number of frames to add or subtract. Then click Enter.
  - Drag an edit point in the Scrubber bar. The In Shift and Out Shift fields update to show the number of frames modified in the edit.
- 4** If trimming multiple edits, choose the track you want to view during the edit operation from the pop-up list of tracks. The frames from that track appear in the display.
- 5** Use the transport controls to review the changes.
  - Click the “Play In to Out” button to play both clips from beginning to end.
  - Click the Play Around Current button to play the edit with pre- and post-roll and loop.
  - Click the Stop button to stop playback and position the playhead on the edit point.
- 6** To trim another edit on the same track, use the Previous and Next Edit buttons to move to the next edit on the current track. You can also select one or more edits in the Timeline and then go back to the Trim Edit window to perform additional trim operations.

- 7 When you are finished trimming, move the playhead off the edit point in the Canvas or Timeline, or click in the Timeline to deselect all edits. The Trim Edit window closes. You can also close the Trim Edit window.

### Slipping an Edit in the Trim Edit Window

You can slip either clip displayed in the Trim Edit window. A slip edit changes the clip's In and Out points simultaneously while maintaining the clip's duration. Surrounding clips are not affected.

To slip an edit in the Trim Edit window:

- 1 Select an edit and open the Trim Edit window. (Press Command-7 or double-click the edit.)
- 2 Shift-drag the active edit point on either Scrubber bar to slip that clip. You can also drag the edit point with the Slip tool.

As you drag, the display changes to show the In and Out point frames for the clip you are slipping.

- 3 Release the mouse button to complete the slip edit.

The display changes back to the frames at the current edit point.

### Trimming Edits in the Timeline and Viewer

You can perform many trim edits in the Timeline or Viewer.

To trim in the Timeline, use a trim tool to select an edit point. The selection determines the type of trim operation that will be performed on that edit point. You can do all types of trim edits in the Timeline: ripple, roll, slip, slide, and resize.

To trim in the Viewer, open the clip in the Viewer and change an In or Out point. The Viewer can accommodate three types of trim operations: ripple, roll, and slip. To do any of these edits, you must open the clip from the Timeline into the Viewer. If the clip has been opened from the Browser, you cannot trim it.

**Note:** You can cancel an edit at any time by pressing the Esc key while the timecode field is visible. You can also undo an edit at any time by dragging a selected track up or down in the Timeline and reverting to a zero offset.

### Performing a Ripple Edit

Use the Ripple tool to perform a ripple on the selected edit. A Ripple edit affects the overall duration of the sequence. Clips that are to the right of the edit on other unlocked tracks move to accommodate the change so that sync is maintained in the sequence.

To perform a Ripple edit in the Timeline:

- 1** Select the Ripple tool.
- 2** Select the edit by clicking near the edge of the clip. If linked selection is on, the edit points of linked clips are also selected.
- 3** Ripple the edit using one of the following methods:
  - Drag the edit to lengthen or shorten the clip in the sequence.
  - Type the number of frames you want to add to or subtract from the current In or Out point. (Use the + or – key followed by the number of frames to add or subtract, then click Enter.)

To perform a Ripple edit in the Viewer:

- 1** Open the clip in the Viewer by double-clicking it in the Timeline.
- 2** Select the Ripple tool.
- 3** Drag the In or Out point to ripple the clip.

As you drag, the Viewer displays the Out point of the outgoing clip; the Canvas displays the In point of the incoming clip.

Tips for rippling edits:

- If you lengthen the clip, clips on the same track move forward in time. Clips on other unlocked tracks that begin after the playhead point also move forward in time.
- If you shorten the clip, clips on the same track move backward in time, as do clips after the playhead position on other unlocked tracks.
- If you can't ripple backward, it is because clips on other tracks can't move back in time without bumping into other clips.
- If you don't want a Ripple edit to affect another track in the sequence, lock that track. Locked tracks do not ripple.
- To ripple across multiple tracks simultaneously, press Command or Control to select multiple edit points, then use the Ripple tool to perform the Ripple edit across all of the tracks.

**Note:** The Shift key toggles between the Ripple and Roll tools.

### **Performing a Roll Edit**

Use the Roll tool to roll the selected edit. A Roll edit affects the two clips that share the edit point. The overall duration of the sequence is unchanged. When the Roll tool is active, you can roll an edit directly in the Timeline or open the clip in the Viewer and adjust its In and Out points.

To perform a Roll edit in the Timeline:

- 1** Select the Roll tool.
- 2** Select the edit point. If linked selection is enabled, the edit points of linked clips are also selected.
- 3** Roll the edit using one of the following methods:
  - Drag in either direction.  
As you drag, the Canvas displays the Out point of the outgoing clip on the left and the In point of the incoming clip on the right.
  - Type the number of frames you want to add to or subtract from the current edit point. (Use the + or – key followed by the number of frames to add or subtract, then press Enter.)

To perform a Roll edit in the Viewer:

- 1** Open the clip in the Viewer by double-clicking it or select it and choose Clip from the View menu.
- 2** Select the Roll tool.
- 3** Drag the In or Out point to roll the edit.

Tips for rolling edits:

- If you can't drag any further during a Roll edit, you have reached the end of the media.
- To roll multiple tracks simultaneously, press the Command key to select multiple edit points, then use the Roll tool to perform the Roll edit across all of the tracks.

### **Slipping a Clip**

Use the Slip tool to change the clip's In and Out points simultaneously while maintaining the clip's duration. Surrounding clips are not affected.

To slip a clip in the Timeline:

- 1** Select the Slip tool.
- 2** Select the clip and drag it left or right. As you drag, an outline of the clip appears, indicating the amount of media available. The Canvas displays the In point frame and the Out point frame.

To slip a clip in the Timeline using numerical timecode entry:

- 1 Select the Slip tool.
- 2 Select the clip in the Timeline.
- 3 Type + or – and the number of frames to slip, then click Enter.

To slip a clip in the Viewer:

- 1 Open the clip in the Viewer by double-clicking it or select it and choose Clip from the View menu.
- 2 Do one of the following:
  - Select the Slip tool and drag one of the edit points.
  - Press Shift and drag one of the edit points.

### **Sliding a Clip**

Use the Slide tool to move a clip in the sequence, performing a Roll edit on the clips surrounding it. The Out point of the clip to the left of the sliding clip is modified; the In point of the clip to the right of the sliding clip is modified. A slide operation can be performed in the Timeline only.

To slide a clip in the Timeline:

- 1 Select the Slide tool.
- 2 Select the clip and drag it left or right.

As you drag, the Canvas displays the Out point frame of the clip to the left of the sliding clip and the In point frame of the clip to the right of the sliding clip.

To slide a clip in the Timeline using numerical timecode entry:

- 1 Select the Slide tool.
- 2 Select the clip in the Timeline.
- 3 Type + or – and the number of frames to slide, then click Enter.

### **Changing the Duration of a Clip**

The Selection tool lets you change the duration of a clip in the Timeline by dragging an edit point.

To resize the duration of a clip in the Timeline:

- 1 Select the Arrow tool.

- 2 Select an edit point and drag it.

You can drag the edit point to create a gap (by making the duration of the clip smaller) or to cover an existing gap. You cannot do a Ripple or Roll edit with the Selection tool in the Timeline.

You can change the duration of a clip in the sequence by extending its Out point.

To extend the duration of an edit:

- 1 Select the edit in the Timeline.
- 2 Move the playhead to the position that the edit will extend to.
- 3 Choose Extend Edit from the Sequence menu, or press the E key.

The selected edit is rolled over any gaps or clips that are encountered, up to the position of the playhead. The edit can only be extended to the length of the clip's media. If there is not enough media, an alert sounds and the clip is extended as far as possible.

## Understanding Error Messages When Trimming

If you try to perform a trimming operation that is not possible, Final Cut Pro displays an error message.

- *You cannot set the In point later than a disabled Out point:* When you set an In/Out point in the source clip in the Trim Edit window, In points cannot be placed beyond an Out point. Likewise, Out points cannot be placed before an In point.

The following messages include the track number where the error occurs:

- *Clip Collision:* A trimming operation would cause clips to collide or overwrite another.
- *Transition Conflict:* A transition would have to change its duration to accommodate the trimming change.
- *Media Limit:* There is not enough media in the source clip to change the edit.

# Creating Transitions

The simplest transition between two clips is a cut, in which a clip begins immediately after the previous clip ends. You create a cut by arranging two clips tail to head on the same video track in the Timeline.

To create more elaborate transitions between clips, such as fading in one clip over another (dissolve), or revealing the frames of the next clip through a selected pattern (irises and wipes), you can use one of the more than 50 transition effects included with Final Cut Pro. For information about changing effects settings, see Chapter 12, “Compositing and Special Effects,” on page 219. For descriptions of the transition effects, see Appendix B, “List of Audio and Video Effects,” on page 325.

## Adding Transition Effects

You add transition effects between two adjacent clips in the same video track in the Timeline. You can add transition effects when editing a clip into a sequence or after a clip has been edited into a sequence. For information on adding a transition effect as you edit a clip into a sequence, see “Performing Edits in the Canvas” on page 171.

You can place a transition so that it is centered on the cut, starts at the cut, or ends at the cut. When adding a transition effect as you edit a clip into a sequence, the transition is centered on the cut between the two clips. If you want a transition effect to either start or end at the cut, you have to add the transition after the clips are placed in the sequence. You can also edit the transition in the Transition Viewer after it has been placed.

**Note:** When you add a transition effect, the two clips on either side of the cut must have enough material in the source media for Final Cut Pro to create the effect.

To add a transition effect that is centered on a cut:

- 1 Align two clips in the same track sequentially so that their edges meet.
- 2 Select the edit point between the two clips by doing one of the following:
  - With the Arrow tool, click a cut in the video track and choose a transition effect from the Video Transitions submenu in the Effects menu.

- Drag a transition effect from the Effects tab in the Browser onto the cut, centering it over the cut.
- Open the shortcut menu over the cut and choose Add Transition to add the default transition.

To add a transition effect that starts or ends at a cut:

- Drag a transition effect from the Effects tab in the Browser onto the cut, aligning it so that it starts or ends at the cut.

To set the default transition effect:

- Open the shortcut menu on a transition effect.
- Choose Set Default.

To clear the default transition effect:

- Choose Clear Default from the Effects menu.

To apply the default transition effect:

- Select the edit point where you want to place the transition and choose the default transition from the Effects menu.
- Open the shortcut menu on the edit point and choose Add Transition.

To delete a transition from a sequence:

- Select the transition and press the Delete key.

## **Changing Transition Settings**

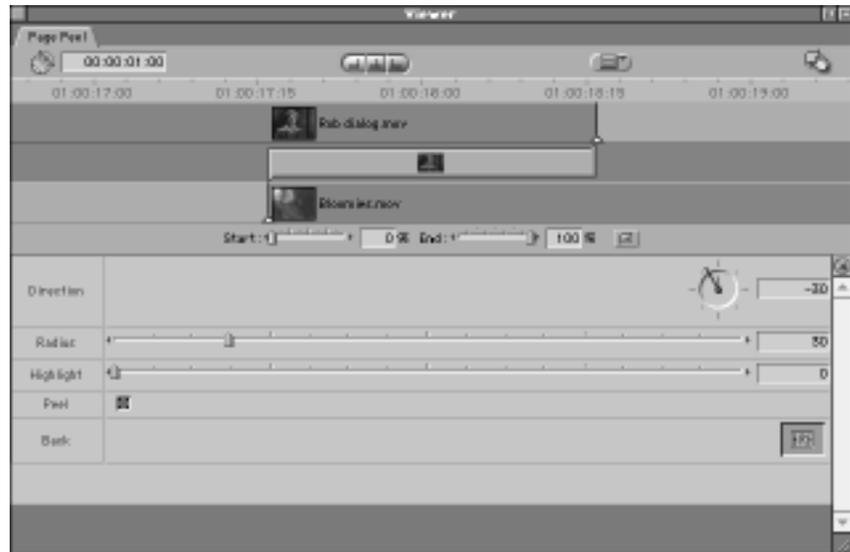
Once you have added a transition to a sequence, you can modify the settings of the transition to customize its appearance. Most transitions have controls that let you add a border to a transition, set the width and color of the border, reverse the effect's direction, and specify the center of the effect, among others. These controls are explained in the section "Setting Effects Parameters" on page 220.

## **Using the Transition Viewer to Change Settings and Edit Transitions**

You change settings for transitions in the Timeline by opening them in the Transition Viewer.

All Final Cut Pro transitions let you set the starting and ending percentages of the effect. This is the percentage of the total transition effect over time that is applied to the clips. This is different from the amount of media over which the transition is applied (its duration).

The starting percentage determines the point where the transition process begins, and the ending percentage determines the point where the transition stops. The default is a starting percentage of 0 percent and an ending percentage of 100 percent, which encompasses the whole transition effect. If, for example, a transition involves a colored vertical bar moving from far left to far right across the video frame, setting the starting percentage to 50 percent begins the effect with the bar at the center. Setting the ending percentage to 100 percent ends the transition with the bar at the far right.



To change the settings for a transition:

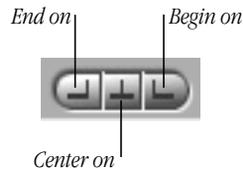
- 1** Do one of the following:
  - Double-click the transition in the Timeline to open the Transition Viewer.
  - Select the transition's icon in the Timeline and choose Transition Editor from the View menu.
  - Choose Open from the shortcut menu for the transition in the Browser (before it is applied to a sequence) or the Timeline.
- 2** To change the starting and ending effect percentages, drag the Start and End sliders or type a percentage in the text boxes.



- 3** To change the direction of the effect, click the Reverse button.



- 4 To have the transition center on, begin on, or end on the edit, click the corresponding placement button at the top center of the Transition Viewer.



- 5 Make other settings as desired for the transition. For more information, see “Setting Effects Parameters” on page 220.

### Trimming and Moving Transitions in the Viewer

Once you’ve placed a transition effect in a sequence, you can move and trim it in the Viewer. You can trim a transition by specifying a new duration or by dragging either end of the transition to lengthen or shorten it. When specifying a new duration, Final Cut Pro moves both ends of the transition effect by extending it from its center. You can only extend or move a transition if the clip contains enough source media.

When you trim and move transitions in the Viewer by dragging, the Canvas displays one frame from the incoming clip and one frame from the outgoing clip. The name of each clip is at the top of each display and the Out and In timecode for each frame is visible at the bottom of each display.



Icons at the ends of the clips in the transition viewer indicate which frames are currently displayed in the Canvas. The first icon indicates the frame on the right side of the Canvas, and the second indicates the frame on the left side of the Canvas.

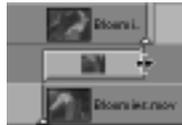


When you trim either the In point or the Out point of the transition, the Canvas displays the frames of each clip where the transition effect is starting or ending. When you move a transition by dragging, the Canvas displays the frame of the outgoing clip where the transition effect ends and the frame of the incoming clip where the transition effect begins.

### Trimming or Performing Ripple and Roll Edits on Transitions

To change the duration of a transition in the Viewer:

- 1 Enter a new duration in the Duration field or position the pointer at either end of the transition.



- 2 When the pointer changes shape to a resize cursor, drag the end of the transition. Shift-drag to move both ends of the transition simultaneously.

To perform a Ripple edit on a transition in the Viewer:

- 1 Place the pointer below the leading edge or above the trailing edge of the transition.



- 2 When the pointer changes to the Ripple tool, drag the transition in the edit.

To perform a Roll edit on a transition in the Viewer:

- 1 Place the pointer anywhere on the transition.



- 2 When the pointer changes to the Roll tool, drag the transition in the edit.

## Modifying Audio Transitions

Final Cut Pro includes two audio cross-fade transitions. The first is a 0 decibel cross-fade. This transition fades the first clip out, while simultaneously fading the second clip in. This effect applies a linear ramp to the volume level. The second is a +3 decibel cross-fade. This transition performs the same operation as the 0 decibel cross fade, but applies an exponential, equal-power ramp to the volume level.

Control-click an audio transition to access a shortcut menu that contains the two cross-fade transitions and the duration of the transition. You can apply either cross fade or you can modify the duration for the audio transition.



For more information about audio transitions, see Appendix B, “List of Audio and Video Effects,” on page 325.

## Saving Transition Settings by Creating a Favorite Transition

You can save the transition settings you’ve specified so that you can use the same transition again without having to remember or note settings. This is also an effective method for changing the default settings for a transition. You create another instance of the transition with the settings you’ve specified. The new transition is saved in the Favorites bin on the Effects tab and appears in the Favorites submenu. You can also rename the new transition.

You can create a favorite transition by saving the settings of a transition in a sequence, or by dragging a transition into the Favorites bin on the Effects tab and then modifying its settings.

To create a favorite transition by saving its settings:

- 1 Make the desired changes to the settings of a transition.
- 2 Do one of the following:
  - Choose Make Favorite Effect from the Modify menu.
  - Drag the transition icon in the Viewer to the Favorites folder on the Effects tab in the Browser.

To create a favorite transition before changing its settings:

- 1 In the Effects tab in the Browser, find the transition that you want to use and drag it to the Favorites bin.
- 2 Open the Favorites bin and double-click the transition.
- 3 Make changes to the settings and close the Viewer.

- 4** Rename the new transition in the Favorites bin.
  - You can also select the transition in the Browser and choose Duplicate from the Edit menu. A copy of the transition appears in the Favorites submenu of the Effects menu.

## Previewing Transitions

You can preview a transition effect in the Canvas by placing the playhead in the Viewer within the area covered by the transition. As you change transition settings, Final Cut Pro changes the previewed effect in the Canvas as the playhead is stationary.

## Viewing a Transition in the Canvas

You can view a transition or other effect a frame at a time in the Canvas by pressing the Right Arrow key to move the transition forward and the Left Arrow key to move the transition backward. This gives a slow-motion view of the transition.

You can disable this view by pressing the Caps Lock key.

## Rendering Transitions

If you want to play a transition in the Canvas, you must render it first.

To render a single transition:

- 1** Select the transition.
- 2** Choose Render Selection from the Sequence menu.



# Compositing and Special Effects

You can use Final Cut Pro to add many effects to video and audio, and to create unique composite effects by altering the layers of video.

## Locating and Applying Effects

You can locate and apply effects in the following ways:

- Select them from the Browser's Effects tab and drag them onto clips.
- Select a clip and then choose an effect from the Effects menu.
- Use the Motion tab in a clip's Viewer window to turn on and set the motion effects.
- Select a saved motion from the Favorites folder in the Effects tab of the Browser.

The motion effects that you set from the Motion tab are not available in the Effects menu.

**Note:** You can open a Viewer window for a previously applied effect by double-clicking the Timeline's filter and motion bar in the clip where the effect was applied.

## Using the Viewer Effects Tabs

When you apply effects to clips, you set their parameters using the Effects tabs in the Viewer. There are three Effects tabs. You can turn an effect on or off using the triangle next to its name.

### The Filters Tab

Use the Filters tab to work with the filters you have applied to a clip.

### The Motion Tab

Use the Motion tab to work with the basic motion effects that are applied to every clip by default.

### The Audio Tab

Use the Audio tab to work with the level and pan or spread for a clip.

## Setting Effects Parameters

When you apply an effect to a clip, you can set parameters to fine-tune it. You can view and change an effect's parameters within a clip by clicking the Audio, Filters, or Motion tab in a clip's Viewer.

There are several types of effects parameters:

- *Slider controls:* Some of these are logarithmic, rather than linear, and vary depending on the type of setting. You can also click the arrows at either end of a slider to change the setting at single increments.
- *Rotation and Angle controls:* Set these by moving the needle to the desired angle.
- *Point Control:* Use this to choose pixel locations. The coordinates are x and y parameters.
- *Color Selector:* Use this to select colors for borders, tints, and other colored effects.
- *Text Entry:* Use this with a generator effect to enter the text to be generated.
- *Clip Control:* Drag a clip to this box if you want to use the clip's content to affect the filter. (The way the filter is affected depends on the filter.) The Clip Control box looks like this:



This is the equivalent control to the Layer pop-up control in Adobe After Effects.

Other effects settings can be chosen using checkboxes, pop-up menus, or buttons.

To reset the parameters for an effect:

- Click the Reset button in the Viewer tab for the effect.



## Using Video Filters

Final Cut Pro includes more than 50 video filters that you can use to create special effects, transitions, color corrections, and more. See Appendix B, “List of Audio and Video Effects,” on page 325 for a list of the effects that can be created with the included video filters. Most video filters can be changed over time with keyframes, letting you animate the intensity of an effect. You can also save the settings of a filter as a Favorite with the Make Favorite command so that you can use it again without having to specify filter settings.

In a few cases, alpha channels may have an effect on filters, especially when transitioning between composite modes. See “Using Alpha Channels” on page 239.

Final Cut Pro supports three types of effects. The Final Cut Pro FXScript architecture includes video effects for transitions, filters, and generators. QuickTime 3.0 filters are also recognized. In addition, Final Cut Pro works with many After Effects third-party filters. Not all of these plug-ins, however, are certified for use with Final Cut Pro. For more information about After Effects third-party filters, see “Using After Effects Third-Party Filters” on page 223.

All of these filters can be found in the Effects tab in the Browser window. The Final Cut Pro filters are in folders labeled Video Transitions, Video Filters, and Video Generators. After installation, QuickTime filters can be found in a folder called QuickTime inside the Video Transitions and Video Filters Folders. After Effects filters can be found in a folder called AE Filters in the Video Filters Folder.

## Applying Filters From the Timeline or the Browser

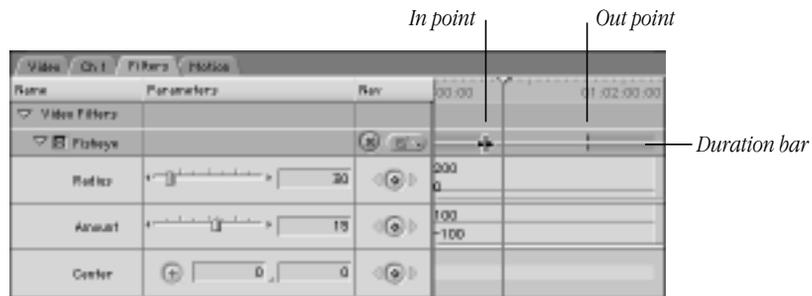
Before applying a filter to a clip, decide whether to apply the filter to a clip in the Timeline (which applies it only to that copy of the clip in that sequence) or to a clip in the Browser (which applies the filter to the clip whenever you subsequently insert that clip into a sequence). Applying a filter to a clip in the Browser can be useful for color correction of clips that you plan to use across sequences or multiple times in a single sequence. See also “Using Clips in Sequences” on page 143.

To apply a filter to a single clip:

- Drag the filter from the Browser to the clip in the Timeline.
- Select the clip and choose the filter by name from the Effects menu.

To adjust the position or duration of a filter in a clip:

- 1 Open the clip in the Viewer and click the Filters tab.
  - Default In and Out points are at either end of the duration bar.



- 2 Move the cursor over an In or Out point in the duration bar.
  - The cursor changes to this symbol.



- 3 Drag the ends of the duration bar to set a filter's In and Out points within a clip.
- 4 Drag between the In and Out points on the duration bar to move the position of the filter's duration within the clip.

To turn a filter off:

- 1 Open the clip in the Viewer and click the Filters tab.
- 2 Click the checkbox next to the filter's name.

The filter remains applied to the clip, but is temporarily disabled.

### Applying Filters to a Range of Clips

You can apply a filter so that it covers a portion of a single clip or so that it covers a range across multiple clips.

- 1 Open the clip in the Viewer and select the Filters tab.
- 2 Change the filter's settings as desired.

**Note:** To turn off rendering while changing settings, press the Caps Lock key.
- 3 Choose the Range Selection tool from the Tool palette.
- 4 Click within the clip in the Timeline and drag across the desired range.
- 5 Drag a filter from the Effects tab in the Browser to the selected range in the Timeline.

**Note:** When you apply a filter to a range across multiple clips, Final Cut Pro adds an individual copy of the filter to each clip. If you want the filter settings to be different for each clip in the range, you can change them in each clip's Viewer window.

### Changing Filters Over Time

Using keyframes enables you to change the settings of a filter over time so that you can animate the intensity of a filter. See "Using Keyframes to Change Effects Over Time" on page 232.

## Changing the Rendering Order of Filters

The order in which filters are listed on the Filters tab is the order in which they are rendered. You can affect the final results of a filtered clip by changing the rendering order.

To change the rendering order of filters:

- In the Filters tab, drag a filter name into a new position.

## Saving Filter Settings by Creating a Favorite Filter

You can save the filter settings you've specified so that you can use the same filter again without having to remember settings. You can also change the default settings for a filter. You cannot change the default settings for any of the filters included with Final Cut Pro. Rather, you create another instance of the filter with the settings you've specified. The new filter is saved in the Favorites bin on the Effects tab and appears in the appropriate Favorites submenu of the Effects menu. You can also rename the new filter.

You can create a favorite filter by saving the settings of a filter applied to a clip or by dragging a filter into the Favorites bin on the Effects tab.

To create a favorite filter by saving a filter applied to a clip:

- 1 Make the desired changes to the settings of a filter.
- 2 With the Timeline active, choose Make Favorite Effect from the Modify menu.

To create a favorite filter by dragging:

- 1 Find the effect that you want to use in the Effects bin of the Browser.
- 2 Drag it to the Favorites bin.
- 3 Open the Favorites bin and double-click the effect to open its Viewer.
- 4 Make the desired settings and close the Viewer.
- 5 Rename the new filter in the Favorites bin.

**Note:** Duplicating an effect puts a copy in the Favorites bin.

## Using After Effects Third-Party Filters

Final Cut Pro supports After Effects third-party image filter plug-ins. File import filters are not supported. These filters will be listed as they load during startup on the splash screen. Filters appear in categorized folders in the Browser under the Filters tab. Categories are created according to the types of filters you're adding.

Final Cut Pro also supports QuickTime Effects. The files are automatically loaded during startup and appear as QuickTime Transitions or QuickTime Filters in the Browser under the Effects tab and menu.

To install After Effects third-party filters:

- Drag the After Effects third-party filters to the Plug-ins folder in the Final Cut Pro application folder.  
Or create an alias of the folder where the After Effects plug-ins reside and place it in the Plug-ins folder in the Final Cut Pro folder.
- If the third-party filter requires a hardware key or dongle, install the key or dongle and the Plug-ins folder in the Final Cut Pro application folder.

To apply an After Effects third-party filter to a clip:

- Drag a filter from the Browser to a clip in the Timeline, or select the clip and choose the filter from the Effects menu.

### Custom User Interfaces

Some After Effects third-party filters have custom user interfaces. Final Cut Pro supports these interfaces in the Filters tab in the Viewer window. You can control a filter's effects through these interfaces just as you would in After Effects.

Some After Effects third-party filters have a Clip Control box. This is a target where you can drag and drop a clip from the Browser. These are similar in function to the Layer pop-up control in After Effects. When the Control Clip has not had an image dragged to it, the layer has an effect equivalent to none. If a clip has been dragged to the Clip Control, a thumbnail of the clip appears in the box.



In After Effects, the origin or anchor point of a filter is registered in the upper-left corner of the clip at (0, 0). In Final Cut Pro, the origin is at the center.

For information about a third-party filter, click the filter's About button on the Filters tab in the Viewer window.

### Performance

When using After Effects third-party filters, you can choose from low-resolution and high-resolution settings, and draft or field rendering. High-resolution and field-rendered filters provide higher quality but take longer to render. High-resolution rendering is equivalent to a Layer Quality mode of Best in After Effects.

If an image doesn't appear when you use a third-party filter, try the following:

- If the filter uses Clip Controls, drag a clip to all Clip Control boxes.
- Change the alpha type in the Modify menu.
- Choose Reverse Alpha from the Modify menu.
- If the filter uses a hardware key or dongle, make sure you've installed it.

To process effects faster:

- Turn on Draft Render in the Render Quality Editor.
- Turn Field Rendering off in the Render Quality Editor.
- Scale down the Viewer window.

Factors that contribute to slow rendering performance:

- Clips with large frame sizes (640 x 480 pixels or larger) with field rendering on
- Applying multiple filters to a single clip
- Complex filter settings

**Note:** Pressing the Caps Lock key temporarily disables rendering. This allows you to adjust all of your settings before rendering a preview. It does not speed up final rendering, but allows you to work faster without the processing overhead of background rendering.

If you move your project to a new disk, make sure you reinstall your plug-ins on the new disk. Plug-in information is stored in the Final Cut Pro MOA Cache file (in the Final Cut Pro application folder) to reduce program launch time.

### **Additional Filters**

For a current list of compatible third-party After Effects filters, consult the Apple Final Cut Pro Web site at [www.apple.com/finalcutpro](http://www.apple.com/finalcutpro)

### **Using Generators**

Final Cut Pro has video generators in the Effects tab of the Browser. These generators allow you to create original content that can be added to the sequence in a video track. For example, you can use the Text generator in combination with motion, filters, and effects to create custom titles such as crawling text or rolling credits in your sequence.

To use a generator, follow these steps:

- 1** Click the Effects tab in the Browser and open the Video Generators folder.
- 2** Drag a generator such as the Text generator to a track in the Timeline.

If you want to superimpose text over your sequence, drag the text generator to the uppermost track in your sequence.

Dragging a generator to the Canvas will also place the generator in the Timeline.

- 3 Double-click the generator in the Timeline to open the generator in the Viewer.

If the generator can be configured, a Controls tab appears in the Viewer.

- 4 Click the Controls tab in the Viewer.
- 5 Adjust the parameters to suit your needs.

You can manipulate and apply the settings over the duration of the generator using keyframes in the timeline of the Viewer.

## Editing Motion Properties

Video and still-image clips have a set of associated motion effects that determine the size of a clip, its position in the Canvas, its rotation, and its shape. You can change these properties graphically in the Canvas or Viewer. You can also change the properties numerically in the clip's Motion tab. You can change most of these properties over time using keyframes to create animation. (See "Using Keyframes to Change Effects Over Time" on page 232.)

### The Motion Properties

- *Scale*: Changes the overall size of the clip without changing its proportions
- *Rotation*: Rotates the clip through an axis about its center without changing its shape. Clips can be rotated plus or minus 90 rotations.
- *Center*: Specifies the center point of the clip
- *Anchor Point*: Specifies a point that is used to center the clip for rotation relative to its actual center
- *Crop*: Crops the clip from the specified side. The Edge Feather option applies a soft border at the crop line.
- *Distort*: Changes the shape of the clip by moving its corners
- *Opacity*: Makes a clip opaque or translucent
- *Drop Shadow*: Places a drop shadow of the specified color, softness, and opacity, offset by the specified amount, behind the clip
- *Motion Blur*: Blurs moving images by the specified amount, using the specified sample rate

**Note:** Before editing any motion property, decide whether to edit the motion property of a clip in the Timeline (which applies the changes only to that copy of the clip in that sequence) or to a clip in the Browser (which applies the changes to the clip whenever you insert that clip into a sequence). See also "Using Clips in Sequences" on page 143.

When you change any motion property graphically in the Viewer or Canvas, it must be in one of the two wireframe modes.



**Note:** Green crosshairs indicate that there is a keyframe for scale on that frame. A green center handle indicates that the center has a point keyframe applied. A green border indicates a rotation keyframe.

To use wireframe mode, do one of the following:

- Press **W** once to place the Viewer or Canvas into Image + Wireframe mode. Press **W** again to turn on wireframe mode. Press **W** again to return to image mode.
- Choose Wireframe from the View menu.
- Choose Wireframe from the View pop-up menu at the top of the Viewer or Canvas.

### **Changing the Position of a Clip in the Viewer or Canvas**

You can use the Viewer or Canvas to change the motion properties for a clip graphically using one of the wireframe modes.

By default, clips are positioned in the center of the Canvas. You can move a clip by dragging or by specifying a different location for the center point of the clip. You can move a clip partially or completely outside the Canvas.

To move a clip by dragging:

- 1** In the Viewer or Canvas, turn on a wireframe mode.
- 2** Select the Arrow tool and drag the layer to a new position.

To move a clip in the Viewer's Motion tab:

- 1** Double-click a clip in the Timeline or in the Browser.
- 2** Click the Motion tab in the Viewer.
- 3** Do one of the following:
  - Enter new values for the center property.
  - Click the button with the plus sign to the left of the center property and then click the Canvas or the Video tab of the Viewer to specify new center coordinates.

### **Scaling a Clip in the Viewer or Canvas**

Clips play in Final Cut Pro at their native size, which is the size at which they were captured, regardless of the sequence frame size. Clips that are the same size as or smaller than the sequence frame size appear entirely within the sequence frame. Clips that are larger than the sequence frame size are partially obscured. You can scale a clip by dragging or by entering a scaling percentage. You can also scale a clip in one step so that it is the same size as the sequence.

To scale a clip by dragging:

- 1** In the Viewer or Canvas, turn on a wireframe mode.
- 2** Select the Arrow tool and do one of the following:
  - To scale both dimensions proportionally, drag a corner handle.
  - To scale either dimension unproportionally, Shift-drag a corner handle.
  - To scale and rotate the clip simultaneously, Command-drag a corner handle.

To scale a clip in the Viewer's Motion tab:

- 1** Double-click a clip in the Timeline or in the Browser.
- 2** Click the Motion tab in the Viewer.
- 3** Drag the Scale slider or enter a new value in the text box to the right of the slider.

To scale a clip to fit entirely in the sequence:

- Select the clip and choose "Scale to Sequence" from the Modify menu.

### **Rotating a Clip**

You can rotate a clip any number of degrees in relation to its original orientation. You can rotate a clip either by dragging or by entering a degree of orientation. You can rotate a clip partially or completely outside the Canvas. By default, clips rotate around their center point, but you can rotate a clip around a different point by changing the center of rotation.

You can rotate a clip multiple times, when you want to rotate an object over time, such as a spinning wheel. (See “Using Keyframes to Change Effects Over Time” on page 232.)

To rotate a clip by dragging:

- 1 Open a clip in the Viewer or Canvas and turn on a wireframe mode.
- 2 Select the Arrow tool and point to the outside border of the clip.
- 3 Click any edge of the border and drag in an arc around the clip’s center point.

The wider the arc from the center point, the finer control you have. Drag away from the clip’s center point to provide more precise control over the rotation. To constrain dragging to 45-degree increments, hold down the Shift key. Drag around the clip continuously for the desired number of rotations.

To scale and rotate a clip simultaneously in the Canvas:

Option-drag a clip’s corner handle in wireframe mode.

To rotate a clip in the Viewer’s Motion tab:

- 1 Double-click a clip in the Timeline or in the Browser.
- 2 Select the clip.
- 3 Click the Motion tab in the Viewer.
- 4 Drag around the rotation control or enter a new value in the text box.

To constrain dragging to 45-degree increments, hold down the Shift key.

### **Distorting the Shape of a Clip**

You can distort the shape of a clip by separately moving its corner points as you drag with the Distort tool, or by specifying the location of the four corner points numerically. By distorting a clip you can create effects such as perspective.

To distort the shape of a clip:

- 1 In the Viewer of Canvas, turn on a wireframe mode.
- 2 Select the Distort tool and drag a corner handle of the wireframed clip. Command-drag to change the perspective of the image.

To distort a clip numerically:

- 1 Double-click a clip in the Timeline or Browser.
- 2 Click the Motion tab in the Viewer and click the triangle to the left of the Distort effect.
- 3 To specify new locations for the corner points, do one of the following:
  - Enter new values for the corner points you want to move.

- Click the button with the plus sign next to the corner property you want to adjust and then click the Canvas or the Video tab of the Viewer.

### **Cropping a Clip**

You can crop a clip to remove unwanted elements from a clip's image. This is a useful technique if you want to remove rough, overscan edges on captured clips. Cropping hides the selected parts of a clip rather than deleting them, so you can always reset the cropped image to reveal the original image. You can crop a clip by either dragging with the Crop tool or by specifying how many pixels to crop from the borders. You can also feather the edges of the frame to make them blend smoothly with the background.

To crop a clip by dragging:

- 1** In the Viewer or Canvas, turn on a wireframe mode.
- 2** Select the Crop tool.
- 3** Drag from the edges of the clip to eliminate the unwanted elements in the image. (Press Shift while dragging to constrain the aspect ratio, or press Option while dragging to move the clip symmetrically while cropping.)

To crop a clip in the Viewer's Motion tab:

- 1** Double-click a clip in the Timeline or Browser.
- 2** Click the Motion tab in the Viewer and click the triangle to the left of Crop.
- 3** Drag a slider or enter a new value to crop the clip from the specified side.

To feather the edges of a clip:

- 1** Double-click the clip and click the Motion tab.
- 2** Click the triangle to the left of Crop.
- 3** Drag the Feather Edge slider or enter a new value.

### **Setting a Clip's Opacity**

Clips are completely opaque by default, except for the portions within an alpha channel. You can reduce the opacity of a clip to less than 100 percent to make it appear semi-transparent, displaying the image on the layer beneath it.

You can change a clip's opacity either with controls on the Motion tab or in the Timeline.

To set a clip's opacity from the Viewer's Motion tab:

- 1** Double-click a clip in the Timeline or the Browser.
- 2** Click the Motion tab in the Viewer and click the triangle to the left of Opacity.
- 3** Drag the slider or enter a new value in the text box.

To set a clip's opacity in the Timeline:

- 1 Click the Clip Overlays button in the Timeline.



- 2 Select the Pen tool and Shift-drag from the top of the clip's video track. The pointer changes shape to indicate when you can drag the opacity control. Final Cut Pro displays the opacity setting next to the pointer as you drag.

### **Adding a Drop Shadow to a Clip**

For clips that are smaller than the sequence frame size, you can display a drop shadow. A clip may be smaller because it was small when captured (native size), or because you have scaled, cropped, moved, or distorted it. Drop shadows are also useful for full-size clips with alpha channels. You can control how far the drop shadow is offset from the image, its angle, color, softness, and opacity.

To add a drop shadow to a clip:

- 1 Double-click a clip in the Timeline or Browser.
- 2 Click the Motion tab and turn on the Drop Shadow option.
- 3 To set the appearance of the drop shadow, click the triangle to the left to reveal the drop shadow properties.
- 4 Use the controls to set the shadow's distance from the clip (offset), its opacity, softness, and direction (angle).
- 5 To choose a color for the drop shadow, do one of the following:
  - Drag the hue, saturation, and brightness sliders, or enter values in the text boxes, so that the color swatch displays the desired color.
  - Click the eye dropper and click in the Canvas to sample a color.
  - Click the color swatch and use one of the color pickers to choose the desired color.

### **Adding Motion Blur to a Clip**

The most dramatic effects using motion blur involve rapid changes between two adjacent frames using keyframes such as rotation or scaling.

- 1 Double-click a clip in the Timeline or Browser.
- 2 Click the Motion tab and turn on the Motion Blur option.
- 3 Use the slider to set the blur percentage, and the pop-up menu to set the number of samples.

**Note:** The blur is applied to one frame's duration. The quality and rendering time of samples is decreased as the number of samples is increased.

## Using Keyframes to Change Effects Over Time

You can create many time-varying effects by applying a combination of keyframes and changes to effects parameters to a clip.

A keyframe is a point where a parameter for an effect changes. If you want to create an animated effect such as rotating a clip, you place keyframes at every point in the clip where the rotation changes to build up an animated rotation. This is different from changing an effect parameter a single time within a clip. In this instance, the parameter setting remains in effect for the duration of the clip. In the rotation example, you can change the rotation settings one time only to display the whole clip at the same degree of rotation, or you can change the rotation settings and set keyframes at each change point, to create, for example, a spinning or oscillating effect.

You can add and edit keyframes in the Audio, Motion, and Filters tabs of the Viewer. You can also add them in the Timeline or Canvas. Each effect parameter that you want to animate has separate keyframes.

For precision tuning of a keyframe's parameters or its point in time:

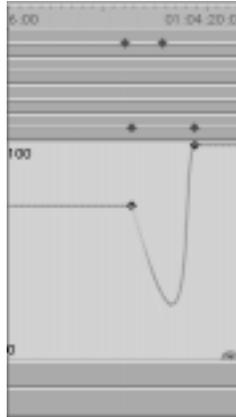
- In the timeline of the Viewer, hold down the Command key while you drag a keyframe. This enables “gear down” dragging which allows you to move the keyframe in precise increments.
- Drag the keyframe up or down to adjust the value of the parameters effect.
- Drag the keyframe left or right to adjust the keyframe's point in time.
- Hold down the Shift and Command keys while dragging the keyframe to adjust both the value of the parameter and the keyframe's point in time simultaneously.

You can also set keyframes by graphically scaling, rotating, distorting, and cropping clips in either the Canvas or Viewer. In addition, you can use the Pen tool to visually fine-tune the motion path. (See “Creating a Motion Path” on page 235.)

Keyframes are placed wherever any effects parameters are changing over time. If you apply a special effect, such as a color tint, and choose a color for the tint, you do not need keyframes in the clip as long as the color does not change. If you decide, for example, that the tint should change through a series of colors during the clip, then you need to add keyframes at each point where the color begins to change. Final Cut Pro calculates the color for each frame in between two keyframes. You may choose to place only a small number of keyframes to create a small number of changes, or you may decide that the color parameter should be changed many times within the clip, and place a large number of keyframes.

The Nav column in the Viewer's Filters and Motion tabs lets you view, add, delete, or change the position of keyframes.

**Note:** After you have added a keyframe to a clip for the first time, a new keyframe will be added whenever you change the parameters for an effect applied to that clip at a different point in time.



## Types of Keyframes

There are two types of keyframes:

- *One-dimensional:* These relate to absolute specifications, such as points or colors.
- *Two-dimensional:* These relate to parameters that can change on a sliding scale, such as size, height, audio level, or speed. You can drag these up and down on a line graph in the Timeline or Viewer to change the values.

## Working With Keyframes in the Viewer

You add keyframes for a filter setting or motion property in the Viewer's Filters and Motion tabs. When you add a keyframe, Final Cut Pro displays a diamond corresponding to the location of the keyframe in the keyframe graph in the tabs and in the Timeline (if you have chosen to display keyframes in the Timeline).

When creating keyframes, you must explicitly add the first keyframe for the property you want to animate. Once you add a keyframe for a property, moving the playhead off that keyframe and modifying the property value automatically creates an additional keyframe.

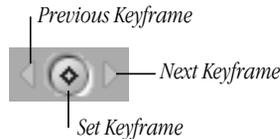
To begin working with keyframes in the Viewer:

- 1** Display the Filters tab or the Motion tab for a clip.
- 2** Display the property you want to animate.

- 3 Move the playhead in the Canvas or the playhead above the keyframe graph in the Filters or Motion tab to the point at which you want to create a keyframe.
- 4 Adjust the value for the property you want to set. Alternatively, you can graphically edit the motion properties for position, scale, rotation, and crop.

To set a keyframe:

- 1 Move the playhead to a position in time where you want to place a keyframe.
- 2 Click the Set Keyframe button for the desired effect.



- 3 To set additional keyframes for the same effect property, move the playhead to the next point at which you want to create a keyframe and adjust the value for the property. Final Cut Pro automatically adds a keyframe at that point.

You can also use the Pen tool to set keyframes along the Timeline of any effect property.

To move keyframes:

- 1 Select the Arrow tool or the Pen tool.
- 2 Drag any keyframe in the effects Timeline.
  - Drag vertically to modify the parameter of the property for the keyframe.
  - Drag horizontally to reposition the keyframe in the effects Timeline.

To navigate between keyframes:

- Click the Next or Previous Keyframe button for the desired keyframe graph.

To refine a keyframe:

- Control-click a keyframe and choose Smooth from the shortcut menu.

### Editing Keyframes in the Viewer

You can edit the values for keyframes using the keyframe graphs in the Motion and Filter tabs of the Viewer. Additionally, you can edit motion keyframe properties for scale, position, rotation, and crop graphically in the Canvas. You can also change the location in time of keyframes in the Timeline, but not the property values of keyframes.

To edit or delete keyframes:

- 1 Display the Filter or Motion tab for a clip.
- 2 Display the effect you want to edit.

- 3 Click the Next or Previous Keyframe button to move the playhead to the desired keyframe.
- 4 Adjust the property values for the keyframe. You can also make changes graphically for motion properties of scale, position, rotation, and crop in the Canvas.
- 5 To expand the keyframe graph, drag the Zoom control in the right corner of the keyframe graph.



- 6 To delete a keyframe, click the Add Keyframe button while the playhead is over a keyframe. To delete all the keyframes for an effect setting, click the red reset button to the left of the keyframe graph.

To move a keyframe in the Timeline:

- 1 Click the Clip Keyframes button in the bottom-left corner of the Timeline.



- 2 Place the pointer over a keyframe in the Timeline. The pointer changes to a crosshair.
- 3 Drag the keyframe to the desired position in the Timeline.

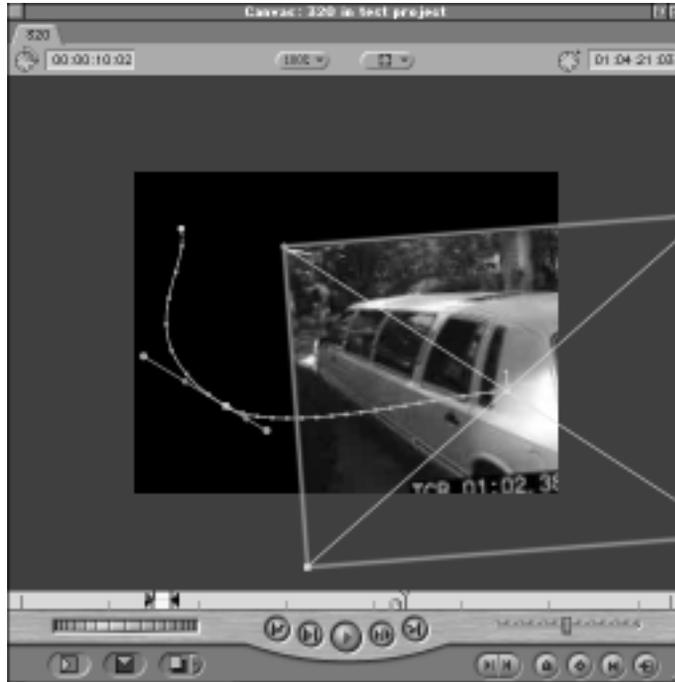
To move a group of keyframes in the Timeline:

- 1 Click the Clip Keyframes button in the bottom-left corner of the Timeline.
- 2 Place the pointer between keyframes in the Timeline. The pointer changes to a Slip cursor.
- 3 Click the line between any two keyframes and drag the group of keyframes to the desired position in the Timeline.

## Creating a Motion Path

You create a motion path by altering the clip's center point in the Canvas or Viewer when in a wireframe mode, adding keyframes at desired points in time. The motion path appears as lines connected by squares and dots. Squares indicate keyframes and the smaller dots indicate the relative speed of the clip's movement as it moves between keyframe positions.

You can use the Pen tool for maximum control over the shape of the motion path, creating curves and corners along the path, and controlling the speed of a clip as it travels along the path. (See “Editing a Motion Path” on page 237.) You can also control the position of the clip at keyframe locations by modifying the center (position) motion property for those keyframes.



To create a motion path:

- 1** Set the Canvas or Viewer display mode to Wireframe+Image or Wireframe.
- 2** Move the playhead to the point on the Timeline where you want to add the first keyframe.
- 3** To add a keyframe, do one of the following:
  - Click the Add Keyframe button at the bottom of the Canvas or Viewer.
  - Display the Motion tab for the desired clip, display the center (position) motion property, and click the Add Keyframe button.
  - To add a specific parameter keyframe, press the Right Arrow key while clicking the Add Keyframe button.
- 4** Use the Arrow tool and drag the clip from the center handle to the desired position.
- 5** Move the playhead to where you want to add the next keyframe.

- 6 Drag the clip to a new position. Final Cut Pro automatically adds a new keyframe.
- 7 Repeat steps 5 and 6 to add as many keyframes as you want.

### **Editing a Motion Path**

You can edit a motion path directly in the Viewer or Canvas by moving or deleting motion-path keyframes. Because a motion path defines spatial as well as temporal changes, the playhead doesn't need to be over a keyframe for you to be able to move or delete it, nor does the playhead location prohibit you from adding a motion-path keyframe.

### **Creating Curves and Corners Along a Motion Path**

By default, when you create a motion-path keyframe, it is a corner. A corner creates an abrupt change in direction. You can create a smooth change by converting the corner to a curve through the shortcut menu. Curves can also be converted to corners.

Curve points have Bezier handles that enable you to shape the curve. They also include ease handles that you can use to control the speed of the clip as it approaches and leaves the keyframe. For more information, see “Controlling Speed Along a Motion Path,” next.

To toggle a keyframe between a corner and a curve:

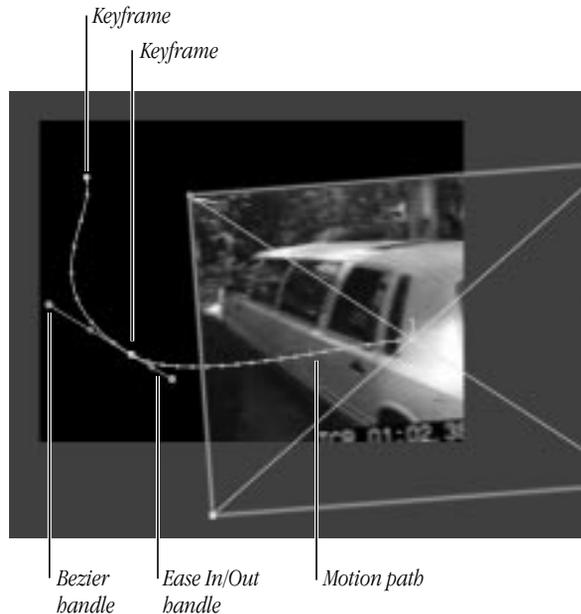
Control-click a keyframe in the Viewer and choose Smooth or Corner from the shortcut menu. In the Canvas, Control-click a keyframe in wireframe mode and choose Ease In/Ease Out, Linear, or Make Corner Point.

To convert a curve point into a corner point, Command-click and drag a Bezier handle.

### **Controlling Speed Along a Motion Path**

The speed at which a clip travels along a motion path is determined by the spatial and temporal difference between keyframes. For example, you can increase the speed of a clip between two keyframes by moving the keyframes further apart without changing their location in time. Thus, the clip travels further in the same amount of time.

You can also fine-tune the rate at which a clip approaches and leaves a keyframe if the keyframe is a curve. The ease handles are located between the Bezier handles and the center point. You can drag the handles so that the clip eases in and eases out at the same rate, or you can drag the handles separately to set different ease-in and ease-out rates.



This motion path has Bezier handles at the ends of the straight line. You adjust the path by dragging the handles.

To make a clip ease in and ease out of a keyframe:

- 1** If necessary, convert a corner into a curve.
- 2** Select the Arrow tool.
- 3** Click the curve keyframe.
- 4** Do one of the following:
  - Drag either ease handle to move both an equal amount. Dragging the handle away from the keyframe increases clip speed to and away from the keyframe. Dragging the handle towards the keyframe slows the clip's speed.
  - Shift-drag either the incoming or outgoing ease handle to change only the ease-in or ease-out effect.

## Using Alpha Channels

An alpha channel is a fourth 8-bit channel in an image that describes which areas of the image are transparent. Because an alpha channel has 8 bits of information per pixel, an image can be partially transparent or have areas that change from opaque to transparent. An image can have an alpha channel if the hardware or software that produced it has alpha channel support. Many digital-image and video-editing applications can create alpha channels in an image.

When you place a clip with an alpha channel in a sequence, Final Cut Pro automatically makes the alpha channel area transparent.

- To view the alpha of an image, choose Channel from the View menu and then choose Alpha from the submenu.

When you create a transparent image, it's best to create drop shadows by creating another layer behind the image, rather than using the Drop Shadow function.

## Importing Transparent Images

Images created in other programs may pre-multiply colors with black or white to create the effect of a more transparent or opaque layer. When you import these images into Final Cut Pro, you may need to choose an alpha type other than None/Ignore from the Alpha Type submenu (in the Modify menu) to achieve the correct alpha type for the image. In most cases, however, Final Cut Pro automatically imports the image with the appropriate alpha type.

## Setting the Clip Composite Mode

Composite modes are applied to clips and control how the colors in a clip combine with the colors in clips in underlying video layers or how the clip visually interacts with the clip on the track immediately below it.

You can place clips in the same timecode location in a sequence, on multiple tracks, and blend them together in many ways by setting each clip's composite mode.

**Note:** If you change the opacity of a clip, this can allow the clip on the track below it to show through. The opacity setting influences the result of setting the composite mode.

If a transition is attached to a clip, the transition takes on the composite mode of the incoming clip. This can result in dramatic changes in composite modes if two clips, with different composite modes, have a transition between them. To maintain each clip's composite mode, keep the clips on separate tracks with the transitions.

Gradients are helpful test images for trying out the effect of composite modes.

To set the clip composite mode:

- 1 Select the clip in the Timeline.
  - 2 Open the Modify menu and choose the mode you want from the Composite Mode submenu.
    - *Normal*: Displays the clip without any changes
    - *Add*: Combines the color values of the clips, not exceeding absolute white. The resulting image is lighter. Where the added values are greater than one, absolute white is displayed.
    - *Subtract*: Subtracts the color values of the clips, not going below absolute black. The resulting image is darker. Where the subtracted values are less than one, absolute black is displayed.
    - *Difference*: Subtracts the color values of the underlying clip from the selected clip, displaying the absolute color values.
    - *Multiply*: Compares the color values for each pixel on the clip and the track below and multiplies them together. If the image is already dark, there is little or no effect. If the image is light, Multiply darkens it.
    - *Screen*: Compares the color values for each pixel in the clip with those of the track below and multiplies the inverse of each. If the image is already light, there is little or no effect. If the image is dark, Screen lightens it.
    - *Overlay*: Wherever the color value is greater than 128, Screen is applied. Wherever the color value is less than 128, Multiply is applied.
    - *Hard Light*: Darkens or lightens the colors, depending on the color values for the clip. The effect is similar to shining a hard spotlight on the clip.
    - *Soft Light*: Darkens or lightens the colors, depending on the color values for the clip. The effect is similar to shining a diffused spotlight on the clip.
    - *Darken*: Compares the color values for each pixel in the clip with those for the clip on the track below, and selects the darker of the two
    - *Lighten*: Compares the color values for each pixel in the clip with those for the clip on the track below, and selects the lighter of the two
    - *Travel Matte*: Applies a matte that moves with an image and makes the layer transparent, displaying the layer underneath. The Luma option averages the RGB values to gray. The Alpha option ignores RGB values.
- Note:** Travel Mattes always involve 3 tracks. The foreground clip goes on an upper track. The matte track goes on the middle track, and the background clip goes on the lowest track. The Travel Matte composite mode is then applied to the foreground clip. When the Travel Matte is on Track V1, Final Cut Pro will use black as the default background.

# Rendering

## About Rendering

Rendering is the process of computing frames of video and sections of audio so that they can be played smoothly in Final Cut Pro. Once rendered, the audio and video are stored in render cache files.

This section describes the fundamental concepts that you need to understand about rendering when creating sequences in Final Cut Pro. Most Final Cut Pro sequences (containing transitions, motion, and filters) need to be rendered before they can be played in real time.

## Rendering Versus Real-Time Playback

Because you can create very simple or very complex sequences, the amount of rendering that is required depends on many factors.

Sequences consisting of cuts only can be created in Final Cut Pro and played back in real time, without rendering. For more information, see “How to Avoid Rendering,” on page 246.

## How Sequences Are Rendered

For the most part, you can create sequences in Final Cut Pro without knowing anything about how rendering occurs or in what order. For some special effects and compositing techniques, it may be useful to understand how the sequence is rendered in order to achieve a particular result.

## Setting a Sequence's Render Qualities

The Render Quality Editor lets you specify four render qualities for the current project. This lets you work at lower frame rates, smaller frame sizes, and with various rendering options disabled for some effects, while viewing full-frame video at another quality level. By customizing the quality settings, you can manage the quality-speed trade-offs of video editing by quickly switching between quality levels while you work.

Final Cut Pro maintains a separate render cache for each render quality level. This means that once a segment is rendered at a particular render quality level, you can switch to a different render quality setting and then back without losing the rendered frames.

To set the sequence render quality:

- 1 Open the Sequence menu and choose Render Quality.
- 2 Select the desired render quality.

You can also choose the render quality by using the pop-up menu in the top-left corner of the Timeline.

## Editing Render Quality Levels

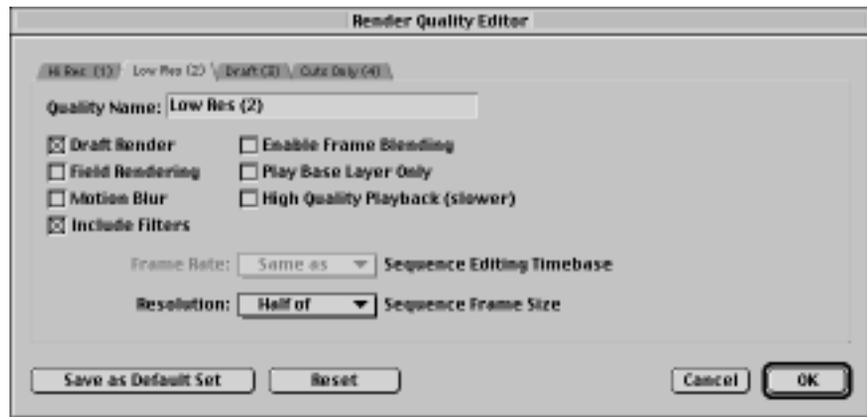
Final Cut Pro has four render quality levels. You can customize the definition of each render quality. While creating a sequence in Final Cut Pro, you can switch among render qualities to influence the time it takes to render and the quality of the rendered result.

When a render quality is current, any rendering that is required is indicated in the Timeline by a red line over the ruler. Once rendered, the frames are saved in the render cache storage locations specified in the Scratch Disks tab of the Preferences window. Switching to a different render quality changes how the output appears in the Canvas, but Final Cut Pro does not delete or discard previously rendered material of a different quality unless new edits invalidate part of the rendered sequence.

To edit the sequence render quality levels:

- 1 Do one of the following:
  - Open the Sequence menu and choose Edit Render Qualities from the Render Quality submenu.
  - Choose Project Properties from the Edit menu and click the Edit Render Qualities button.

- Open the Render Quality pop-up menu in the Sequence tab in the Timeline and choose Edit Render Quality.



- 2 Specify the options for each render quality and click OK.
  - *Quality Name*: You can assign names to each render quality.
  - *Draft Render*: Check this box to render filters at the lowest possible quality. This is useful to speed up previewing, but should be left unchecked before final rendering and export.
  - *Field Rendering*: Check this box to turn field rendering on.
  - *Motion Blur*: Check this box to apply motion blur when rendering.
  - *Include Filters*: Check this box to include filters when rendering.
  - *Enable Frame Blending*: Check this box to enable motion smoothing effects where the speed of the video has been changed.
  - *Play Base Layer Only*: Check this box to render the base tracks (V1 and A1) and cuts only. No transitions are rendered. Motion will not be applied to clips or sequences when played back in the Viewer.
  - *High Quality Playback*: Renders the playback at the highest quality. It plays back DV clips at the highest visual quality, but at the expense of frame rate on the computer monitor. This does not affect render quality or speed of playback when exporting to a camcorder or deck. This should only be used for checking the visual quality of filtered or composited clips.
  - *Frame Rate*: Allows you to render at frame rates proportional to the sequence editing timebase.
  - *Resolution*: Allows you to render at a resolution proportional to the sequence's frame size.

**Important** The Render Quality settings are independent of the sequence settings. They apply only to rendered output.

## Video Rendering

Video frames in sequences are rendered in the following order:

- The top layer of video (the highest numbered track) is processed first and then composited onto the track below it.
- Within each track, motion effects, filters, and transitions are processed, in that order.

**Note:** It is possible to change the order of rendering by using nested sequences. See “Using Nested Sequences,” on page 244 for more details.

## Audio Rendering

In many cases, audio can be played in real time without rendering. Rendering is necessary in the following circumstances:

- If the sequence has more audio tracks than the number of tracks specified in the Real-time Audio Mixing preference (see “Setting General Preferences,” on page 96). Final Cut Pro can mix up to 8 tracks of audio in real time. The maximum number of tracks you will be able to mix depends on multiple factors (see “Mixing Audio in Real Time,” on page 165). You can specify a lower number to dedicate more processing resources to video playback.
- Real-time audio capabilities can be explained based on track equivalent costs. Track costs can accumulate quickly when combining any or all of the following items:
  - Each track to mix has a cost of 1.
  - Filters have a certain cost depending on complexity. Most filters have a cost of 3 tracks.
  - Compressor/Limiter, Expander/Gate, Vocal De-Esser, and Vocal De-Popper have costs of 6 tracks each.
  - Each track referencing a sub-sequence counts as the cost of all audio tracks in the sub-sequence. Use the mixdown audio feature to reduce this cost. For more information, refer to “Mixing Audio in Real Time,” on page 165.
  - A stereo track referenced as a sub-sequence has a cost of 4 tracks (two for each channel).

## Using Nested Sequences

Nested sequences are sections of the sequence that have been converted using the Nest Item(s) command or sequences that have been placed within other sequences. Nested sequences are treated like other clips in a sequence. For more information on nested sequences, refer to “Placing Sequences Within Other Sequences,” on page 267.

Tips for rendering nested sequences:

Make sure that the nested sequence has the same render settings (frame rate, frame size, and compression settings) as the main sequence to avoid rendering the nested sequence again.

The nested sequence inherits the render quality of the parent sequence. If render files already exist for the nested sequence at that render quality, then they are used. If render files don't yet exist, they are created when the parent sequence is rendered and saved with the nested sequence.

Nested sequences may require separate rendering in a parent sequence in these circumstances:

- If a parent sequence modifies a nested sequence, then the nested sequence needs to be rerendered as a sub-sequence. Modifications include any compositing, filters, transitions, speed changes, and so on.
- If movement, such as rotation, has been applied to a sequence and then rendered, then the sequence needs to be rerendered if it is nested inside another sequence.
- If a nested sequence is on the base track, the Alpha Channel type is set to none. If it is on a higher track, the Alpha Channel type is set to straight. If the alpha channel for the nested sequence is set to none, the clips it contains do not need to be rerendered. The rendered files will be retained as long as they do not need to be combined with other tracks in the sequence, but the clip will be opaque.

### **Using Nested Sequences to Render Transitions**

For clips in V2 or higher with a motion path applied, it may be necessary to nest the clip as a sequence in order to render it properly if it has a transition such as 3D, Slide, Push, Zoom, Stretch, or Squeeze applied.

### **Rendering Indicators**

As you create a sequence, the following indicators appear when rendering is required:

- The rendering indicator above the Timeline ruler indicates which sections of the sequence require rendering in order to play back smoothly. Red indicates that the section needs to be rendered; gray indicates that no rendering is required.
- When video material that requires rendering is playing in the Viewer or Canvas, and the Play Base Layer Only option in Render Quality Editor is not enabled for the current render quality, a blue background with the word “Unrendered” appears, indicating that the video can't play in real time. If the Play Base Layer option is enabled, the base tracks play, but without any transitions or other special effects.
- When audio material that requires rendering is playing in the Viewer or Canvas, a steady beeping sound occurs, indicating that the material can't play in real time.

## How to Avoid Rendering

In general, you need to render transitions, effects, and composited layers to play a sequence smoothly. Sequences consisting of cuts only do not require rendering for playback as long as sequence size and frame rate match the original source material.

To avoid rendering when creating a sequence with cuts only, make sure that the sequence's editing timebase, frame rate, and compression settings are the same as the frame rate, frame size, and compression settings of your source media. If the frame rate, frame size, or video or audio compression settings in your source media are different from those settings in your sequence, those frames need to be rendered before the sequence can be exported or printed to video.

To view the compression settings for source material:

- 1 Select the clip in the Browser or Timeline.
- 2 Choose Item Properties from the Edit menu.

You can also avoid unnecessary rendering by nesting sequences within other sequences. Refer to the previous section, "Using Nested Sequences," on page 244.

**Note:** Pressing the Caps Lock key temporarily disables rendering. This allows you to adjust all of your settings before rendering a preview. It does not speed up final rendering, but allows you to work faster without the processing overhead of background rendering.

## Rendering

To render an entire sequence:

- Choose Render All from the Sequence menu.  
A progress bar is displayed while the sequence is being rendered. Click Cancel to stop rendering. All rendered frames are saved, even if rendering is canceled.

To render a section of a sequence:

- 1 Select one or more contiguous clips or transitions, or set the In and Out points to the area that you want to render.
- 2 Choose Render Selection from the Sequence menu, or press Command-R.

A progress bar is displayed while the sequence is being rendered. Click Cancel to stop rendering.

## Specifying Storage Locations for Render Files

Final Cut Pro lets you specify multiple disk locations for storing render cache files. When render files are created, they are stored on the disk with the most available space. You can specify up to five disks for storing either captured video, captured audio, or render cache files.

If no disk locations are specified, Final Cut Pro saves the render files in a folder called Render Files, which is located in the same folder as the Final Cut Pro application.

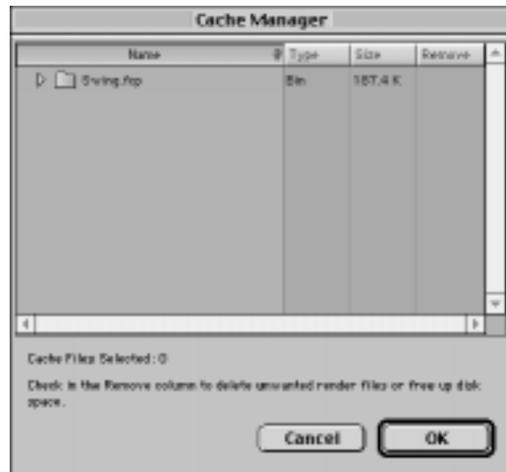
You specify the storage locations for rendered files using scratch disk preferences. For more information, see “Setting Scratch Disk Preferences,” on page 110.

## Using Cache Manager to Manage Rendered Files

You use the Cache Manager to delete unwanted render files or to free disk space. This is useful for removing render cache files for deleted or obsolete projects, or for removing unnecessary render files for existing projects, such as those at render quality levels that you no longer need.

The Cache Manager finds files from unopened projects as well as open projects. If you delete render cache files for projects in which you are still working, some re-rendering may be required.

If you run out of disk space, a dialog box opens in which you can delete old render cache files.



To view or delete render cache files:

- 1 Choose Cache Manager from the Tools menu.

The Cache Manager displays a list of all of the Final Cut Pro render files on designated scratch disks.

- 2** Click next to the file name in the Remove column to designate a file to be deleted.
- 3** When you click OK, all of the files tagged for removal are deleted from your hard disk.

### **Automatically Rendering Before Playing**

The render ahead preference tells Final Cut Pro to render a specified amount of material ahead of the current playhead position before attempting to play it. For example, with the render ahead preference set to 5 seconds, when you click Play, all material up to 5 seconds ahead of the playhead position is rendered first. Then Final Cut Pro begins playing the clip or sequence.

This preference is an alternative to explicitly specifying a section of the sequence to render and choosing Render Selection from the Sequence menu. The rendered material is added to the render cache just as explicitly rendered material is.

# Creating Final Output

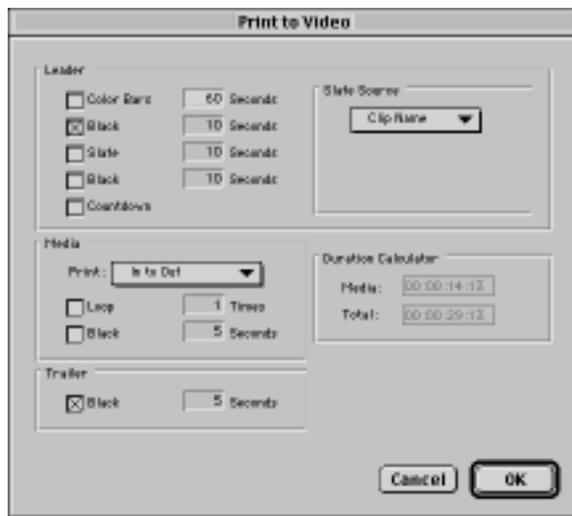
## Printing to Video

You use the Print to Video command in the File menu to output a sequence or clip to videotape. You can use the Print to Video command without device control. If you have device control, the Edit to Tape command in the Tools menu lets you perform precise Insert and Assemble edits to tape in addition to previewing an edit.

To print a sequence or clip to video using the current render quality:

- 1 Select the sequence or clip in the Browser.
- 2 Open the File menu and choose Print to Video.
- 3 Specify options in the Print to Video dialog box.

You can specify the duration for all options.



- *Leader*: These options create lead-in frames that precede the actual footage. The options are applied in order. A duration for each option can be defined by typing a time value into the field next to the option.
  - *Color Bars*: Check this box to add color bars and a 1 kHz tone, preset to  $-12$  dB, before the beginning of the sequence or clip.
  - *Black*: Check this box to add black frames between Color Bars and Slate or before the beginning of the sequence or clip.
  - *Slate*: Check this box to add the content specified in the Slate Source pop-up menu.
  - *Black*: Check this box to add black frames between Slate and Countdown or before the beginning of the sequence or clip.
  - *Countdown*: Check this box to add a 10-second countdown before the sequence or clip.
- *Slate Source*: Specifies the type of slate to be used. You can specify the sequence or clip name, a file on disk, or multiple lines of custom text.
- *Media*: These options let you print the entire sequence or clip or only the marked portion.
  - *Print*: Select a print option from this pop-up list.
  - *Loop*: Check this box to specify the number of times the sequence or clip is edited to tape.
  - *Black*: Check this box to insert black frames for the specified time between the looped portions.
- *Trailer*: Check the box labeled “Black” to add a black trailer of a specified duration at the end of the printed sequence or clip. If you are looping the sequence or clip, the trailer appears after the last looped sequence or clip.
- *Duration Calculator*: Calculates the total duration of the media you’ve selected to print including all options you’ve specified.

The sequence is rendered if necessary and a message tells you to start recording on your video deck.

**Note:** The image dimensions and codec selected in the current render settings directly affect the size and quality of the video playback window in Print to Video.

- 4 Start recording on your video deck and click OK.

**Note:** If you have turned “Mirror on desktop during Print to Video” on in General preferences, you may notice dropped frames in your final output. To eliminate this problem, turn off this option in the General preferences tab.

This prints the selected clip or sequence using the current render quality. To print to video at a different render quality, use the Render Qualities pop-up menu in the Timeline.

**Note:** Final Cut Pro monitors the state of controlled devices. If your camcorder or deck malfunctions while printing to video or editing to tape, you may receive an error warning. Cancel the operation before proceeding further and consult your camcorder or deck's manual for troubleshooting information.

## Editing to Tape

The Edit to Tape command lets you perform linear Insert and Assemble edits to tape with frame accuracy. Editing to tape requires device control. If you do not enable device control in the Device Control tab in the Preferences window, this command is unavailable. Use the Print to Video command to print a sequence or clip to videotape without using device control.

To open the Edit to Tape window, choose Edit to Tape from the Tools menu.



**Note:** The Tape Deck status box at the bottom center of the Edit to Tape window lets you know if there is any malfunction or failure during the editing process. Check this frequently to make sure your deck is functioning properly and the tape is undamaged.

Edit to Tape has two modes. You choose the mode from the pop-up menu in the top center of the window.

- *Editing*: Uses exactly the content that you select and doesn't include any mastering options. In editing mode, you can do standard three-point edits directly to tape. You use editing mode if you want to replace video, audio, or both on tape.
- *Mastering*: Includes mastering options in the final output such as color bars and tone, a slate, and a countdown. The Duration and Out fields are dimmed, since mastering options affect the overall duration of the piece. You use mastering mode when you want to output your finished sequence to tape from a specified starting timecode. This mode is the default.

## Edit to Tape Operations

Edit to Tape has three types of operations, which you choose using the buttons at the bottom left of the window or by activating the overlay function. To edit to tape using the edit mode buttons, click any of the three buttons in the bottom-left corner of the Edit to Tape window. You can also drag a sequence or clip into the window to activate the Edit to Tape overlay function.

**Note:** Edit to Tape buttons only work on clips loaded into the Viewer. To load a sequence into the Viewer, close the opened sequence (if it's in the Canvas), and drag the sequence from the Browser to the Viewer.



- *Insert*: Preserves the existing timecode on the tape. Insert requires black and coded tapes, which you can create using the “Black and Code” button. This is the default mode if you drag the clip directly into the Edit to Tape window.
- *Assemble*: Writes the sequence or clip to tape at the designated In point, or at the current point (after pre-roll). It overwrites the existing timecode on the tape.

**Note:** Assemble will not work on non-coded tapes. Use the “Black and Code” button to format a tape with timecode. See “Preparing a Videotape With Black and Code” on page 257.

**Important** Be sure that your deck is capable of insert and assemble editing if you want to use these features. Play-only decks cannot perform edits. DV devices only support assemble editing. If your deck or camcorder is not capable of performing certain functions, buttons or functions in the overlay are dimmed.

- *Preview*: Plays a preview of the sequence or clip on your external monitor, if present. It renders the sequence or clip first (if necessary) and it includes all selected mastering options in the preview.

**Note:** Dragging a clip from the Browser or Timeline to the Preview button in the Edit to Tape window simulates an insert operation. Nothing is actually edited to tape.

When working with multiple windows in the Viewer, Timeline, Canvas, or Browser, menu commands and keyboard shortcuts apply to the default, or labeled, window. To use commands and shortcuts in other windows, you must drag the desired window to one of the main labeled windows.

### **The Difference Between Insert and Assemble Editing**

An insert edit is “clean in, clean out.” This means that the deck starts recording at exactly the specified frame and ends at exactly the specified frame. It also means that timecode continuity can be maintained because you don’t record timecode along with the video and audio. An Insert edit uses the chosen In and Out points based on media plus any extras such as black, color bars, and so on. The edit is frame-accurate when written to tape (assuming you have a frame-accurate deck).

In contrast to an Insert edit, an Assemble edit overwrites the timecode (in addition to laying down video and audio) on the tape. To avoid timecode breaks on the Out point, an assemble operation extends the edit beyond the Out point on the tape anywhere from 2 to 15 frames on professional equipment. With DV, this value may range from .5 to 1.5 seconds. Any material will be overwritten at that point. This avoids discontinuities in the timecode around the requested Out point on the tape.

## Choosing Which Tracks to Record

Click the track selection controls on the bottom right of the Edit to Tape window to choose which tracks are recorded. When you play the clips in Final Cut Pro, you will hear and see all three tracks, but only the selected ones will actually be recorded onto the tape. This allows you to record audio with no video, or vice versa.

## Setting Up for Editing to Tape

To perform an edit to tape, there must be timecode on the tape. If you are editing to a new tape, you must first prepare at least 30 seconds of the tape with black and code. This will allow you to set an In point in Final Cut Pro. If you are using a previously edited tape, be sure you begin your edit at a point on the tape with timecode. If you have blank spaces between your edits, begin your edit at a point with timecode or use black and code to format the blank space between edits. See “Preparing a Videotape With Black and Code” on page 257.

Before editing to tape:

- 1 Select the correct device control settings for your system.

Open the Tools menu and choose Edit to Tape. You can use the Device Settings tab to specify device control settings. The Input button allows you to configure your capture card, which is receiving a signal from the deck. For information on device control settings, see “Setting Device Control Preferences” on page 99.

- 2 Set an In point for your edit.

Click the Video tab in the Edit to Tape window. In mastering mode, the In point field located at the bottom-left corner of the window is by default not set. You must enter an In point in this field. Setting an Out point is only necessary in editing mode.

- 3 Configure your deck so that it directs output to your NTSC or PAL monitor.

This allows you to view the results of your edits in their final form.

## Performing an Edit to Tape

Editing to tape is very much like editing source material into a sequence. Once you are set up, the only difference is that the result is edited to videotape as you work.

To edit a sequence to tape:

- 1 Choose Edit to Tape from the Tools menu.
- 2 Choose editing or mastering mode.

Mastering mode includes mastering options in the final output; editing mode does not.

- 3 Insert a tape.

**Note:** If you notice that the tape you inserted is not displaying the type of timecode you expected (drop frame or non-drop frame), play the tape first to register its timecode in Final Cut Pro.

- 4 If you are working in mastering mode, click the Mastering Settings tab and specify the desired mastering options.

Mastering options let you add items such as a leader with a countdown, color bars, tone, and a slate.

- 5 Select the type of Edit to Tape operation (preview, insert, or assemble) to perform. You can use the edit operation buttons or the Edit to Tape overlay interface. See the section titled “Edit to Tape Operations” on page 252 for more details.

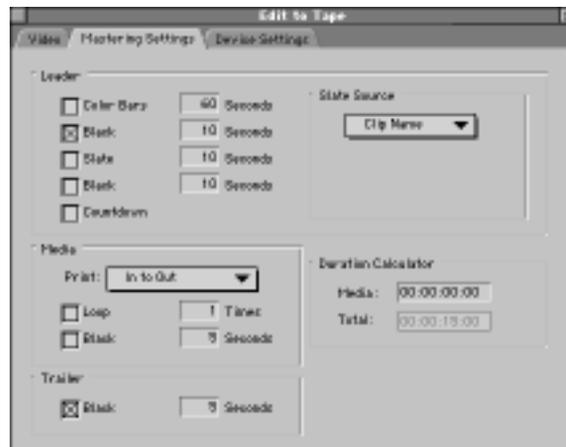
- 6 If you selected the Insert or Assemble edit, insert a tape into the video deck at the prompt.

Any material that needs to be rendered at the current render quality will be rendered before being edited to tape. You can monitor edit to tape results on an NTSC or PAL monitor. This allows you to accurately preview the results.

**Note:** If you have turned “Mirror on desktop during Print to Video” on in General preferences, you may notice dropped frames in your final output. To eliminate this problem, turn off this option in the General preferences tab.

## Setting Mastering Options

These options appear on the Mastering Settings tab in the Edit to Tape window.

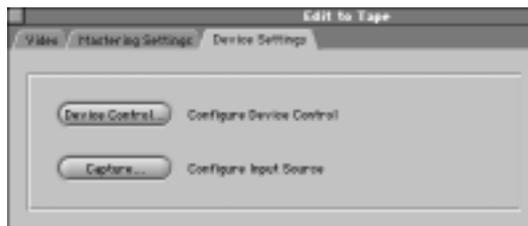


- **Leader:** These options create lead-in frames that precede the actual footage. The options are applied in order. A duration for each option can be defined by typing a time value into the field next to the option.

- *Color Bars*: Check this box to add color bars and a 1 kHz tone, preset to  $-12$  dB, before the beginning of the sequence or clip.
- *Black*: Check this box to add black frames between Color Bars and Slate or before the beginning of the sequence or clip.
- *Slate*: Check this box to add the content specified in the Slate Source pop-up menu.
- *Black*: Check this box to add black frames between Slate and Countdown or before the beginning of the sequence or clip.
- *Countdown*: Check this box to add a 10-second countdown before the sequence or clip.
- *Slate Source*: Specifies the type of slate to be used. You can specify the sequence or clip name, a file on disk, or multiple lines of custom text.
- *Media*: These options let you print the entire sequence or clip or only the marked portion.
  - *Print*: Choose a print option.
  - *Loop*: Check this box to specify the number of times the sequence or clip is edited to tape.
  - *Black*: Check this box to insert black frames for the specified time between the looped portions.
- *Trailer*: Check the box labeled “Black” to add a black trailer of a specified duration at the end of the printed sequence or clip. If you are looping the sequence or clip, the trailer appears after the last looped sequence or clip.
- *Duration Calculator*: Calculates the total duration of the media you’ve selected to print including all options you’ve specified.

### Edit to Tape Device Settings

These options appear on the Device Settings tab in the Edit to Tape window.



- *Device*: Click this button to configure the device control for your particular hardware. See “Setting Device Control Preferences” on page 99.
- *Capture*: Click this button to configure your input source. See “Specifying Capture Preferences” on page 101.

## Preparing a Videotape With Black and Code

The “Black and Code” button is to the right of the pop-up menu at the top center of the Edit to Tape window. Black and code formats the tape in a connected deck with a black screen and user-defined timecode.



To prepare a tape with black and code:

- 1** In the Edit to Tape window, click the “Black and Code” button.
- 2** Verify that the settings are correct for your video card, to be sure that the card will output black.
- 3** Enter the starting timecode and click OK.

The tape rewinds to the beginning and then records black and timecode starting from the timecode specified. To cancel the “Black and Code” process, press the Esc key.

**Note:** Some decks do not allow remote setting of the timecode.

## Working With Edit Decision Lists

You can export a sequence as an Edit Decision List (EDL) and use this with a linear editing system to create sequences.

When you export an EDL, be sure the disk you use is correctly formatted for linear editing decks. This must be done using special formatting software. Check with your post-production facility to find out the correct format.

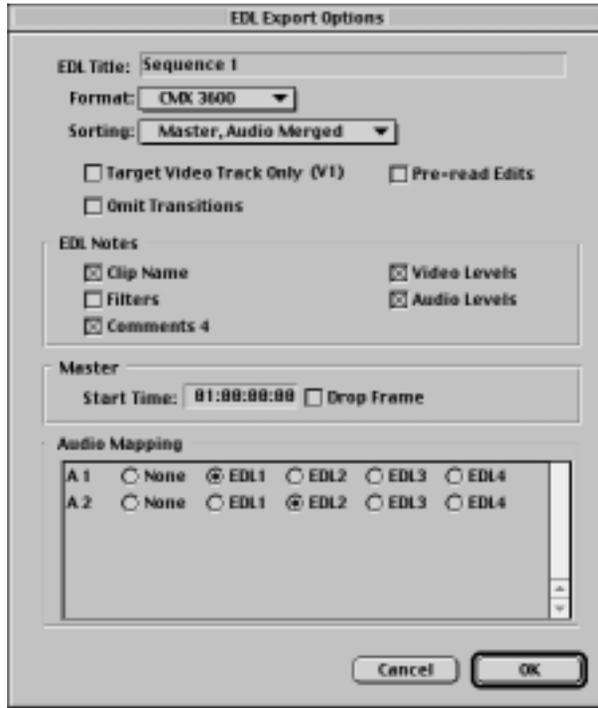
### Exporting an EDL

EDLs can have up to one video track, four audio tracks, and one static superimpose layer. Transitions are limited to standard dissolves and 20 standard wipe patterns.

To export a sequence as an EDL:

- 1** Select a sequence in the Browser, or open the sequence into the Timeline and make the Timeline active.
- 2** Open the File menu and choose EDL from the Export submenu.

- 3 Specify the EDL export options and click OK.



**Note:** If you exceed the number of events for a specified EDL format, additional files will be created.

### Setting EDL Export Options

- **EDL Title:** Displays the title of the EDL as it will appear at the top of the file. You can change the name in this field. This name can be different from the file's name on the disk.
- **Format:** Choose an EDL format. It should correspond to the format required by the linear system that will use the EDL.

If you will be going to film, select the CMX 3600 or GVG 4 Plus format. Then use Trakker Technologies' Slingshot to translate your EDLs into frame-accurate cut lists, dupe lists, pull lists, and optical count sheets. Bring these to your negative cutter for conforming.

**Note:** If you select Sony 5000, the EDL Title will change to "Untitled" when you import the EDL.

- **Sorting:** Choose an option to determine how video and audio edits are sorted in the EDL. The following options are available:
  - **Master, Audio Merged:** Sorts the sequence edits chronologically. Linked video and audio appear on the same line, even if the audio ends before the video.

- *Source, Audio Merged*: Sorts edits first by source reel number, then by sequence chronology. Linked video and audio appear on the same line, even if the audio ends before the video.
- *Target Video Track Only*: Check this box to export the edits from the sequence's current target video track. All audio edits are still exported.
- *Pre-read Edits*: Check this box to create a transition between two clips on the same reel. This only works with digital video decks that support this feature. If this option is not selected, Final Cut Pro creates a B-reel EDL.
- *Omit Transitions*: Check this box to omit transitions when exporting an EDL.
- *EDL Notes*: These options export editing information to the EDL for use by the online editor. The following types of notes can be exported:
  - *Clip Name*: Check this box to export the clip name as used in the sequence. It appears in the EDL each time the clip is used.
  - *Filters*: Check this box to export the names of filters or effects that are applied to a clip or a range in the sequence, along with the effects' starting and ending sequence timecode.
  - *Comments 4*: Check this box to export the contents from the Comments 4 column of the Effects tab in the Browser.
  - *Video Levels*: Check this box to export video key levels (opacity).
  - *Audio Levels*: Check this box to export audio levels.
- *Master*: Specifies export mastering options.
  - *Start Time*: Specifies the starting timecode of the master reel in the EDL. By default, the starting timecode of the sequence is used.
  - *Drop Frame*: The Drop Frame checkbox specifies the timecode format for the master tape. This is only applicable to NTSC format.
- *Audio Mapping*: Determines how audio is mapped to EDL channels. Each sequence audio track can be mapped to one of a maximum of four EDL channels or turned off. Multiple sequence tracks can be mapped to a single EDL channel.
 

**Note:** Sony 5000 and 340 formats do not support four channels. You will be prompted to set audio mapping to two channels if you select these formats.

### Importing an Edit Decision List

You can import an EDL created on a linear editing system and use it to create sequences.

To import an Edit Decision List:

- 1** Open the File menu and choose EDL from the Import submenu.
- 2** Locate and select the EDL's filename.

- 3 Click the Options button to
  - recapture or relink media when importing
  - specify handle sizes for capturing additional media
  - enable or disable the feature that makes filenames unique. Check this box if you will be recapturing clips. Leave the box unchecked if you will be relinking to clips that are already on disk.
- 4 Click Import.

After you import an EDL, the sequence is placed in the Browser. The clips are in the sequence as they appear in the EDL. Clips are named in two ways. If the EDL clip was exported from a non-linear system, the name may have been exported with the clip in the format of “Clip Name:”. Final Cut Pro interprets this format and uses this name as the clip’s name. In all other cases, Final Cut Pro uses the reel number and starting timecode numbers as the clip name. Example: 0001 01:02:20:05.

**Note:** If you selected Sony 5000 as the EDL format when you exported the file, the EDL Title changes to “Untitled” when you import the EDL.

## Working With Batch Lists

A batch list is a tab-delimited text file containing a list of logged clips for a batch capture. It is saved as a text file when exported. When you import a batch list, the first record of the list must have the Browser column names, and all subsequent records must be aligned under their respective columns.

### Exporting a Batch List

To export a sequence as a batch list:

- 1 Set your Browser display to List View.
- 2 Select a project tab.
- 3 Open the File menu and choose Batch List from the Export submenu.
- 4 Specify a destination for the file and click OK.

All columns that are visible at the time of export are generated into a batch list. To exclude columns from the batch list, hide the columns before export. To hide a column, Control-click in the header of the column and choose Hide from the shortcut menu.

### Exporting FXScripts as Text

You can save the scripts that build Final Cut Pro filters and transitions as text files.

To export an effect as text:

- 1 Select the effect in the Browser and choose Effect Editor from the View menu.  
The text version of the effect is loaded into FXBuilder.
- 2 Open the File menu and choose Text from the Export submenu.
- 3 Specify a file destination and click OK.

## Exporting Sequences and Clips

You can export clips, sequences, or portions of either as a Final Cut Pro Movie or in a variety of movie and audio formats using QuickTime. When you export a sequence or clip, only the material between the In and Out points is exported.

To export a clip or sequence using your predefined sequence settings:

- 1 Select a clip or sequence in the Browser, or open the sequence in the Timeline.
- 2 Open the File menu and choose Final Cut Pro Movie from the Export submenu.
- 3 Specify settings, output quality, and whether to include video, audio, or both in the three pop-up menus.
  - *Settings*: The QuickTime settings used for the export. Choose Current Settings to use the current QuickTime settings for the sequence, or choose from the available presets.
  - *Quality*: The render quality for the item you are exporting. This allows you to export at a different render quality from the current setting chosen for the sequence.
  - *Include*: Export video, audio, or both.
- 4 Check the box labeled Recompress All Frames to re-render all frames in the item to be exported. If the item has already been rendered, leaving this box unchecked exports a copy of the current rendered files.
- 5 Specify a filename and destination folder then click Save.

To export a sequence using the QuickTime export settings:

- 1 Select a clip or sequence in the Browser, or open the sequence in the Timeline.
- 2 Open the File menu and choose QuickTime from the Export submenu.
- 3 Choose an export format from the Export pop-up menu.
  - Choose a preset setting from the Use pop-up menu if you want to use a preset export method rather than customize the settings.
  - If you want to customize the export settings, click the Options button to specify video and audio compression settings and other settings for the selected format, then click OK.
- 4 Specify a filename and destination folder and click Save.

To export a still image:

- 1 Place the playhead in the Canvas or Viewer on the frame that you want to export.
- 2 Open the File menu and choose Still Image from the Export menu.
- 3 Click the Options button to select the format, resolution, and compression settings for the image and click OK.
- 4 Specify a filename and destination folder and click Save.

To export an image sequence:

- 1 Set the Still Image Duration field in the General preferences tab to 1 frame (00:00:00:01).  
**Note:** The default is 10 seconds. When you export an image sequence, this results in an extremely long export time.
- 2 Select a clip or sequence in the Browser, or open the sequence in the Timeline.
- 3 Open the File menu and choose QuickTime from the Export submenu.
- 4 Choose “Movie to Image Sequence” from the Export pop-up menu.
- 5 Choose a preset setting from the Use pop-up menu if you want to use a preset export method rather than customize the settings.
- 6 Click the Options button if you want to customize the export settings and select the format, frame rate, or additional options; then click OK.
- 7 Specify a filename and destination folder and click OK.
- 8 Reset the Still Image Duration field in the General preferences tab to 10 seconds (00:00:10:00).

To export the audio only from a clip or sequence into a movie format:

- 1 Select a clip or sequence in the Browser, or open the sequence in the Timeline.
- 2 Open the File menu and choose QuickTime from the Export submenu.
- 3 Choose a preset audio export method from the Use pop-up menu if you want to use a preset audio export method rather than customize the export settings.
- 4 Choose one of the following from the Export pop-up menu if you want to customize the export settings:
  - Movie to AVI
  - Movie to QuickTime Movie
- 5 Uncheck the box next to Video.
- 6 Check the box next to “Prepare for Internet Streaming” if you will deliver your audio over the Web. This is only available in the “Movie to QuickTime Movie” export selection.

- 7 Choose a method from the pop-up menu and specify settings, if available.
- 8 Click the Sound Settings button.
- 9 Choose a method from the Compressor pop-up menu and make the appropriate selections for Rate and Size. The Options button offers additional settings for certain compressor types.
- 10 Select either Mono or Stereo output.
- 11 Click OK in this and the next window.
- 12 Specify a filename and destination folder and click Save.

To export the audio only from a clip or sequence into an audio file format:

- 1 Select a clip or sequence in the Browser, or open the sequence in the Timeline.
- 2 Open the File menu and choose QuickTime from the Export submenu.
- 3 Choose one of the following audio file export methods from the Export pop-up menu:
  - *Sound to AIFF*: Audio Interchange File Format. A standard format for use across multiple platforms. Be sure to leave the .aif extension on your filename if the file will be used on the Windows platform.
  - *Sound to System 7 Sound*: A Mac OS audio file format recommended for short audio sound effect clips or desktop sounds. Not recommended for lengthy audio segments such as CD audio tracks.
  - *Sound to Wave*: Windows audio file format
  - *Sound to  $\mu$ Law*: A standard audio compression format
- 4 Choose a preset audio export method from the Use pop-up menu if you want to use a preset audio export method rather than customize the export settings.
- 5 Click the Options button to specify audio export settings if you want to customize your settings.
- 6 Specify a filename and destination folder and click Save.

## Exporting Sequences and Clips in a Batch Operation

Batch export lets you build a list of sequences and individual clips for exporting in a single operation. This makes it easy to export several sequences or clips without waiting by the computer. Each Batch folder in the Batch Export window can contain multiple clips and sequences. All of the items within a Batch folder, including items in nested folders, share the same export settings.

To export items in a batch process:

- 1 Click on items in the Browser then choose Batch Export from the File menu. The Batch Export window opens with a Batch folder containing the selected items.

You can also choose Export Queue from the Window menu to open the Batch Export window. Items can then be dragged from the Browser to the Batch Export window.

Final Cut Pro creates new Batch folders in the Export Queue tab for each group of items that are dragged to the Batch Export window. Items can also be dragged into existing Batch folders. All of the items in a top-level Batch folder share the same export settings, so be sure to group items into batches based on which export options you want to use.

- 2 Click on individual or multiple Batch folders, then click the Settings button at the bottom of the Batch Export window to specify export options.

The Settings button opens an export options dialog that allows you to set parameters that are displayed in certain columns of the Batch Export window, including output format selection and preset options. An alternative way to set parameters for a batch is to Control-click in a column for a particular batch and choose a parameter.

- If a single Batch folder is selected, the title bar of the export options dialog box displays the name of the Batch. Any changes made to the settings will apply to the batch.
- If multiple batches are selected, the title bar of the export options dialog box displays “(Multiple Batches Selected).” Changes to export settings will apply to all selected batches in the Batch Export window. The initial settings of the parameters in the dialog box will be taken from the first selected Batch folder.

**Note:** Depending on the selected output format, certain parameters may be disabled.

- 3 Click the Export button at the bottom of the Batch Export window to begin exporting the items.

Items marked Done in the Status column have already been exported and are excluded from the Export. If one or more batches, or items within them, are selected when the batch export begins, only items in those folders are exported.

- 4 After the batch export is completed, select any item in a folder and click View Exported to open it into the Viewer.

**Note:** Each exported file selected will be displayed in its own Viewer.

This option is available only after the item has been successfully exported and the Status column displays Done. If any errors occurred during the batch export, an error message appears in the Status column.

### Batch Export Columns

The columns in the Batch Export window display all of the details about the batch export items. Many of the columns display information that can also be specified in the Export Settings dialog box. You can change details for some items by Control-clicking the detail.

- *Name:* Displays the name of the item
- *Type:* Displays the type of item

- *Status*: Displays the current export status for the item
  - *Queued*: Appears when an item is added to the batch queue
  - *Done*: Appears when the item has been successfully exported. Items marked Done are ignored when a batch export operation is started.
  - *Canceled*: Appears when the export process has been canceled
  - If there is an error during export, a message explaining the problem will appear in this column.
- *Output Filename*: Lets you specify new filenames for clips and sequences. If nothing is specified in this column, the item name is used as the output filename. Naming options specified in the Export Settings dialog box are also applied to the filename specified here.
- *Length*: Displays the total length of the clip or sequence
- *Destination*: Indicates the folder location for saving the exported files associated with this top-level Batch folder. The last specified batch export folder is used by default. (If no target has been specified, the first render scratch location is used by default.)
- *Settings*: Defines the compression settings and other movie options for the exported sequence or clip
  - *Item Settings*: Uses the current settings for each item in a batch
  - Existing presets can be accessed through the shortcut menu. Select any of these presets as QuickTime settings and apply them to individual or multiple batches.
- *Quality*: Specifies the render quality level to be used for the items in this batch. This applies only to sequences that are using current settings. Because clips may be exported from several projects with different render quality names, the numbers 1–4 are used to specify render qualities. Render quality 1 is used by default. Only applies if the output format is Final Cut Pro Movie.
- *Include*: Specifies the media channels to be included in the exported media file. The choices are, Audio and Video, Audio only, or Video only. These choices can be accessed through the shortcut menu. For output types that contain only a single media format (such as an audio clip or an image sequence), the correct media type is automatically selected. Only applies if the output format is Final Cut Pro Movie.
- *Recompress All Frames*: Controls how existing QuickTime media is used in creating the new file. When selected, all frames in the QuickTime movie are recompressed at the designated quality. When not selected, samples are copied directly from the QuickTime file unless they are incompatible with the main export setting. Only applies if the output format is Final Cut Pro Movie.

Usually it's best to copy the source media without recompression, since it is faster and avoids any quality loss. You may want to recompress all frames when exporting to a temporally compressed output format or to ensure a constant data rate.

- *Format*: Displays the current export type. All available export types can be accessed through the shortcut menu. Select any of these presets as QuickTime settings and apply them to individual or multiple batches.
- *Use Item In/Out*: Exports the sequence or clip using the current In and Out points. If this option is not selected, all of the media in the clip or the entire sequence is exported.
- *Naming Options*: Columns that correspond to the options in the Naming Options dialog box, described in the next section. All of these options apply to top-level batches. To change any of these options, you can modify the column cell or select the batch and choose Export Settings.
  - *Strip .ext*: Corresponds to the Strip Existing Extension option
  - *Custom .ext*: Corresponds to the Add Custom Extension option
  - *Type .ext*: Corresponds to the Add File Type Extension option

### **Naming Options Dialog Box**

File naming options are applied to the top-level batch in the batch export operation and affect all files in the batch.

- *Example File Name*: Shows an example of how the file naming options will affect the base filename
- *Strip Existing Extension*: Specifies whether the existing extension should be removed from the base filename when the export filename is created
- *Add Custom Extension*: Specifies a custom extension to be applied to the filename.
- *Add File Type Extension*: Specifies whether the default extension for the specific export output type should be appended to the filename

# Managing Complex Projects

Working with complex and large projects that contain hundreds or thousands of individual clips can be complicated. Final Cut Pro provides a number of ways to manage these projects. As a project demands the use of more tracks to create desired effects, you can simplify the management of many tracks by nesting sequences inside one another. For projects with large amounts of media, you can conserve disk space by creating rough cuts with low-resolution clips that can be replaced with higher-resolution clips that have only the media you need to finish the project. Final Cut Pro also enables you to move a project and its source media.

## Placing Sequences Within Other Sequences

You can edit or *nest* one sequence into another sequence. By nesting sequences, you can break down a complex project into smaller pieces that can be worked on separately, and then combine them into a single sequence for output.

Nesting makes it possible to do the following:

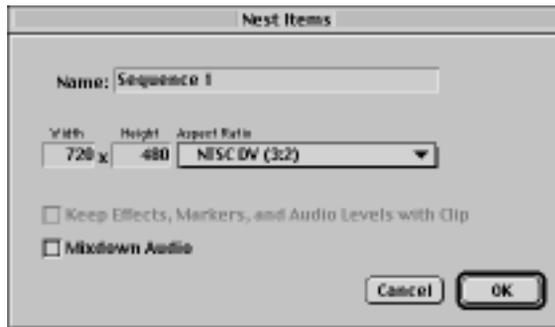
- *Apply the same effects uniformly to multiple clips:* For example, if you want to animate a series of still images along the same motion path at the same point in time, insert all of the still images into a single sequence and nest that sequence into another sequence. You can then apply the motion path to the single, nested sequence rather than creating separate motion paths for each image.
- *Reuse sequences:* For example, if you animate a logo or create a standard introductory sequence that you want to use again, you only need to create it once, then insert the sequence into as many other sequences as desired.
- *Update numerous projects by changing a single sequence:* Unlike clips, nested sequences are actually pointers or references to the original sequence, not copies. You can nest a sequence into multiple projects, then change the original sequence and all the projects in which that sequence is nested will be updated.
- *Move clips together as a group.*

## Nesting Clips

You can nest several clips in a sequence into another sequence. This allows multiple identical parts of a larger sequence to be standardized because the new sequence and all settings that apply to it can be reused. You can also use the Nest Item(s) command to apply the attributes of one clip to an entire sequence.

To nest clips in a sequence:

- 1 Select the clips you want to nest.
- 2 Choose Nest Item(s) from the Sequence menu.



- 3 Name the sequence and choose the new frame size.

All other sequence properties are copied from the current sequence.

- 4 If you've only selected one clip, leave "Keep Effects, Markers, and Audio Levels with Clip" deselected if you want the clip's current effects to be applied to the entire sequence.

The new sequence is placed into the same Browser bin as the current sequence.

## Using the Sequence Trimmer

You can use the Sequence Trimmer to trim clips into an offline sequence, so that you can recapture media at a higher resolution at the final output stage. This helps save disk space.

To trim clips into an offline sequence:

- 1 Select the sequence in the Browser or Timeline and choose Trimmer from the Sequence menu.
- 2 Enter a duration for handles for the offline clips. This adds extra footage at both the head and tail of the trimmed clip, enabling you to fine-tune the sequence timing.

- 3 Enter a name for the new sequence and click OK.



**Note:** Selecting Extract Full Clip will not trim the clips, but will provide them in their full media length in an offline sequence and a bin.

## Relinking Offline Files

If you've moved the source media files used in a project or sequence, you can relink online and offline clips to media on your disk using the Relink Media command.

To relink individual offline files:

- 1 Select the file or files to be relinked.
- 2 Open the File menu and choose Relink Media.
- 3 Locate the disk file for each clip in your sequence.
- 4 Click Select each time you locate the correct file.

**Note:** You can make it easier to locate the correct filename, especially if you're looking through a long list of similar names, by clicking the checkbox labeled "Show Only Files that Match This Name."

To relink all files in the same path:

- If all the files you're looking for are in the same folder, you can check the "Relink All Files In This Path" checkbox. When you click Select to link the first file you find, Final Cut Pro looks at all files in the same path and automatically links them with any clips in the sequence that are associated with files that match the selected filename.

## Moving a Project and Its Media

Occasionally you may need to move the source media used in a project or copy a project and its media to another disk. You can use the Media Mover to move a project and its source media without breaking any links.

**Note:** Using the Save As command will make a copy of the project file, but not related media. Use Media Mover to save a copy of your project along with copies of associated render files.

To use the Media Mover:

- 1** Click the project's Browser tab, or select any item in the project.
- 2** Open the Sequence menu and choose Media Mover.
- 3** If you want to move rendered files as well as the source media, click the Include Render Files checkbox.
- 4** Click OK.
- 5** Choose the location where you want to store the copy of the project.
- 6** Name the project, if necessary.
- 7** Click Save.

The project file and two new directories (Render Files and Clips) containing the related media are copied to the new location.

**Note:** If you are using third-party plug-ins, you need to copy them to the new location also.

## Managing Projects With Multiple Users

In situations where multiple users may be sharing the same system or working on the same project, folders can be used to manage and organize multiple users' media files.

To create a personal or project folder:

- 1** In the Finder, find and open your scratch disk.
- 2** Choose New Folder from the File menu.
- 3** Give the folder an appropriate name.

To select the folder as a storage directory for scratch files:

- 1** In Final Cut Pro, open the Edit menu and choose Preferences.
- 2** Click the Scratch Disks tab.
- 3** Select the type of media files to be stored in the folder and click the Set button to find and choose the folder in the scratch disk.

When other users use the system, they can create their own folders and set the scratch disk preferences to their folders.

## Building Effects With FXBuilder

FXBuilder gives you the ability to create, test, and modify custom video effects, such as filters, text generators, or transitions. You don't need in-depth programming knowledge to create your own effects in FXScript. You use a process called *scripting* to create your effects.

You can build effects quickly and connect several effects together, so that they run in the order you choose.

You can also save effects in a protected format that allows them to be run, but prevents anyone from viewing their code. This means you can create and distribute effects that are copyrighted without losing control of their content.

### What Is Scripting?

Scripting is similar to programming. It is the process of putting together a series of video processing instructions in a way that Final Cut Pro understands. A set of instructions that performs a specific function is called a *script*.

Scripts have elements in common with written language as well as with programming. Scripts have structural and syntactical rules, but the words you use are very similar to English.

Scripting is a way to put many smaller instructions together in a sequence, so that you can perform complex tasks automatically. For example, if you want to add a color tint to a video clip, Final Cut Pro does this by looking at the dots in each frame of the clip and then changing some of them to the color of the tint you want. Doing this without a script would be a tedious and error-prone task. With a script, all the instructions for creating the tint effect can be applied to the clip with one simple step.

Scripting also guarantees that a particular effect will look and behave in the same way every time it is used. It therefore makes a video effect consistent over multiple projects.

## How Does FXBuilder Work?

You can do several things with effects scripts in FXBuilder:

- Open an existing script
- Make changes to a script
- Test a script to see how it looks in real time
- Create a new script

In addition, you can take existing effects from your project's Browser and apply them to video in your project's Timeline or Canvas.

FXBuilder has three components:

- *The FXBuilder window:* You use this to create, test, and edit effects scripts. This contains two tabs, one for script entry and one for the input controls that modify the behavior of the script when it is run.
- *The FXScript language:* This is the scripting language you use. FXScript commands and functions are listed in Appendix A, "FXScript Reference," on page 285.
- *The effects scripts provided with Final Cut Pro:* You can apply these to your projects unchanged or modify by changing the script code. The effects scripts are listed in Appendix B, "List of Audio and Video Effects," on page 325.

## Opening FXBuilder

You work in the FXBuilder environment while you create and test effects scripts. You can open an existing script in an FXBuilder window, or you can open a new FXBuilder window and begin creating a script from scratch.

To open an empty FXBuilder window:

- Choose FXBuilder from the Tools menu.

You can open as many FXBuilder windows as you want.

The FXBuilder menu appears next to the Tools menu when an FXBuilder window is active. You can use this menu to insert script words, run a script on a sample of video, or save your script as a file that can't be modified.

## Opening and Applying Scripts

The sample scripts provided with Final Cut Pro are available in the Effects tab of the Browser. Effects scripts are divided into several groups in the Browser:

- *Filters:* Modify the picture in a single clip
- *Transitions:* Perform effects to change the picture from one clip to another
- *Generators:* Create new video information, such as text

To open a script so that you can view its code:

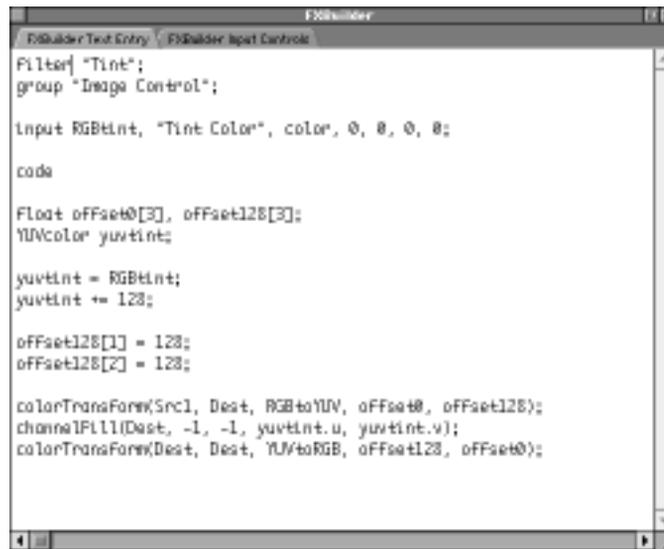
- 1 In the Browser's Effects tab, locate and select the effect you want.
- 2 Choose Effect Editor from the View menu.

An FXBuilder window shows the script for the selected effect. This is the window you use when working with scripts.

### The FXBuilder Tabs

The FXBuilder window has two tabs.

- *FX Builder Text Entry*: Use this tab to review, enter, and edit script code.



```
FXBuilder
FXBuilder Text Entry | FXBuilder Input Controls
Filter| "Tint";
group "Image Control";

input RGBtInt, "Tint Color", color, 0, 0, 0, 0;

code

Float offset0[3], offset128[3];
YUVcolor yuvtint;

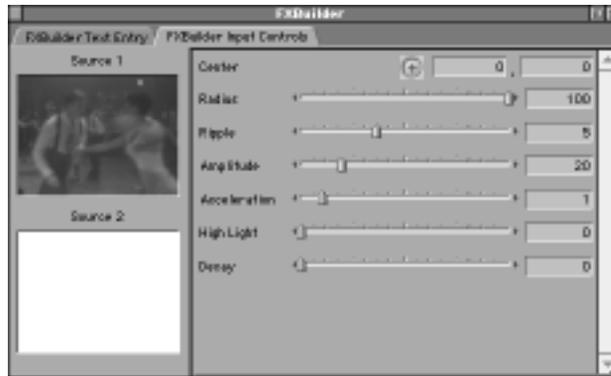
yuvtint = RGBtInt;
yuvtint += 128;

offset128[1] = 128;
offset128[2] = 128;

colorTransform(Src1, Dest, RGBtoYUV, offset0, offset128);
channelFill(Dest, -1, -1, yuvtint.u, yuvtint.v);
colorTransform(Dest, Dest, YUVtoRGB, offset128, offset0);
```

**Note:** FXBuilder does not support multiple levels of undo.

- **FXBuilder Input Controls:** Use this tab to test your script on some source video. Some scripts require input from you in order to run. For example, if you're testing a script that adds a color tint, you need to specify which color you want the tint to be. You also need to set the input controls for a script when you apply it to a clip in a sequence's timeline.



### Running a Script in FXBuilder

You can run scripts in real time, without rendering them first.

To run a script:

- 1 Open the effects script you want.
- 2 Click the Input Controls tab.
- 3 Drag a clip into one of the source spaces (transitions require two clips). You can drag clips from the Browser, the Timeline, or a Viewer window.

**Note:** Controls will not appear in the FXBuilder Input Controls tab until you run your script in the FXBuilder Text Entry tab.

- 4 Open the FXBuilder menu and choose Run.

The script runs in an FXBuilder window.

You can use the playhead in the Scrubber bar to step through the effect frame by frame, or move rapidly through it.

- 5 Set the inputs as required.
- 6 You can do this while the script is running. If you click the Stop button or choose Stop from the FXBuilder menu, the inputs revert to the default the next time you run the script.

### Applying a Script in the Timeline

You can apply scripts to video in a sequence's Timeline. To do this, drag the script from the Browser's Effects tab to the required location in the Timeline.

You can place effects anywhere in the video you want to apply them to. You can also apply multiple effects to the same video.

If you are placing transitions in the Timeline, you can place them between the end of the first and the beginning of the second clip in the transition. You can also place effects at the end of the second clip, or the beginning of the first.

When you place effects in the Timeline, you can adjust their inputs. If you do not set the input controls, the defaults apply.

To adjust the input controls for a transition or generator effect in the Timeline:

- Double-click the effect's icon that appears where you placed the transition or generator.

To adjust the input controls for any other type of effect in the Timeline:

- Double-click the clip.
- Click the Filters tab in the clip's Viewer window.

## Rendering

When you have applied scripts in the Timeline, you must render them before you can play them. If you do not render video to which scripts have been applied, you will see a blue display with the word "Unrendered" in the Canvas.

If you want to see what an effect will look like when used with project video in real time, you can use FXBuilder to do this, as explained in "Running a Script in FXBuilder" on page 274. For more information about Rendering, see Chapter 13, "Rendering," on page 241.

## Modifying Scripts

Final Cut Pro's extensive library of effects can easily be modified to suit individual projects. All scripts have the same simple structure, which makes it easy to understand and change them.

### How Is a Script Structured?

The script below applies a color tint to the video. It is one of the scripts supplied with Final Cut Pro. You can open this script by selecting it in the Browser and choosing Effects Editor from the View menu.

```
filter "Tint";
group "Image Control"

input RGBtint, "Tint Color", color, 0,0,0,0;

code
float offset0[ 3], offset128[ 3] ;
```

```

yuvcolor yuvtint;
yuvtint = RGBtint;
yuvtint += 128;
offset128[ 1] = 128;
offset128[ 2] = 128;
colorTransform (Src1, Dest, RGBtoYUV, offset0, offset128);
channelFill(Dest, -1, -1, yuvtint.u, yuvtint.v);
ColorTransform (Dest, Dest, YUVtoRGB, offset128, offset0);

```

The first two lines state the script's name and type, and assign it to a group in the Browser. This script is named "Tint." It is a filter script and has been assigned to the group Image Control. This means it can be found in the Browser's Image Control bin.

```

filter "Tint";
group "Image Control"

```

The third line specifies the input control needed. In this case, all that is needed is a standard color selection control. If more input controls were needed, they would appear in this part of the script, on separate lines. This input control takes a number corresponding to the color selected and places it in a variable called RGBtint.

All input controls place the result of the input into a variable, so that it can be used later on in the script code.

```

input RGBtint, "Tint Color", color, 0,0,0,0;

```

The next line shows where the actual script code begins. Every line that follows it is script code:

```

code

```

The remaining lines are the code required to take the selected color and apply it to the video by changing the colors in individual pixels of video. The final line, which begins with the word `channelFill`, is the one that actually applies the selected color.

```

float offset0[ 3], offset128[ 3] ;

yuvcolor yuvtint;
yuvtint = RGBtint;
yuvtint += 128;
offset128[ 1] = 128;
offset128[ 2] = 128;
colorTransform (Src1, Dest, RGBtoYUV, offset0, offset128);
channelFill(Dest, -1, -1, yuvtint.u, yuvtint.v);

ColorTransform (Dest, Dest, YUVtoRGB, offset128, offset0);

```

## Script Lines

A script is divided into lines. Each line contains a statement, or a group of statements. You can't end a line in the middle of a statement. So, for example, in the Tint script, the statement `yuvTint = RGBtint` must all appear on the same line. If you break the line in the middle of this code, the script will not run.

The `;` character denotes the end of a line. You can also use a carriage return (the Return key). Use the `;` character if you want to join two short lines together.

## Customizing a Script

There are many ways to customize scripts.

For example, the Tint script can be changed by adding a brightness control that can be set by the user.

First, set the input control for the brightness level. You can do this by entering the line below under the Tint Color input command at the top of the script:

```
input brightness, "Brightness", slider, 100, 0, 200 label "%";
```

The input is then used to change the brightness of the clip. You use the `channelMultiply` command to multiply the luminance channel by the input variable. The following line of code does this, and should be placed below the `channelFill` line in the body of the script:

```
channelMultiply (dest, dest, 1, brightness/100, 1, 1);
```

The next time you run the script, you can change the brightness as well as the color tint.

## Exporting Scripts

To export a script, make sure that the FXBuilder window for the script is active and choose Export from the File menu.

### Exporting Scripts as Text Files

If you export your script as a text file, it can be opened, viewed, and changed. Use this option when you are working on a script, or if you are using scripts that are in the public domain.

To export a script as a text file:

- 1** Make sure that the FXBuilder window for the script is active.
- 2** Open the File menu and choose Text from the Export submenu.
- 3** Name your text file.
- 4** Export the file to the FXScripts folder within the Plug-Ins folder inside the Final Cut Pro folder.

## Preventing Scripts From Being Modified or Viewed

- *If you want a script to be saved so that it can be viewed only in Final Cut Pro:* Choose Create Plugin from the FXBuilder menu.
- *If you want the script to be saved so that it can't be viewed or changed:* Choose Create Encoded Plugin from the FXBuilder menu. This saves a copy of the script that can be run, but can't be viewed or changed.

## Making a Favorite Effect From a Script

- Choose Make Favorite Effect from the Effects menu.

## Installing Scripts

To install a script, drag the script file to the following location:

- Final Cut Pro : Plugins : FXScripts folder

If you know the type of the script you are installing, place it in the appropriate folder within the FXScripts folder.

Final Cut Pro will load the new effects the next time you start the application.

Go to [www.apple.com/finalcutpro/fxscripts](http://www.apple.com/finalcutpro/fxscripts) to find additional scripts and instructions.

## Building Scripts

There are four parts to the process of building a good, well-structured script.

- *Planning:* What do you want your script to do?

It's important to have clear goals in mind before you start. It should be possible to describe the function of a script in one or two sentences. You can write a script's description as a comment line in the script code.

- *Structure:* The purpose of your script determines its structure to a great extent.

Code that is broken up into structural "building blocks" is easier to test and modify than code written without careful attention to structural detail.

FXScript allows you to break scripts up into subroutines that can be "called" from other parts of the script. This means that you only need to write code once, regardless of how many times it will be used. You should also group variable definitions together as much as possible, and use comments to break up the script's text and provide information about what each part does.

- *Coding*: Once you know your script’s purpose and have an idea of how it will be structured, you can begin writing the code.

**Important** When you’re coding, remember that the exact format (“syntax”) of each word or statement is important. Misspelled words, or words that are not accompanied by all the necessary information, will cause errors in the script.

It’s also a good idea to keep your script lines as short as possible. This makes the code easier to read and interpret.

- *Testing*: Is it working, and if not, how do you fix it?

Testing is a crucial part of the scripting process. If you have written a simple script, you may only need to run it once or twice to be satisfied that it works. More complex scripts may need to be tested on different clips, and incorporated into Timelines to see how a final product might look.

Some scripts will not run at all because they contain syntax errors. Syntax errors are like spelling mistakes in the code. If you try to run a script that contains syntax errors, FXBuilder stops the script and highlights the first line that contains an error. You can use the reference information in Appendix A, “FXScript Reference,” on page 285, to check the syntax of your script.

If your script contains input controls, be sure to test the script with a representative range of input settings, so that you can be sure that all combinations of settings will work together. If you find that certain combinations of settings give a result that is unacceptable, you may need to modify the range of values accepted by one or more of the input controls, to prevent those combinations from being chosen.

## About the FXScript Commands

This section explains the functions of the different types of FXScript commands. For complete reference information about the FXScript language, see Appendix A, “FXScript Reference,” on page 285.

### Statements

A statement is a command that accomplishes a single action. There are several types of statements in FXScript.

#### The Definition Statement

The first statement in every script should be the definition statement. This tells Final Cut Pro what the name of the script is, and what type of script it is (filter, transition, or generator). Final Cut Pro uses this information to place the script in the Browser’s Effects tab.

If you don’t place a definition statement in your script, it will not run.

## Conditional Statements

A conditional statement says that something should happen if a certain condition is met. Conditional statements always begin with `if` and end with `end if`.

This example comes from the Bevel filter script, which places a beveled border around the picture.

```
if framewidth<frameheight
    framemin=framewidth;
    framemax=frameheight;
else
    framemin=frameheight;
    framemax=framewidth;
end if;
```

This statement is conditional upon the values of two variables, `framewidth` and `frameheight`. It changes the values of two other variables, `framemin` and `framemax`, depending upon the relative values of the variable pair mentioned in the conditional statement.

You can add more conditions by placing `else if` clauses into the conditional statement. Each `else if` clause allows you to add one more condition to the statement.

The `else` clause means “in all other cases not covered by the previous condition or conditions.” It is not essential to place `else` statements in scripts unless you want to specify what should happen if none of the conditions are met.

## Input Statements

Input statements are extremely powerful and versatile. They enable you to place user controls into a script, so that an effect can be finely adjusted. The user controls appear in the Input controls tab in the FXBuilder window, and also in the Viewer when a script is added to the Timeline for a sequence.

There are several types of input control. You can choose the type of control that meets the needs of the script most closely. You can have more than one input control in a script; some have three or four.

## Loops

A loop is a section of code that repeats, usually according to certain conditions specified by the needs of the script. There are two basic types of loops in FXScript: the For/Next loop and the Repeat/End Repeat loop, which has several specific forms.

## Subroutines

A subroutine is a section of the code that can be “called” from another part of the script. When the subroutine is called, it runs and then returns the script flow to the place from which it was called. Subroutines are a useful way to break code up, and they minimize the amount of code in a script, because they can be reused.

You begin a subroutine in a script using the `on` command, like this:

```
on mysub (parameter 1, parameter 2...)
```

You end a subroutine with the word `end` on a line by itself.

All the code between the `on` and `end` commands is part of the subroutine.

“Mysub” is the subroutine’s name, and the “parameters” in brackets are information the subroutine needs to do its job. Sometimes the parameters are taken from input controls in the script.

The script can call the subroutine at any time just by using its name in a line of code. In a sense, the subroutine has become a new scripting word, which you have created.

When the subroutine has been run, the script returns to the line immediately after it was called.

## Variables

A variable is a “container” for information that is unknown and that can change, such as the result of an input control selection. You can treat variables as if they were numbers or sequences of text; they’re like placeholders.

Any time you use a variable in a script, it must be introduced to the script in a declaration statement. The exception to this rule is any predefined variable included in the FXScript language.

There are three types of variables in FXScript:

- *Predefined variables:* These are part of the FXScript language. Examples are color specifications, used by drawing routines, and the constants used by the numeric formatter. Another example is the variable `fps`, which contains the number corresponding to the current frame rate for the sequence.
- *Global variables:* These are variables you define in the code section of the script. They reset to zero after each video frame on which the effect is applied, and can be referred to in any part of the script following their declaration statement. The declaration statement for a global variable must specify the data type of the variable being defined, as well as the name.
- *Static variables:* These are declared before the code section of the script. They maintain their values between frames of video, unless the script code changes them.

## Constants

A constant is a number that always has the same value. Several are available for use in your scripts.

## Data

Data is any type of information processed in a script. FXScript can handle several types of data:

- *Strings*: A string is a sequence of characters. Strings are processed as characters only and do not have mathematical or arithmetical meaning, even if they contain numbers.
- *Numbers*: FXScript allows you to work with several types of numbers. You can use floating-point numbers, numeric coordinates, and numbers corresponding to colors.
- *Images*: These are buffers that can hold frames of video.
- *Regions*: These define an area of a video frame.
- *Clips*: These are buffers that can hold entire clips.

## Arrays

An array is a grid of one or more dimensions. In a sense, a video picture is a two-dimensional grid made up of colored dots. Arrays are often used in scripts that calculate which pixels or regions of a frame need to be modified.

## Operators and Expressions

An expression is a statement about the value of a number or numbers. It consists of numbers themselves, or variables, combined with operators.

An operator is a symbol that defines a mathematical, logical, or arithmetical function such as addition or subtraction, or a condition, such as the state of being greater than or less than something else.

FXScript understands a wide variety of operators suited to different scripting purposes.

## Functions

A function is a pre-defined calculation. Functions are very useful in graphical calculations, such as the arctangent or cosine of a number. Some functions are used in color processing, and others are used when processing digital video information on a pixel-by-pixel level. Functions can be references in your scripts in the same way as variables.

## Comments

Any script line that begins with the characters `//` is a comment. You can place a comment line anywhere in a script. It's a good idea to include plenty of comments in scripts, especially if you make changes to them, or if they are long or complex.

Comments are an essential part of a script. They give information about the script and what it is doing. They can make a script much easier to understand, test, and change by including useful explanatory detail about the script's code and structure.



# FXScript Reference

This appendix lists all the commands and functions in the FXScript language. These are grouped by the FXBuilder submenu they appear in. Each command includes information about its syntax, any parameters it requires, and any special information about its use.

When creating a script, you can place command templates into an FXBuilder Text Entry tab by choosing them from the FXBuilder menu.

## Scripting Parameters

Many FXScript commands require parameters for the calculations they perform. These have names that indicate their uses. Any parameter required by FXScript functions and commands can be replaced by a variable, as long as the variable is of the correct data type and has been correctly declared elsewhere in the script. Some functions and commands can use numeric parameters as well as variables.

## Expressions in FXScript

Expressions are like phrases made up from scripting words, numbers, and operators, together with parentheses. The operators determine *what sort of* calculation or evaluation (also known as an *operation*) is done, and the parentheses determine the *order in which* calculations are performed.

The rules are as follows:

- An expression is interpreted from left to right.
- Multiplication and division take precedence over addition and subtraction.
- Parts of the expression that are enclosed in parentheses are given priority over parts that are outside the parentheses. If there are several layers of parentheses, the expression is evaluated in order from the innermost parentheses to the outermost.

## Operators

The following table lists all the operators that can be included in your scripts.

Operator	Meaning
+	Add (This operator can also be used to indicate a positive number.)
-	Subtract (This operator can also be used to indicate a negative number.)
*	Multiplication
/	Division
! or not	Logical NOT
~	Bitwise NOT
% or mod	Modulo
==	Equal
!=	Not equal
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
<<	Shift left
>>	Shift right
&	Bitwise AND
	Bitwise OR
^ or xor	Bitwise XOR
&& or and	Logical AND
or or	Logical OR
? and :	<conditional> ? <value 1> : <value 2> If the conditional is true, it will return value 1; if it is false, it will return value 2.

**Note:** Numbers are assumed to be floating-point unless preceded by “0x,” which denotes hexadecimal.

## Compound Operators

In an assignment statement, you can use the compound assignment operators. These are `+=`, `-=`, `*=`, `/=`, `%=`, `&=`, `|=`, and `^=`.

## Operators and Regions

For regions, only a few operators can be used. These are `+`, `-`, `&`, `|`, and `^`.

## Operators and Strings

For strings, only the `+` operator can be used, for adding strings together.

## Data Types

Data types allow you to declare variables and assign specific data types to them.

Data type statements are always followed by one or more variable names, separated by commas.

You can create arrays by following a data type statement with up to 10 dimensions of the array in brackets. The example creates a 3\*4 array of points and names it “p”:

```
point p [3] [4]
```

Data Type	Syntax	Description
float	<code>float variablename</code>	Declares a floating-point variable
point	<code>point variablename</code>	Declares a variable that contains a two-dimensional point coordinate
point3d	<code>point3d variablename</code>	Declares a variable that contains a three-dimensional floating-point coordinate
image	<code>image variablename [width][height]</code>	Declares a two-dimensional buffer of pixels to be operated on
region	<code>region variablename</code>	Declares a named region. A region is an arbitrary shape.
string	<code>string variablename</code>	Declares a text string

<b>Data Type</b>	<b>Syntax</b>	<b>Description</b>
color	color variablename	Declares a variable with four fields (one each for a, r, g, and b) that contains an ARGB color value
YUVcolor	YUVcolor variablename	Declares a variable with four fields (one each for a, y, u, and v) that contains a YUV color value
clip	clip variablename	Declares a variable that holds a video clip
value	value variablename	Declares a non-modifiable parameter in a subroutine

## Functions

Functions can be used with variables as well as with known numbers.

<b>Function</b>	<b>Syntax</b>	<b>Description</b>
Sin	Sin(angle)	The sine of the specified angle (as a floating-point number in degrees)
Cos	Cos(angle)	The cosine of the specified angle (as a floating-point number in degrees)
Tan	Tan(angle)	The tangent of the specified angle (as a floating-point number in degrees)
ASin	ASin(value)	The arcsine of the value in degrees
ACos	ACos(value)	The arccosine of the value in degrees
ATan	ATan(value)	The arctangent of the value in degrees
Sqrt	Sqrt(value)	The square root of the value

Function	Syntax	Description
Abs	<code>Abs (value)</code>	The absolute integer value of the value
Power	<code>Power (value, exponent)</code>	The value raised to the specified exponent
Exp	<code>Exp (value)</code>	The mathematical constant e raised to the power corresponding to the specified value
Log	<code>Log (value)</code>	The base e logarithm of the value
Log10	<code>Log10 (value)</code>	The base 10 logarithm of the value
Integer	<code>Integer (value)</code>	Converts the value into an integer number
Sign	<code>Sign (value)</code>	The sign of the value. This is $-1$ if the value is less than zero, $0$ if the value equals zero, and $1$ if the value is greater than zero.

## Geometry

Command	Syntax	Description
DistTo	<code>DistTo(p1, p2)</code>	The distance from P1 to P2. P1 and P2 are two-dimensional point coordinates.
AngleTo	<code>AngleTo(p1, p2)</code>	Returns the angle from P1 to P2, where P1 to P2 is a vector
Interpolate	<code>Interpolate(p1, p2, percent, result)</code>	Interpolates between two points. The result is a two-dimensional point variable.
CenterOf	<code>CenterOf(poly, point)</code>	Places the center point of the polygon represented by “poly” into the variable represented by “point”

Command	Syntax	Description
BoundsOf	<code>BoundsOf(image, result)</code>	Fills in the polygon represented by “result” with a four-sided rectangle that is the bounds of “image.” The result must be a point [4] variable, set as a rectangle.
DimensionsOf	<code>DimensionsOf(image, width, height)</code>	Returns the width and height of the specified image buffer
AspectOf	<code>AspectOf(image)</code>	Returns a floating-point value that is the aspect ratio of the pixels of the specified image buffer. This buffer must have been previously declared and have the image data type.
Grid	<code>Grid(srcPoly, destPoly)</code>	This splits a rectangular polygon, “srcPoly,” and divides it into a grid of rectangles based on the dimensions of “destPoly”
Mesh	<code>Mesh(srcPoly, destPoly)</code>	Makes a mesh out of a rectangular polygon, “srcPoly,” based on the dimensions of “destPoly.”
Convert2dto3d	<code>Convert2dto3d(point/ poly, point3d/ poly3d, zvalue)</code>	Fills in the values of “point3d” or “poly3d” with the corresponding values from “point” or “poly,” using the number represented by “zvalue” for the z-axis dimension of each point
Convert3dto2d	<code>Convert3dto2d(point3d/ poly3d, point/ poly, eye3d)</code>	Fills in the values of “point” or “poly” with the corresponding values from “point3d” or “poly3d.” Eye3d is the view point for the conversion. If it is zero, then parallel projection is used for the conversion.

## Shapes

Command	Syntax	Description
Line	<code>Line(p1, p2, image, color, width)</code>	Draws a line in the buffer corresponding to “image,” from p1 to p2, with the specified color (expressed as an RGB value) and width (in pixels)
MakeRect	<code>MakeRect(result, left, top, width, height)</code>	Fills in a rectangular polygon, “result,” with the dimensions specified. Left and top are two-dimensional points and width and height are distances in pixels.
MakeRegion	<code>MakeRegion(poly, rgn)</code>	Turns the specified polygon into a region, stored in the region named “rgn”
OvalRegion <sup>1</sup>	<code>OvalRegion(poly, rgn)</code>	Makes an oval from the upper-left and lower-right corners of the specified polygon. This is stored in the region named “rgn” .
RegionIsEmpty	<code>RegionIsEmpty(rgn)</code>	Returns “true” if the region specified contains no pixels. “True” has a value of 1.
FrameRegion <sup>1</sup>	<code>FrameRegion(rgn, image, color, width)</code>	Draws a line around the specified region, rgn, with specified color and width in the image buffer
FillRegion <sup>1</sup>	<code>FillRegion(rgn, image, color)</code>	Fills the specified region with the specified color and stores the result in the specified image buffer

Command	Syntax	Description
FramePoly	FramePoly(poly, image, color, width)	Draws a frame around the bounds of the specified polygon, with the specified color (as an RGB value) and the specified width (in pixels). Stores the result in the specified image buffer.
FillPoly	FillPoly(poly, image, color)	Fills the specified polygon with the specified color and stores the result in the specified image buffer
DrawSoftDot	DrawSoftDot(dest, point/poly, shape, size, softness, subSteps, color(s), opacity(s), aspect)	Draws one or more sub-pixel-positioned shapes in a buffer. This command can be used to draw circles, squares, and diamonds in the specified color, size, softness, positioning accuracy, and opacity. The color and opacity can be an array or a single value.
FillOval	FillOval(poly, dest, color)	Fills the specified oval with the specified color and stores the result in the specified image buffer
FrameOval	FrameOval(poly, dest, color, width)	Draws a frame around the bounds of the oval specified polygon, with the specified color (as an RGB value) and the specified width (in pixels). Stores the result in the specified image buffer.

<sup>1</sup> The Region routine fills the alpha channel with black.

## Transform

Command	Syntax	Description
Rotate	<code>Rotate(point/poly, center, angle, aspect)</code>	Rotates the specified point or polygon through the specified angle in degrees, around the specified center
Rotate3d	<code>Rotate3d(point3d/poly, center3d, xrotate, yrotate, zrotate)</code>	Rotates the specified three-dimensional point or polygon through the specified angle, around the specified center. Note that center3d has three fields, corresponding to height, width, and depth and separated by commas.
Scale	<code>Scale(point/poly, center, hScale, vScale)</code>	Scales a point or polygon around the specified center by the amounts specified in hscale and vscale
Scale3d	<code>Scale3d(point3d/poly3d, center3d, xscale, yscale, zscale)</code>	Scales a point or polygon around the specified center by the three scaling factors
Offset	<code>Offset(point/poly, hAmount, vAmount)</code>	Moves a point or polygon by the specified amount on each dimension in the amount specified
Offset3d	<code>Offset3d(point3d/poly3d, xoffset, yoffset, zoffset)</code>	Moves a three-dimensional point or polygon by the specified amount in each dimension
Outset3d	<code>Outset3d(poly3d, center3d, amount)</code>	Moves a four-sided polygon towards or away from the specified center point

## Blit

Command	Syntax	Description
RegionCopy	<code>RegionCopy(srcImage1, srcImage2, destImage, rgn, softness)</code>	Copies the two source images into the destination image buffer using the specified region as a mask, softening the edges of the mask according to the value given for softness
Blit	<code>Blit(sourceImage, sourcePoly, destImage, destPoly, opacity)</code>	Copies the pixels inside “sourcepoly” in “sourceimage” into the “destpoly” in “destimage,” applying the “opacity” value
BlitRect	<code>BlitRect(sourceImage, sourcePoly, destImage, destPoly)</code>	Copies the pixels inside “sourcepoly” in “sourceimage” into the “destpoly” in “destimage.” The source and destination polygons must be four-sided and the alpha channel of the source is treated as opaque.
MeshBlit	<code>MeshBlit(sourceImage, sourcePoly, destImage, destPoly, opacity)</code>	Copies the pixels from “sourceimage” into “destimage,” using two point meshes as the transformation and applying the value specified for “opacity”
MeshBlit3D	<code>MeshBlit3d(sourceImage, sourcePoly, destImage, destPoly3d, opacity, center3D)</code>	Copies the pixels from “sourceimage” into “destimage,” using two 3D point meshes as the transformation and applying the value specified for “opacity”

Command	Syntax	Description
MaskCopy	MaskCopy( sourceImage1 , sourceImage2 , maskImage , destImage , softness , amount )	Copies from the two source images into the destination image, using a gradient mask. The value given for “softness” defines the threshold amount for the gradient, and “amount” specifies the gradient percentage. This command is the same as RegionCopy, but the mask is derived from an image buffer.
PagePeel	PagePeel ( srcImage1 , srcImage2 , destImage , centerPoint , radius , angle , peel , aspect )	Performs a “page peel” effect, using the srcImage1 and 2 buffers as the front and back of the page. The result is placed in the “destImage” buffer. The center point and angle specify the location and angle of the “cut line” for the peel. “Radius” is the radius of the curvature for the peel. The value given for “peel” determines the type of peel that occurs: if it is zero, the image is rolled up along one side, like a scroll, and if it is any value other than zero, the image peels upward and away, starting at one corner, from the image below.

## Process

Command	Syntax	Description
Blur	<code>Blur(srcImage, destImage, radius, aspect)</code>	Performs a blur operation on the source image buffer and places the result in the destination image buffer. “Radius” specifies the radius of the blurred area.
BlurChannel	<code>BlurChannel(srcImage, destImage, radius, doAlpha, doRed, doGreen, doBlue, aspect)</code>	Performs a blur operation on the specified channels of the source image buffer and places the result in the destination image buffer. Any of the four channels can be omitted. “Radius” specifies the radius of the blurred area. The doChannel values are Boolean numbers, either known numbers or variables.
Diffuse	<code>Diffuse(srcImage, destImage, repeatEdges, hMin, hMax, vMin, vMax)</code>	Each pixel in the destination image buffer is filled with a pixel from the source image buffer, which is offset spatially by a random number. The range for this random number is defined by the values assigned to “hmin” and “hmax” on the horizontal axis, and “vmin” and “vmax” on the vertical axis. “RepeatEdges” is a Boolean operation that determines whether pixels that would be beyond the bounds of the source image are filled with copies of the nearest edge pixel, or with transparent black pixels.

Command	Syntax	Description
DiffuseOffset	<code>DiffuseOffset(srcImage, destImage, repeatEdges, hMin, hMax, vMin, vMax, hTable[width], vTable[height])</code>	This is similar to Diffuse, but the horizontal and vertical offset for each pixel is added to the hTable and vTable, which contain the horizontal and vertical position for each pixel.
MotionBlur	<code>MotionBlur(srcImage, destImage, hDist, vDist, steps)</code>	Copies the source image buffer into the destination image buffer, adding a motion blur with a magnitude specified by “hdist” and “vdist.” “Steps” determines how many intermediate steps are added.
RadialBlur	<code>RadialBlur(srcImage, destImage, centerPt, amount, spin, steps, aspect)</code>	Copies the source image buffer into the destination image buffer, adding radial blur with a magnitude specified by “amount,” around the center specified in “centerPt.” “Steps” specifies how many intermediate steps are added to the blur effect. “Spin” can be either true or false. If true, “amount” is a rotation angle. If false, “amount” is the distance that the blur extends from the center point.
Blend	<code>Blend(srcImage1, srcImage2, destImage, amount)</code>	Blends the two source image buffers and places the result in the destination image buffer. “Amount” specifies the blend percentage.

Command	Syntax	Description
ColorTransform	<code>ColorTransform(srcImage, destImage, matrix, float[3], float[3])</code>	Performs color transformation from the source image buffer to the destination image buffer, based on the specified 3x3 float matrix. The two float arrays specify the offsets to be added to the source and destination buffers during the operation. If the matrix is an RGB to RGB transformation, the arrays should be filled with zeros.
LevelMap	<code>LevelMap(src, dest, alphaMap[256], redMap[256], greenMap[256], blueMap[256])</code>	Maps the source image buffer into the destination image buffer, passing each component of the source image through a 256-entry floating-point lookup table. The tables are alpha, red, green, and blue, in that order.
ChannelCopy	<code>ChannelCopy(src, dest, copyAlpha, copyRed, copyGreen, copyBlue)</code>	Copies a set of channels from the source image buffer to the destination image buffer. Each channel is copied from the channel specified by its corresponding parameter. The “copy” parameters are the predefined variables kalpha, kred, kgreen, and kblue.
Convolve	<code>Convolve(srcImage, destImage, kernel, divisor, offset)</code>	Performs a 3x3 convolution from the source image buffer to the destination image buffer. The sum of the contents of the 3x3 array specified as “kernel” is divided by the specified divisor, and “offset” is added in.

<b>Command</b>	<b>Syntax</b>	<b>Description</b>
ChannelFill	<code>ChannelFill(destImage, alphaValue, redValue, greenValue, blueValue)</code>	Fills the channels of the destination image buffer with the color values specified
ChannelMultiply	<code>ChannelMultiply(srcImage, destImage, alphaValue, redValue, greenValue, blueValue)</code>	Copies the source image buffer into the destination image buffer, multiplying each channel by the corresponding color value. If any of these is set to 1.0, the channel is unchanged.

## Distort

Distort is a group of routines that distort a clip.

Command	Syntax	Description
Cylinder	<code>Cylinder(srcImage, destImage, center, radius, amount, vertical)</code>	Copies the source image buffer into the destination image buffer, distorting the pixels so that they appear to have been mapped onto the surface of a cylinder. “Center” specifies the three-dimensional center point for the cylinder; “radius” specifies the width of the affected area. Vertical is a Boolean number (true or false) that specifies whether the cylinder is horizontal or vertical. Amount specifies the intensity of the effect.
Fisheye	<code>Fisheye(srcImage, destImage, centerPt, radius, amount, aspect)</code>	Copies the source image buffer into the destination image buffer and distorts the image outwards, creating a fisheye lens effect. “Radius” specifies the effect’s radius from the center point in pixels. You can use a negative number for “amount,” which creates a reverse effect.
Whirlpool	<code>Whirlpool(srcImage, destImage, repeatEdges, centerPt, amount, aspect)</code>	Copies the source image buffer into the destination image buffer, distorting the image outwards from the center point by spinning the pixels around by the “amount” specified. If “RepeatEdges” is true, then the edge pixels are repeated; otherwise transparent black pixels are introduced at the edges.

Command	Syntax	Description
Ripple	<code>Ripple(srcImage, destImage, repeatEdges, centerPt, amplitude, wavelength, aspect)</code>	Copies the source image buffer into the destination image buffer, distorting the image by applying waves from the edges. “Amplitude” and “wavelength” control the size and number of waves in the ripple.
Wave	<code>Wave(srcImage, destImage, repeatEdges, centerPt, amplitude, wavelength, vertical, aspect)</code>	Copies the source image buffer into the destination image buffer, distorting the image outwards from the center point in such a way that the image appears horizontally or vertically rippled. The number and size of the waves are controlled by “amplitude” and “wavelength.” The Boolean number (true or false) represented by “vertical” determines whether the waves are arranged horizontally or vertically. If “RepeatEdges” is true, then the edge pixels are repeated; otherwise transparent black pixels are introduced at the edges.
PondRipple	<code>PondRipple(srcImage, destImage, centerPt, radius[n], thickness[n], amplitude, luminance, aspect)</code>	Copies the source image buffer into the destination image buffer, distorting the image outward from the center point in a pond ripple pattern. The two parameters must be floating-point arrays of the same size. “n” ripples are created, with radius and thickness corresponding to “n.”

Command	Syntax	Description
Displace	<code>Displace(srcImage, destImage, mapImage, repeatEdges, xScale, yScale, lumaScale, aspect)</code>	Performs a pixel operation by taking the red and green channel values of a clip to offset the source clip horizontally and vertically, respectively
BumpMap	<code>BumpMap(srcImage, destImage, mapImage, repeatEdges, angle, scale, lumaScale, aspect)</code>	Performs a pixel operation by taking the luminance value of a clip to offset the source clip
OffsetPixels	<code>OffsetPixels(srcImage, destImage, repeatEdges, hDisplace[width], vDisplace[height], aspect)</code>	Performs a row and column operation by using two arrays to offset the source clip

## Composite

Command	Syntax	Description
Matte	<code>Matte(overImage, baseImage, destImage, amount, type)</code>	Composites the image buffer specified as “overImage” onto the buffer specified as “baseImage,” and places the result in the destination image buffer. “Type” can be one of the predeclared variables <code>kAlpha</code> , <code>kWhite</code> , or <code>kBlack</code> . These allow alpha channel compositing or black or white matte alpha channel compositing. “Amount” controls the opacity of the image being overlaid.
Screen	<code>Screen(srcImage1, srcImage2, destImage, amount, type)</code>	Mixes the white areas of source image 1 into source image 2, placing the result in the destination image buffer. “Amount” controls the percentage of the blend.
Multiply	<code>Multiply(srcImage1, srcImage2, destImage, amount, type)</code>	Mixes the black areas of source image 1 into source image 2, placing the result in the destination image buffer. “Amount” controls the percentage of the blend.
Overlay	<code>Overlay(srcImage1, srcImage2, destImage, amount, type)</code>	Mixes the white areas of source image 1 into source image 2, where the color values of pixels in source image 1 are over 127, and mixes the black areas of source image 1 into source image 2 elsewhere. The result is placed in the destination image buffer. “Amount” controls the percentage of the blend.

Command	Syntax	Description
Lighten	Lighten(srcImage1, srcImage2, destImage, percent, type)	For each pixel in the destination image buffer, this function chooses the corresponding pixel in the source image that has the lighter grayscale value.
Darken	Darken(srcImage1, srcImage2, destImage, percent, type)	For each pixel in the destination image buffer, this function chooses the corresponding pixel in the source image that has the darker grayscale value.
Difference	Difference(srcImage1, srcImage2, destImage, type)	Each pixel in the destination image buffer is filled with a color value corresponding to the absolute value of the difference between each of the channels in the two source image buffers.
Add	Add(srcImage1, srcImage2, destImage, percent, type)	Each pixel in the destination image buffer is filled with a color value corresponding to the sum of the pixels in source image 1 and the fraction of source image 2 specified by “percent.”
AddOffset	AddOffset(srcImage1, srcImage2, destImage, offset)	Each pixel in the destination image buffer is filled with a color value corresponding to the sum of the pixels in source image 1 and source image 2. The amount of offset is specified by adding or subtracting a value.

Command	Syntax	Description
Subtract	<code>Subtract(srcImage1, srcImage2, destImage, percent, type)</code>	Each pixel in the destination image buffer is filled with a color value corresponding to that for the same pixel in source image 1 less the values of the matching pixels in the portion of source image 2 specified by “percent.”
ImageAnd	<code>ImageAnd(srcImage1, srcImage2, destImage)</code>	Fills the destination image buffer with a logical AND of all the pixels in the two source image buffers
ImageOr	<code>ImageOr(srcImage1, srcImage2, destImage)</code>	Fills the destination image buffer with a logical OR of all the pixels in the two source image buffers
ImageXor	<code>ImageXor(srcImage1, srcImage2, destImage)</code>	Fills the destination image buffer with a logical XOR of all the pixels in the two source image buffers
Invert	<code>Invert(srcImage, destImage)</code>	Inverts the image
InvertChannel	<code>InvertChannel(srcImage, destImage, doAlpha, doRed, doGreen, doBlue)</code>	Inverts one or more channels selectively
UnMultiply	<code>UnMultiply(srcImage, srcImagetype)</code>	Removes black or white pre-multiplication

## Key

Command	Syntax	Description
BlueScreen	<code>BlueScreen(srcImage, destImage, min, max, fillRGB)</code>	Creates a mask from the source image buffer, extracting the blue areas of the image. “min” and “max” control the range of color extraction. If “fillRGB” is 1, the RGB channels are filled with a grayscale mask. Otherwise only the alpha channel is filled.
GreenScreen	<code>GreenScreen(srcImage, destImage, min, max, fillRGB)</code>	Creates a mask from the source image buffer, extracting the green areas of the image. “min” and “max” control the range of color extraction. If “fillRGB” is 1, the RGB channels are filled with a grayscale mask. Otherwise only the alpha channel is filled.
BGDiff	<code>BGDiff(srcImage, destImage, min, max, fillRGB)</code>	Creates a mask from the source image buffer, extracting the areas of maximum difference between the blue and green channels. “min” and “max” control the range of color extraction. If “fillRGB” is 1, the RGB channels are filled with a grayscale mask. Otherwise only the alpha channel is filled.

Command	Syntax	Description
RGBColorKey	<pre>RGBColorKey(srcImage,              destImage,              redTarget,              redPass,              greenTarget,              greenPass,              blueTarget,              bluePass,              softness,              fillRGB)</pre>	<p>Fills either the alpha or RGB channels of the destination image buffer with a mask created by comparing the values of the pixels in the source image to the “pass” values and “target” numbers specified. “Softness” specifies the softness of the mask. “FillRGB” specifies whether the alpha or RGB channels are filled with the results.</p>
YUVColorKey	<pre>YUVColorKey(srcImage,              destImage,              yTarget, yPass,              uTarget, uPass,              vTarget, vPass,              softness,              fillRGB)</pre>	<p>Fills either the alpha or RGB channels of the destination image buffer with a mask created by comparing the YUV values of the pixels in the source image to the “pass” values and “target” numbers specified. “Softness” specifies the softness of the mask. “FillRGB” specifies whether the alpha or RGB channels are filled with the results.</p>

## External

Command	Syntax	Description
Filter	<code>Filter("name", source, dest, frame, duration, fps, ["parmName", parmValue, ...])</code>	This calls another script, which must be a filter. It passes one source and one destination image buffer, as well as values corresponding to the frame where the filter is to begin, the frames per second for the video where the frame is found, and the duration of the filter effect. You can also set the inputs for the filter using the parameters in square brackets. These should correspond to the variable names declared to hold the inputs in the filter script being called.

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Command	Syntax	Description
Transition	<pre>Transition("name", src1,            src2, dest,            frame, duration,            fps, ["parmName",                parmValue, ...])</pre>	<p>This calls another script, which must be a transition. It passes two source image buffers and one destination image buffer, as well as values corresponding to the frame where the transition is to begin, the frames per second for the video where the frame is found, and the duration of the transition effect. You can also set the inputs for the transition using the parameters in square brackets. These should correspond to the variable names declared to hold the inputs in the transition script being called.</p>
Generator	<pre>Generator("name", dest,           frame, duration,           fps, ["parmName",               parmValue, ...])</pre>	<p>This calls another script, which must be a generator. It passes one destination image buffer, as well as values corresponding to the frame where the generator is to begin, the frames per second for the video where the frame is found, and the duration of the generator effect. You can also set the inputs for the generator using the parameters in square brackets. These should correspond to the variable names declared to hold the inputs in the generator script being called.</p>

## String

Command	Syntax	Description
NumToString	<code>NumToString(number, string, format)</code>	Converts a number into a string of text, using the format specified. The format can be any one of the constants used to describe text formatting.
StringToNum	<code>StringToNum(string)</code>	Converts a string into a series of numbers
Length	<code>Length(string)</code>	Returns a number corresponding to the number of characters in the specified string
CharsOf	<code>CharsOf(sourceString, first, last, destString)</code>	Places a subset corresponding to the “first” through the “last” characters of the source string into the destination string
ASCIIOf	<code>ASCIIOf(string, index)</code>	Returns the ASCII value of the character at the index in the string
ASCIIToString	<code>ASCIIToString(ASCIIValue, destString)</code>	Converts the “ASCIIvalue” into the character it represents and places this character in the destination string specified
CountTextLines	<code>CountTextLines(string)</code>	Returns a number corresponding to the number of lines of text in the string specified
FindString	<code>FindString(sourceString, startOffset, findString)</code>	Finds the characters in “findstring” within “sourcestring,” starting from “startoffset”

## Text

Command	Syntax	Description
DrawString	<code>DrawString(string, h, v, spacing, image, color, aspect)</code>	Draws the specified text string in the specified image buffer, starting in the position specified by “h” and “v.” “Spacing” determines the distance in pixels between the characters (auto-kerning), and “color” specifies the color value for the text. Can be used with double-byte characters.
DrawStringPlain	<code>DrawStringPlain(string, poly, image, color, aspect)</code>	A faster string routine which does not perform auto-kerning. Can be used with double-byte characters.
MeasureString	<code>MeasureString(string, spacing, width, height, ascent, descent, aspect)</code>	Takes the specified string and returns numbers based on its dimensions. “Spacing” determines the distance in pixels between the characters (auto-kerning). Can be used with double-byte characters.
MeasureStringPlain	<code>MeasureStringPlain(string, width, height, ascent, descent, aspect)</code>	Takes the specified string without an auto-kerning calculation and returns numbers based on its dimensions. Can be used with double-byte characters.
SetTextFont	<code>SetTextFont(string)</code>	Chooses a font for the text from the available system fonts
SetTextJustify	<code>SetTextJustify(justification)</code>	Specifies right, left, or center justification for a text string
SetTextStyle	<code>SetTextStyle(style)</code>	Sets plain, bold, italic, or bold italic, for the text type used in a text string

Command	Syntax	Description
SetTextSize	SetTextSize(size)	Sets the point size for a text string
ResetText	ResetText	Resets the text to plain style, black text color, 24-point size, Times® font, and left-aligned

## Clip

Command	Syntax	Description
GetVideo	GetVideo(srcClip, timeOffset, destImage)	Places the clip specified in “srcClip” into the “destImage” buffer, starting at the specified time offset
GetTimeCode	GetTimeCode(srcClip, timeCode, frameRate, dropFrame)	Gets the timecode for the specified frame
GetReelName	GetReelName(srcClip, string)	Places the reel name for the source clip into the specified string
GetLimits	GetLimits(srcClip, duration, offset)	Places the time duration of the specified clip into the variable represented by “duration”

## Utility

Command	Syntax	Description
SysTime	SysTime	Returns the computer’s current clock setting
Random	Random(min, max)	Returns a random number no less than “min” and no greater than “max”

Command	Syntax	Description
RandomTable	<code>RandomTable(array[n])</code>	Fills the specified float array with unique random values between 0 and n-1
RandomSeed	<code>RandomSeed(value)</code>	Initializes the random number generator. If “value” is zero, random numbers generated will be in a different sequence every time.
MatrixConcat	<code>MatrixConcat(srcMatrix1, srcMatrix2, destMatrix)</code>	Concatenates two 3x3 matrices and places the result into the destination matrix
ColorOf	<code>ColorOf(image, point, color)</code>	Places the color value of the specified point in the specified image buffer into the variable specified for “color”
Truncate	<code>Truncate(srcRect1, srcRect2)</code>	Takes the two source rectangles specified and truncates them into two equal-sized rectangles. This is used right before Blit commands to improve speed if sub-pixel accuracy is not needed.
PointTrack	<code>PointTrack(fromImage, srcPoint, toImage, guessPoint, range, deltaPoint)</code>	Scans a rectangle of the size specified in “range” around the specified source point in the “from” image buffer, looking for a match in the “to” image buffer. This assesses the difference in position between the two image buffers. The offset of the matching image data in the “to” image is placed in “deltapoint.”

Command	Syntax	Description
Highlight	Highlight (destImage, centerPoint, angle, width, softness, dither, gaussian, foreColor, backColor, aspect)	Paints a specular highlight band in the destination image buffer, using the specified center point and angle as the highlight line. “Width” and “softness” define the size of the highlight band, and “color” specifies the color. If the value for “dither” is true, a random dither is applied to the highlight gradient, making it smoother over large areas. If “gaussian” is true, the gradient will have a Gaussian fall-off, which looks more natural when used for specular highlight, or when two highlights are screened together.
CircleLight	CircleLight (destImage, centerPoint, width, softness, aspect, dither, gaussian, foreColor, backColor)	Creates a circular highlight outwards from “centerPoint”
RandomNoise	RandomNoise (destImage, alphaMin, alphaMax, redMin, redMax, greenMin, greenMax, blueMin, blueMax, makeColors)	Randomizes the color of all the pixels in the destimage buffer, according to the bounds set by the min and max values for each channel
Assert	Assert (value)	Stops the script with an error

## Constants and Predeclared Variables

These are the predeclared variables included in FXScript. They can be used wherever appropriate in your scripts and do not need to be declared in the script code. You can assign values to them as necessary in your scripts.

## General

Constant	Description
kUndefined	A value that static variables initially have
kAlpha	Used to define the alpha channel or straight alpha type
true	A Boolean variable
false	A Boolean variable

## Color

Constant	Description
kBlack	Used to define black color or black pre-multiplied alpha type
kWhite	Used to define white color or white pre-multiplied alpha type
kGray	Used to define gray color
kRed	Used to define red color or the red channel
kGreen	Used to define green color or the green channel
kBlue	Used to define blue color or the blue channel
kCyan	Used to define cyan color
kYellow	Used to define yellow color
kMagenta	Used to define magenta color

## Formatting

Constant	Description
kInteger	Used to define the integer numerical format
kFloat2	Used to define the real numerical format with two decimal places
kFloat4	Used to define the real numerical format with four decimal places
kFloat6	Used to define the real numerical format with six decimal places
kSize	Used to define the storage format (K, MB, GB, TB)
k24fps	Used to define the timecode format, 24 frames per second

Constant	Description
k25fps	Used to define the timecode format, 25 frames per second
k30fps	Used to define the timecode format, 30 frames per second, non-drop frames
k30df	Used to define the timecode format, 30 frames per second, drop frames
k16mm	Used to define the timecode format 16 mm
k35mm	Used to define the timecode format 35 mm

## Shapes

Constant	Description
kRound	Used to define an oval geometrical shape
kSquare	Used to define a rectangle geometrical shape
kDiamond	Used to define a diamond geometrical shape

## Text

Constant	Description
kleftjustify	Used to define left text alignment
kcenterjustify	Used to define center text alignment
krightjustify	Used to define right text alignment
kplain	Used to define a plain text style
kbold	Used to define a bold text style
kitalic	Used to define an italic text style
kbolditalic	Used to define a bold, italic text style

## Key

Constant	Description
kKeyNormal	Used to define the composite mode Normal
kKeyAdd	Used to define the composite mode Add

Constant	Description
kKeySubtract	Used to define the composite mode Subtract
kKeyDifference	Used to define the composite mode Difference
kKeyMultiply	Used to define the composite mode Multiply
kKeyScreen	Used to define the composite mode Screen
kKeyOverlay	Used to define the composite mode Overlay
kKeyHardLight	Used to define the composite mode HardLight
kKeySoftLight	Used to define the composite mode SoftLight
kKeyDarken	Used to define the composite mode Darken
kKeyLighten	Used to define the composite mode Lighten

## Variables

Variable	Description
fps	Used to define the effects frame rate
frame	Used to define the current frame number
duration	Used to define the length of an effect
ratio	Used to define the ratio of current frame location relative to duration or frame/duration
src1	Used to define the current frame buffer from source clip in filters and outgoing source clip in transitions
clip1	Used to define the source clip in filters and outgoing source clip in transitions
srcType1	Used to define the source clip's alpha type
src2	Used to define the current frame buffer from incoming source clip in transitions
clip2	Used to define the incoming source clip in transitions
srcType2	Used to define the source clip's alpha type
dest	Used to define the current buffer for video output

Variable	Description
exposedBackground	Used to define the background visibility
previewing	Used to define the rendering mode, frame render, or sequence render
renderRes	Used to define the sequence quality
RGBtoYUV	Used to define the matrix conversion from RGB to YUV color space
YUVtoRGB	Used to define the matrix conversion from YUV to RGB color space

## Input

Input statements are used to specify the input controls that appear in the Input Controls tab for your script. In each case, "UIName" signifies the label that appears next to the input in the Input Controls tab.

Statement	Syntax	Description
CheckBox	<code>input varName, "UIName", CheckBox, value</code>	Defines a checkbox. This can have a value of either 0 (not checked) or 1 (checked).
Slider	<code>input varName, "UIName", Slider, value, min, max [ramp value] [label "Units"] [detent/ snap v1, v2, ...]</code>	Creates a slider bar control. You can specify an initial default value, minimum and maximum values, ramp value, "Units" specified as the label, and optional detent and snap values.
Angle	<code>input varName, "UIName", Angle, value, min, max [label "Units"] [detent/ snap v1, v2, ...]</code>	Creates an angle control
Popup	<code>input varName, "UIName", Popup, value, label1, label2, ..., labelN</code>	Defines a pop-up menu with the specified labels, set to the default specified in "value"

Statement	Syntax	Description
RadioGroup	<code>input varName, "UIName", RadioGroup, value, label1, label2, ..., labelN</code>	Specifies a radio button or group of radio buttons with the specified label or labels
Color	<code>input varName, "UIName", Color, alpha, red, green, blue</code>	Defines a color selection tool. The chosen color is placed in the "color" variable. The default color is specified by "alpha," "red," "green," and "blue."
Clip	<code>input varName, "UIName", Clip</code>	Defines an input control that allows you to input a video clip or a still image
Text	<code>input varName, "UIName", Text, "string" [TextHeight h]</code>	Creates a text box
Point	<code>input varName, "UIName", Point, x, y</code>	Creates a point entry control
Label	<code>input varName, "UIName", Label, "string"</code>	Defines the static text in the Name column
FontList	<code>input varName, "UIName", FontList [, "InitialFont", "TextFieldName"]</code>	Creates a pop-up list of fonts to choose from. The "TextFieldName" is the name of the text box to be associated with this font pop-up list. When you change the font pop-up to (for example) Geneva or Osaka, the text in the text box "TextFieldName" will be drawn in Geneva or Osaka (whichever font you choose).

## Definition

These statements are used to define and set up the script. They must be included at the beginning of the script, before any code.

Statement	Syntax	Description
Filter	<code>Filter "name"</code>	Defines the script as a filter with the specified name, which means that it appears in the Filters bin in the Browser's Effects tab
Transition	<code>Transition "name"</code>	Defines the script as a transition with the specified name, which means that it appears in the Transitions bin in the Browser's Effects tab
Generator	<code>Generator "name"</code>	Defines the script as a generator with the specified name, which means that it appears in the Generators bin in the Browser's Effects tab
Group	<code>Group "name"</code>	Specifies the group the script should be placed in. For example, the Gaussian blur sample script appears in the Blur bin in the Filters bin in the Browser's Effects tab.
WipeCode	<code>WipeCode (code, accuracy)</code>	Defines the transition's wipe code
KeyType	<code>KeyType (type)</code>	Defines the transition's key type
AlphaType	<code>AlphaType (type)</code>	Defines the alpha type. A variable can be <code>knone</code> (none/ignore), <code>kalpha</code> (straight), <code>kblack</code> (black), or <code>kwhite</code> (white).

Statement	Syntax	Description
QTEffect	<code>QTEffect("name")</code>	QTEffect defines the QT real-time effect name. If a QT real-time effect is installed on a system with the same name, the application uses the QT real-time effect instead.
ProducesAlpha	<code>ProducesAlpha</code>	Specifies that the effect will produce an alpha channel
FullFrame	<code>FullFrame</code>	Is an input definition which states that the filter only works on a full frame. Final Cut Pro, when processing fields, will only pass the full frames. This flag is only valid for filter scripts.
EffectID	<code>EffectID("name")</code>	Reserved for future use.

## Assignment

Statement	Syntax	Description
Set	<code>Set variable to value</code>	Assigns a value to a variable. The values that can be assigned to a variable depend on its data type.
Set Field	<code>Set the field of variable to value</code>	Assigns a value to a specific field within a variable
assign	<code>variable = value</code>	Assigns a value to a variable. The values that can be assigned to a variable depend on its data type.

## Flow Control

Statement	Syntax	Description
If/Else	If (condition1) Else if (condition2) Else End If	<p>If/Else statements run different script code if the stated conditions are met. Each If statement isolates a single condition and directs the flow of the script to the statement immediately following it only if the condition is met.</p> <p>Else/If statements isolate successive conditions and direct script flow to the code following them, if the condition attached to the statement is met. These are optional.</p> <p>Else statements provide for any other circumstance. They literally mean “in any other event.” These are optional.</p> <p>The end of an If statement is always indicated by an End If statement.</p>
Repeat While	Repeat While (condition) End Repeat	<p>A Repeat While statement is a “loop.” The script lines between Repeat While and End Repeat are run repeatedly as long as the condition in the Repeat While statement is true. As soon as the condition is no longer true, the script moves out of the loop and onto the next line.</p>
Repeat With Counter	Repeat With Counter = start to finish [step amount] End Repeat	<p>This type of loop runs the script lines between the Repeat and End Repeat statements for the number of times specified.</p> <p>Repeat with counter = 1 to 10 repeats the lines of script 10 times.</p>

Statement	Syntax	Description
Repeat With list	Repeat With variable in [x1, x2, x3, ...] End Repeat	This repeats the script lines between Repeat and End Repeat once for each of the values specified in the list. At the same time, it assigns each value in turn to the variable.
Exit Repeat	Exit Repeat	This command directs the script flow to the lines immediately following the End Repeat statement. It can be structured as the result of a condition being met.
For/Next	For variable = start to finish [step amount] Next	This type of loop runs the script lines between the For and Next statements for the number of times specified. Loop with counter = 1 to 10 loops the lines of script 10 times.
Exit For	Exit For	This command directs the script flow in the For loop to the lines immediately following the Next statement. It can be structured as the result of a condition being met.

Statement	Syntax	Description
Subroutine	<pre>On subName (type parm1,              type parm2, ...)</pre> <p>End</p>	<p>A subroutine is a part of a script that can be called by name from anywhere else in the script. Once the subroutine has been run, the flow of the script returns to the line immediately after the subroutine call.</p> <p>You can “pass parameters” to a subroutine. This means that information, such as numbers or text strings, is put into the subroutine from the part of the script that calls it.</p> <p>The subroutine runs the code between the On statement and the End statement.</p>
Return	<pre>Return</pre> <pre>Return (value)</pre>	<p>A Return command directs script flow back to the line immediately after the subroutine was called; it “jumps out” of the subroutine and back to the main script. A return statement may be the result of a particular condition being met.</p> <p>Return (value) can be used to return a numerical value.</p>

## List of Audio and Video Effects

This appendix lists all the special effects provided with Final Cut Pro, which are available in the Browser's Effects tab. It also explains any settings you need to make when applying these effects. You can apply these effects to clips individually or in combinations.

### Audio Transitions

Transition	Description
Cross Fade (0 dB)	Fades the first clip out, while simultaneously fading the second clip in. This effect applies a linear ramp to the volume level.
Cross Fade (+3 dB)	Performs the same operation as Cross Fade (0 dB), but applies an equal-power ramp to the volume level <ul style="list-style-type: none"><li>■ Linear cross-fading introduces a volume dip in the middle of the cross fade. Equal power cross-fading does not.</li><li>■ Equal-power uses a quarter-cycle cosine fade-out curve and a quarter-cycle sine fade-in curve, thus maintaining the output signal power at a constant level.</li></ul>

## Audio Filters

Filter	Description
3 Band Equalizer	Divides the audio spectrum into three frequency bands, corresponding to treble, mid-range, and bass. You can set the center frequency for each band and adjust the volume of each band relative to the others by changing the Gain setting.
Band Pass Filter	Allows you to modify a single frequency band. By choosing its center frequency, you can modify the boost or cut level. You can modify the Q value to narrow or widen the frequency range that is heard and the level of accentuation at the center of the band. A low Q value gives less accentuation and wider audibility across the band. A high Q value focuses more sharply on the center of the band, screening out more of the frequencies above and below it.
Compressor/Limiter	Smooths out inconsistencies in volume levels over time, on all frequencies. Compression of volume reduces the dynamic volume range so that it does not become too loud. The more a sound exceeds the specified limit, the more it is decreased in volume, depending on the ratio setting. After making settings, use the Preserve Volume option to keep the overall level close to the original. The Threshold setting specifies the level at which the effect will be triggered. The Attack and Release settings specify how fast this effect should adjust the volume level in response to the beginning and end of a change.
DC Notch	Compensates for a specific type of signal artifact caused by DC current leakage by allowing you to remove the DC offset component potentially introduced during recording
Echo	Adds a series of repeats to the selected audio. You can adjust the mix of the original source signal with the repeating echo. You can also set the level (amount) of the effect, brightness, feedback (duration of repeats), and delay (time between repeats.) Use the Echo filter to provide a “slapback” or “canyon” effect to the selected audio.
Expander/Noise Gate	Smooths out inconsistencies in volume levels over time by increasing the volume if it drops below a specified level. The lower a level is relative to the highest level, the more it is increased to compensate, depending on the Ratio setting. Noise Gate is used to silence all sound below the specified volume threshold.
High Pass Filter	A Band Pass filter optimized for high frequencies

Filter	Description
High Shelf Filter	Similar to a Band Pass filter, but the upper end of the frequency range is sharply cut off, while lower frequencies are allowed to pass. You can use the Gain setting to boost or cut the relative volume at the upper end of the frequency range.
Hum Remover	A notch filter that allows you to compensate for various types of hum interference by screening out a specific frequency. You can also specify up to five related harmonic frequencies to screen out.
Low Pass Filter	A Band Pass filter optimized for low frequencies
Low Shelf Filter	Similar to a Band Pass filter, but the lower end of the frequency range is sharply cut off, while high frequencies are allowed to pass. You can use the Gain setting to boost or cut the volume at the lower end of the frequency range.
Notch Filter	Cuts out frequencies in a specific range. This works on a narrow range of frequencies. This effect is the converse of a Band Pass filter.
Parametric Equalizer	Allows you to control various aspects of a single frequency band. It combines the features of the Band Pass, Notch, and Shelf filters. You can also set the Q value to narrow or widen the frequency range that is heard and the level of accentuation at the center of the band. A low Q value gives less accentuation and wider audibility across the band. A high Q value focuses more sharply on the center of the band, screening out more of the frequencies above and below it.
Reverberation	Allows you to simulate the natural ambience that occurs when sound is conducted within a physical acoustic space such as a concert hall or auditorium. You can adjust the mix of the dry signal and effected signal as well as the level (amount) and brightness of the effect. This module also provides you with a list of predefined environment types that can be applied to your audio selection.
Vocal DeEsser	A special-purpose filter that controls and dampens sibilant (“s”) sounds. Some vocal recordings show emphasis of these sounds.
Vocal DePopper	A special-purpose filter that controls and dampens plosive (“p”) sounds. Some vocal recordings show emphasis of these sounds.

## Video Transitions

### 3D Simulation

Transition	Description
Cross Zoom	Causes the video to zoom in on the first clip, switch to the second, and zoom out. You can specify the center point, the amount of magnification in the zoom, and the degree of blur applied during the zoom.
Cube Spin	Creates a three-dimensional cube from each clip and spins it in the direction you choose. You can also view the cube from the inside or the outside.
Spin3D	Spins the first clip around its center point, revealing the second clip. You can choose the angle of the spin axis.
Spinback3D	Spins the first clip around its center point, until the clip is viewed from its edge, and then switches to the second clip, which spins into view. You can choose the angle of the spin axis.
Swing	Creates the effect of swinging the first clip in toward the viewer or out toward the second clip, which is revealed as the swing widens. You can choose the angle of the swing axis.
Zoom	Zooms the second clip in from a single center point to full-frame size, over the top of the first clip. You can specify the center point (relative to the first clip) where the zoom begins.

### Dissolve

Transition	Description
Additive Dissolve	Adds the two clips so that the first clip fades out and the second fades in
Cross Dissolve	Blends the first clip into the second clip
Dip to Color	Blends the first clip into the plain color of your choice, and then blends the plain color into the second clip. You can adjust the speed of the blend.
Dither Dissolve	Dissolves the first clip into the second by removing random pixels from the first clip to reveal the second clip
Non-Additive Dissolve	Compares the pixels in the two clips and displays the lighter of the two as the first clip fades out and the second fades in

Transition	Description
Ripple Dissolve	Applies a pond ripple effect to the first clip, simultaneously blending it into the second. You can choose the number of ripples, their center point on the first clip, and their amplitude and acceleration. You can also apply a circle highlight to the ripples.
Fade In, Fade Out	Fades in the incoming clip as the Outgoing clip fades out. Reveals the track below the current track in a transition.

## Iris

Transition	Description
Cross, Diamond, Oval, Point, Rectangle, and Star	These effects are similar. They differ in the shape of the transition. They create the impression of an iris, which contains the first clip, opening to reveal the second. In each iris effect, you can enter the center point around which the opening is defined, and feather the edges, which blends the edges of the clips together and gives a diffused iris.

## Map

Transition	Description
Channel Map	Maps channels from the first and second clip, or fills the channel with black. You can invert individual channels.
Luminance Map	Maps color using the luminance of a clip.

## Page Peel

Transition	Description
Page Peel	Peels the first clip away to reveal the second clip. You can adjust the appearance of the peel.

## Slide

Transition	Description
Band Slide	Bands of the first clip slide in parallel to reveal the second clip. You can adjust the number of bands and the slide direction.
Box Slide	Bands of the first clip slide one at a time in perpendicular directions to reveal the second clip. You can adjust the number of bands and the slide direction.

Transition	Description
Push Slide	The second clip pushes the first clip out of the view. You can adjust the push direction.
Spin Slide	Boxes of the first clip spin and zoom out to reveal the second clip. You can adjust the spin about the center of the box, and the number of boxes.
Multispin Slide	Boxes of the first clip spin and zoom out to reveal the second clip. You can adjust the spin about the center of the first clip, and the spin about the center of the box, as well as the number of boxes.
Split Slide	The first clip splits at specific points and slides to reveal the second clip. You can adjust the orientation of the split.
Center Split Slide	Reveals the underlying clip by splitting the current clip down the center and horizontally sliding the two halves away from each other.
Swap Slide	The first (top) and the second (bottom) clips slide in opposite directions, swap places and slide back, revealing the second clip. You can adjust the slide direction.

## Stretch

Transition	Description
Cross Stretch	The first clip is squeezed as the second clip stretches from the specified edge to the opposite edge.
Squeeze	The first clip is squeezed from the opposite edges toward the center to reveal the second clip. You can specify the squeeze orientation.
Squeeze and Stretch	The first clip is squeezed from the opposite edges toward the center, and stretches in a perpendicular direction to reveal the second clip. You can adjust the squeeze orientation.
Stretch	The second clip stretches from the specified edge over the first clip.

## Wipe

Transition	Description
Band Wipe	Wipes a band across the first clip to reveal the second. You can specify the number of bands and the side orientation.
Center Wipe	A linear wipe from a specified point on the first clip reveals the second clip. You can adjust the wipe direction.

Transition	Description
Checker Wipe	Checked boxes appear on the first clip to reveal the second clip. You can adjust the number of boxes and the wipe direction.
Checkerboard Wipe	Checked boxes wipe individually on the first clip to reveal the second. You can adjust the number of boxes and the wipe direction.
Clock Wipe	A rotational wipe over the first clip reveals the second. You can adjust the start and direction of the wipe, and the center point of the rotation.
Edge Wipe	A linear wipe from the edge of the first clip reveals the second clip. You can adjust the wipe direction.
Gradient Wipe	Uses a gradient wipe image to wipe across the first clip, revealing the second clip. You can adjust the softness of the wipe and invert the gradient wipe image. By default, the transition wipes horizontally from left to right. You can override this by dragging an image onto the gradient clip well.
Inset Wipe	A rectangular wipe from the specified edge or corner of the first clip reveals the second clip.
Jaws Wipe	A jagged-edged wipe from the center of the first clip reveals the second clip. You can adjust the wipe direction and the shape of the jagged edge.
Random Edge Wipe	A linear wipe with a random edge from the edge of the first clip reveals the second clip. You can adjust the direction of the wipe and the width of the random edge.
V Wipe	A V-shaped wipe from the specified edge of the first clip reveals the second clip.
Venetian Blind Wipe	Bands wipe across the first clip to reveal the second. You can adjust the angle of bands and the number of bands.
Wrap Wipe	Bands wipe in the specified direction across the first clip to reveal the second clip. You can specify the start and orientation of the wipe and the number of bands.
Zigzag Wipe	Bands wipe in a zigzag pattern over the first clip to reveal the second clip. You can specify the start and orientation of the wipe. You can also specify the number of bands.

## Video Filters

### Blur

Filter	Description
Gaussian Blur	Blurs the clip. You can adjust which channel to blur.
Radial Blur	Blurs the clip. You can adjust the angle and steps of rotation. You can also specify the center point of rotation.
Wind Blur	Directionally blurs the clip. You can adjust the direction, distance, and steps.
Zoom Blur	Blurs the clip. You can adjust the type, amount, center point, and number of steps for the zoom.

### Border

Filter	Description
Basic Border	Draws a border around the edges of the clip. You can adjust the width and color of the border.
Bevel	Draws a beveled border around the edges of the clip. You can adjust the lighting and bevel.

### Channel

Filter	Description
Arithmetic	Performs an arithmetic operation on the clip in a specific color channel. You can adjust the operator and the channel.
Channel Blur	Blurs channels individually
Channel Offset	Offsets the channel position of the clip. You can specify the center offset and the type of edge to be used.
Color Offset	Offsets the color of individual channels in the clip. You can adjust overflow colors.
Compound Arithmetic	Performs an arithmetic operation on the clip and a second specified clip. You can adjust the operator and the channel.
Invert	Inverts the channel of the clip

## Distort

Filter	Description
Bumpmap	Distorts the clip by offsetting pixels using the luminance of map image. You can adjust the map image, luma scale, direction, outset, and repeat edges. Direction and outset define the direction and amount of the offset. Luma scale and repeat edges define the appearance of the offset.
Cylinder	Distorts the clip as if it were wrapped around a cylindrical object. You can adjust the radius, center, and orientation of the cylinder.
Displace	Distorts the clip by offsetting pixels using the red and green channels. You can adjust the horizontal offset using the red channel and the vertical offset using the green channel. Horizontal and vertical scale define the direction and amount of the offset. Luma scale and repeat edges define the appearance of the offset.
Fisheye	Distorts the clip as if it were bulging outward. You can adjust the amount, radius, and center of the bulge.
Pond Ripple	Distorts the clip as if it were mapped onto a pond ripple. You can adjust the number and size of the ripples and the center point for the ripples.
Ripple	Distorts the clip in a wave pattern, both horizontally and vertically. You can adjust the size and speed of the wave.
Wave	Distorts the clip in a zigzag pattern, horizontally or vertically. You can adjust the size and speed of the wave.
Whirlpool	Distorts the clip in a whirlpool pattern. You can adjust the center and rotation of the whirlpool.

## Image Control

Filter	Description
Brightness and Contrast	Changes the brightness and contrast of the clip by a specific amount
Color Balance	Changes the red, green, and blue levels of the clip. You can adjust the tone.
Desaturate	Removes the color from the clip by the specified amount
Gamma Correction	Changes the mid-tone brightness of the clip by the specified amount
Levels	Changes the channel brightness, contrast, and gamma of the clip by the specified amount

Filter	Description
Proc Amp	Changes the clip's color by the specified amount. You can adjust the setup, video, chroma, and phase.
Sepia	Tints the clip with sepia color. You can adjust the amount and brightness of tint.
Tint	Tints the clip with the specified color

## Key

Filter	Description
Blue and Green Screen	Keys the blue or green area of the clip and uses its color as a transparency mask for compositing backgrounds into a scene. You can adjust the color level and tolerance. You can also adjust the view mode and the edges.
Color Key	Keys out the area of the clip with the specified color. You can adjust the key color level and tolerance. You can also adjust the view mode and the edges.
Difference Matte	Compares two clips and keys out areas that are similar. You can adjust the difference level and tolerance, as well as the view mode and the edges.
Luma Key	Keys out an area of the clip using the clip's luminance. You can adjust the type of key, luminance level, view mode, destination of the result, and tolerance.
Spill Suppressor, Blue	Removes blue around the edges of the clip
Spill Suppressor, Green	Removes green around the edges of the clip

## Using a Color Key

Use a color key when you want to make an area of a clip transparent based on a color value. Final Cut Pro includes a Blue Screen Key that can be used for keying out blue, green, and blue-green difference. It also includes a color key that can be used to key out any other color value. Both keys let you control the tolerance value so that a range of colors can be made transparent. They also have controls that let you create a smooth edge between the transparent and opaque areas of the clip.

To use a color key:

- 1 Select the clip in the Timeline, or open a Viewer window for it.

- 2 Drag the Color Key effect from the Browser onto the clip, or choose Color Key from the Effects menu.
- 3 Click the Filters tab for the clip and adjust the settings as desired.

### Using a Luma Key

Use a luma key when you want to make an area of a clip transparent using the luminance of the foreground clip. Keying out a luminance value works best when the clip has patches of flat color.

To use a luma key:

- 1 Select the clip in the Timeline, or open a Viewer window for it.
- 2 Drag the Luma Key effect from the Browser onto the clip, or choose Luma Key from the Effects menu.
- 3 Click the Filters tab for the clip and adjust the settings as desired.

### Matte

Mattes let you make selected areas of the video opaque.

Filter	Description
8-Point Garbage Matte	Generates an 8-point polygonal matte in the clip. You can adjust the view mode, the points for the polygon, the smoothness around the corners, and the edges.
Extract	Produces a luminous matte around the clip. You can adjust the luminance level, tolerance, and view mode. Use the Copy Result pop-up menu to copy the luminance result to the RGB or Alpha channel.
4-Point Garbage Matte	Generates a four-point polygonal matte in the clip. You can adjust the view mode, the points of the polygon, the smoothness around the corners, and the edges.
Image Mask	Uses the alpha channel or luminance of a specified clip to create a matte
Mask Feather	Blurs the alpha channel of the clip by a specified amount
Mask Shape	Generates a mask shape on the clip. You can adjust the shape.
Matte Choker	Changes the edges of a matte on the clip
Soft Edges	Blurs the four edges of the clip individually by the specified amount
Wide Screen	Generates a wide-screen matte in the clip. You can adjust the type of the wide screen and offset the clip vertically.

## Perspective

Filter	Description
Basic 3D	Transforms the clip in three dimensions. You can adjust the rotation around the x, y, and z axes. You can set the center and scale.
Curl	Curles the clip. You can adjust the amount, direction, radius, type, and back side of the curl.
Flip	Flips the clip horizontally, vertically, or both
Mirror	Reflects a mirror image of the clip. You can adjust the position and angle of the mirror.
Rotate	Rotates the clip by 90 degrees and scales the result to fit the frame size

## Sharpen

Filter	Description
Sharpen	Increases the contrast between adjacent pixels
Unsharp Mask	Increases the contrast of adjacent pixels that are light or dark. You can adjust the sharpness of the clip.

## Stylize

Filter	Description
Anti-Alias	Blurs the high-contrast areas in the clip
Diffuse	Randomly offsets pixels in the clip. You can adjust the offset, direction, and distance.
Emboss	Produces an illusion of raised edges where there is high contrast in the clip
Find Edges	Outlines the edges where there is high contrast in the clip
Posterize	Maps the colors in the clip to a specified number of colors
Replicate	Tiles the clip. You can adjust the number of tiles.
Solarize	Minimizes the midtones and maximizes the highlights and shadows in the clip

## Video

Filter	Description
Blink	Flashes clip on and off. You can adjust the frequency and opacity.
Image Stabilizer	Stabilizes motion in the clip. You can adjust the scan area and range.
De-Interlace	Averages adjacent horizontal lines of the clip
Stop Motion Blur	Blends frames in the clip. You can adjust the time, steps, opacity, and type of blend.
Strobe	Freezes the specified frame of the clip for the specified amount of time
Timecode Print	Displays the clip's timecode. You can adjust the timecode display.
View Finder	Displays view finder overlay, including mode and title/action safe. You can adjust the text and color.

## Video Generators

Filter	Description
Bars and Tone	Generates a video color bar and tone
Color Matte	Generates a specific color matte. You can adjust the opacity.
Custom Gradient	Generates a linear or radial gradient. You can adjust the gradient position, direction, width, and colors.
Gradient	Generates a predefined gradient. You can adjust the gradient colors.
Highlight	Generates a specular highlight band using the specified center point and angle as the highlight line. You can define the width, softness, and size of the band as well as its foreground and background colors. You can also apply a dither or highlight gradient, making it smoother over large areas.
Noise	Generates random pixel noise. You can adjust the colors.
Particulate Noise	Generates random particle noise. You can adjust the particle shape, color, size, softness, and density.
Slug	Generates a slug. This is useful for a placeholder.

## Text

Filter	Description
Lower 3rd	Generates two lines of text in the lower third of the frame. You can adjust the text and background.
Text	Generates multiple lines of auto-kerned text. You can adjust tracking, leading, aspect ratio, and subpixel positioning of the text. You can also enable or disable auto-kerning and tracking.

# Keyboard Shortcuts

This appendix lists keyboard shortcuts provided in Final Cut Pro.

## General Controls

Function	Key command
New project	 +  + <i>E</i>
New sequence	 +  + <i>N</i>
New sequence with presets	 +  + <i>option</i> + <i>N</i>
Open file	 +  + <i>O</i>
Open selected item	<i>return</i>
Open in separate window	<i>shift</i> + <i>return</i>
Open item editor	<i>option</i> + <i>return</i>
Open text generator	<i>control</i> + <i>X</i>
Close window	 +  + <i>W</i>
Close tab	<i>control</i> + <i>W</i>

Function	Key command
Help	 + 
Quit	 + 
Save	 + 
Save all	 + 
Undo	 + 
Redo	 + 
Audio scrub on or off	 + 
Edit render quality	 + 
Looping on or off	 + 
Snapping on or off	

## Application Windows

Function	Key command
Viewer	 + 
Canvas	 + 
Timeline	 + 
Browser	 + 

Function	Key command
Effects	 + 
Favorites bin	 + 
Trim Edit	 + 
Log and Capture	 + 
Item Properties	 + 
Sequence Settings	 + 
Preferences	 + 

## Select, Cut, Copy, and Paste

Function	Key command
Copy	 + 
Cut (lift to Clipboard)	 + 
Duplicate	 + 
Make In/Out a selection	 + 
Paste (overwrite)	 + 
Paste attributes	 + 
Paste insert	 + 

Function	Key command
Select all	 + 
Deselect all	 + 

## Navigation

Function	Key command
Forward one frame	
Back one frame	
Forward one second	 + 
Back one second	 + 
Play reverse <sup>1</sup>	 or  + 
Stop/Pause <sup>2</sup>	 or 
Play forward <sup>3</sup>	 or 
Match frame	
Select an edit	
Add edit	 + 
Next edit	 +  or 
Previous edit	 +  or 

Function	Key command
Next gap	<b>shift</b> + <b>G</b>
Previous gap	<b>option</b> + <b>G</b>
To beginning of media	<b>home</b>
To end of media	<b>end</b> or <b>shift</b> + <b>home</b>
To next edit or In/Out	<b>↓</b>
To previous edit or In/Out	<b>↑</b>
To next edit, In/Out, or marker	<b>shift</b> + <b>↓</b>
To previous edit, In/Out, or marker	<b>shift</b> + <b>↑</b>
To master clip	<b>shift</b> + <b>F</b>

<sup>1</sup> Press key up to four times for accelerated reverse playback: once (1x), twice (2x), three (3x), and four (4x).

<sup>2</sup> Hold key down while pressing J or L to step forward or backward one frame at a time.

<sup>3</sup> Press key up to four times for accelerated forward playback: once (1x), twice (2x), three (3x), and four (4x).

## Finding Items

Function	Key command
Find	<b>⌘</b> + <b>⌘</b> + <b>F</b>
Find next (in Find results)	<b>⌘</b> + <b>⌘</b> + <b>G</b>
Find previous (in Find results)	<b>shift</b> + <b>F3</b>

## Scrolling

Function	Key command
Horizontal scroll left	 + 
Horizontal scroll right	 + 
Vertical scroll up	
Vertical scroll down	

## Screen Layout and Display

Function	Key command
Custom layout 1	 + 
Custom layout 2	 + 
Standard layout	 + 

## Projects and Sequences

Function	Key command
Import file	  + 
New project	  + 
New sequence	  + 
New sequence with presets	  +  + 

## Browser

Function	Key command
Change list (icon view)	 + 
Insert bin	  + 
Open bins (list view)	
Close bins (list view)	
Make Favorite	 + 
Make Favorite Motion	 + 
Set logging (list view)	 + 
Set standard (list view)	 + 

## Timeline

Function	Key command
Create or break link	  + 
Linked selection on or off	 + 
Create or break stereo pair	 + 
Change track size	 + 
Clip Keyframes on or off	 + 

Function	Key command
Clip overlays on or off	<code>option</code> + <code>W</code>
Delete and leave gap	<code>delete</code>
Ripple delete (no gap)	<code>shift</code> + <code>delete</code>
Fit sequence in window	<code>shift</code> + <code>Z</code>
Lock video track	<code>F4</code> + track number
Lock all video tracks	<code>shift</code> + <code>F4</code>
Lock audio track	<code>F5</code> + track number
Lock all audio tracks	<code>shift</code> + <code>F5</code>
Turn on waveforms	<code>⌘</code> <code>#</code> + <code>option</code> + <code>W</code>

## Logging and Capturing

Function	Key command
Log clip	<code>F2</code>
Batch capture	<code>⌘</code> <code>#</code> + <code>H</code>
Capture now	<code>shift</code> + <code>C</code>

## Playing Video

Function	Key command
Play reverse <sup>1</sup>	<code>J</code> or <code>shift</code> + <code>space</code>
Stop/Pause <sup>2</sup>	<code>K</code> or <code>space</code>
Play forward <sup>3</sup>	<code>L</code> or <code>space</code>
Play around current	<code>\</code>
Play every frame	<code>option</code> + <code>P</code>
Play here to Out	<code>shift</code> + <code>P</code>
Play In to Out	<code>shift</code> + <code>\</code>

<sup>1</sup> Press key up to four times for accelerated reverse playback: once (1x), twice (2x), three (3x), and four (4x).

<sup>2</sup> Hold key down while pressing J or L to step forward or backward one frame at a time.

<sup>3</sup> Press key up to four times for accelerated forward playback: once (1x), twice (2x), three (3x), and four (4x).

## In and Out Points

Function <sup>1</sup>	Key command
Set In point	<code>I</code> or <code>/</code>
Set Out point	<code>O</code> or <code>*</code>
Set video In only	<code>control</code> + <code>I</code>
Set audio In only	<code>command</code> + <code>option</code> + <code>I</code>
Set video Out only	<code>control</code> + <code>O</code>

Function <sup>1</sup>	Key command
Set audio Out only	 +  + 
Audio level keyframe	 +  + 
Clear In	 + 
Clear Out	 + 
Clear In and Out	 + 
Make selection an In or Out	 + 
Mark clip	
To In point	 + 
To Out point	 + 

<sup>1</sup> In and Out shortcuts follow a simple “set-go-to-clear” scheme, using “I” or “O” for set, Shift+I or O to go to In or Out, and Option+I or O to clear In or Out. For a navigation key matrix, see “Quick Navigation Keys and Modifiers” on page 353.

## Markers

Function	Key command
Add marker	
Add and name marker	 + 
Delete marker	 +  + 
Delete all markers	 + 

Function	Key command
Extend marker	<code>option</code> + <code>~</code>
Reposition marker	<code>shift</code> + <code>~</code>
Next marker	<code>shift</code> + <code>M</code>
Previous marker	<code>option</code> + <code>M</code>

## Editing

Function	Key command
Apply default video transition	<code>⌘</code> + <code>⌘</code> + <code>T</code> or <code>control</code> + <code>T</code>
Apply default audio transition	<code>⌘</code> + <code>⌘</code> + <code>option</code> + <code>T</code>
Delete (lift)	<code>delete</code> or <code>⌘</code> + <code>⌘</code> + <code>delete</code>
Ripple delete	<code>shift</code> + <code>delete</code> or <code>⌘</code>
Extend edit	<code>E</code>
Insert edit	<code>F9</code>
Insert with transition	<code>shift</code> + <code>F9</code>
Overwrite	<code>F10</code>
Overwrite with transition	<code>shift</code> + <code>F10</code>
Replace	<code>F11</code>

Function	Key command
Fit to fill	<b>shift</b> + <b>F11</b>
Superimpose	<b>F12</b>
Make subclip	<b>⌘</b> + <b>U</b>
Modify duration	<b>control</b> + <b>D</b>
Toggle Ripple/Roll type	<b>U</b> or <b>shift</b> + <b>R</b>
Ripple cut to Clipboard	<b>shift</b> + <b>X</b>
Slip edit	<b>shift</b> + click In or Out
Split edit	<b>option</b> + click In or Out
Set target video	<b>F6</b> + track number
Set target video to None	<b>shift</b> + <b>F6</b>
Set target Audio 1	<b>F7</b> + track number
Set target Audio 1 to None	<b>shift</b> + <b>F7</b>
Set target Audio 2	<b>F8</b> + track number
Set target Audio 2 to None	<b>shift</b> + <b>F8</b>
Mixdown audio	<b>control</b> + <b>M</b>
Trim backward one frame	<b>[</b> or <b>,</b>

Function	Key command
Trim backward x frames <sup>1</sup>	<b>shift</b> + <b>[</b> or <b>shift</b> + <b>,</b>
Trim forward one frame	<b>J</b> or <b>.</b>
Trim forward x frames <sup>2</sup>	<b>shift</b> + <b>J</b> or <b>shift</b> + <b>.</b>

<sup>1</sup> Specify the number of frames in the Preview Pre and Post-Roll fields in the General tab of the Preferences window.

<sup>2</sup> Specify the number of frames in the Preview Pre and Post-Roll fields in the General tab of the Preferences window.

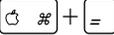
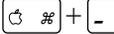
## Output

Function	Key command
Change render quality	<b>Y</b>
Display frame	<b>F13</b> or <b>shift</b> + <b>F12</b>
Print to video	<b>⌘</b> + <b>#</b> + <b>M</b>

## Compositing and Special Effects

Function	Key command
Nest item(s)	<b>option</b> + <b>C</b>
Add motion Keyframe	<b>control</b> + <b>K</b>
Next Keyframe	<b>shift</b> + <b>K</b>
Previous Keyframe	<b>option</b> + <b>K</b>
Make still frame	<b>shift</b> + <b>N</b>

Function	Key command
Render effect (FXBuilder)	 + 
Render selection	 + 
Render sequence	 + 
Render single frame on or off	
Speed	 + 
Change Image/Wireframe view	
Change RGB/RGB+A/Alpha	 + 
Fit in window	 + 
Nudge position down	 + 
Nudge position left	 + 
Nudge position right	 + 
Nudge position up	 + 
Sub pixel down	 + 
Sub pixel left	 + 
Sub pixel right	 + 
Sub pixel up	 + 

Function	Key command
Zoom in	 + 
Zoom out	 + 

## Quick Navigation Keys and Modifiers

Key	No Modifier	Shift + key	Option + key or Control + Shift + key
I	Set In	Go To In	Clear In
O	Set Out	Go To Out	Clear Out
M	Set Marker	Next Marker	Previous Marker
E	Extend Edit	Next Edit	Previous Edit
G		Next Gap	Previous Gap
K		Next Keyframe	Previous Keyframe

## Tools and Modifier Keys

Tool	Select	Tool + (⌘) Command	Tool + Shift	Tool + Option
 Arrow	A	Select additional	Select range	Link on/off
 Edit Selection	G	Select additional	To Ripple tool	Link on/off
 Group Selection	G+G	Select additional	Select additional	Link on/off
 Range Selection	G+G+G			Link on/off
 Track Forward Select	T		All forward	Link on/off
 Track Backward Select	T+T		All backward	Link on/off
 Track Selection	T+T+T			Link on/off
 All Tracks Forward Select	T+T+T+T		Track forward	Link on/off
 All Tracks Backward Select	T+T+T+T+T		Track backward	Link on/off
 Roll Edit	R	Select additional	To Ripple tool	Link on/off
 Ripple Edit	R+R	Select additional	To Roll tool	Link on/off
 Slip	S	Select additional	Select clip	Link on/off
 Slide	S+S	Select additional	Select clip	Link on/off
 Razor Blade	B		To Blade All	Link on/off
 Razor Blade All	B+B		To Blade	

<b>Tool</b>		<b>Select</b>	<b>Tool + (⌘) Command</b>	<b>Tool + Shift</b>	<b>Tool + Option</b>
	Hand	H	Zoom in		Zoom out
	Zoom In	Z	To Hand tool	Zoom in maximum	Zoom out
	Zoom Out	Z+Z	To Hand tool	Zoom out maximum	Zoom in
	Crop	C	All sides	Two sides	
	Distort	D		Perspective	Resize
	Pen	P	Smooth on/off	Adjust line	Pen delete
	Pen Delete	P+P			Pen
	Pen Smooth	P+P+P			





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