



Final Cut Pro 3

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1 Setting Up Your Workstation

Every writer needs just the right desk, every painter needs just the right easel, and every editor needs just the right editing station to work efficiently and creatively. There are many choices to make when setting up your work area. These range from technical concerns such as how to hook up your speakers to making sure you're working in an area where you can think creatively without distraction. Installing Final Cut Pro is just the first

step. You'll need to take a little time to hook up all your equipment correctly and in such a way that you're not tripping over cords. It's important that everything you need is right in front of you and configured to meet your needs. In this chapter, we'll go over how to tailor your workstation for your special needs and how to set up your editing station for the two types of video capture: digital video (DV) and analog.

Overview

"It is important to have a good tool. But, even if it is the best possible, it is only a tool. No implement can ever take the place of the guiding intelligence that wields it. A very bad tool will ruin the work of the best craftsman; but a good tool in bad hands is no better."

Theodore Roosevelt
History as Literature

While even the finest equipment cannot make up for a lack of skill, skilled professionals always seek out the best tools available to them. Final Cut Pro offers excellent capabilities bundled within an easy-to-use interface. However, although Final Cut Pro does offer a multitude of features, it is only part of what you will need in order to create your video.

This chapter will help you set up your workstation for capturing and editing with Final Cut Pro. This chapter assumes that you have successfully installed Final Cut Pro, following the instructions provided by Apple. We will show you how to set up your machine to capture digital footage from an exterior video source such as a DV deck or analog sources like VHS and Beta-SP. We will also cover how to set up an exterior reference monitor and speakers. If you can afford this solution, it's highly recommended. The image you see on the computer monitor will not give you a true sense of the definition and color of the image, so a reference monitor is imperative if you're editing anything for professional use or broadcast.

This chapter will help you understand how to set up your system for capture from either digital or analog source tape.

The Computer

The most obvious additional element you will need is the computer. Although Final Cut Pro 2 can theoretically run on any Macintosh computer with OS 9.1, it runs best on Macs using the G4 chip, also known as the "Velocity Engine," and optimally on dual-processor G4s. The G4 chip was designed with the number-crunching required for high-end graphics in mind. So, while Final Cut Pro will putt right along on a G3 PowerBook, you will notice a significant increase in speed if you are using a G4 (Titanium) PowerBook, and it will really purr with the dual-processor version of the desktop Power Mac.

However, don't be afraid to use Final Cut Pro on an older machine if that is what you have. There are several things that you can do to improve your performance, such as adding additional RAM. 256MB is suggested, but the more RAM, the happier your machine (and you) will be.

At bare minimum, you will need a Mac with a G3 or G4 chip running at 300MHz or faster, OS 9.1, 20MB or more of unused disk space, and at least 192MB RAM. Final Cut Pro 1 and 2 will not run in OS X—not even in the "classic" environment (which can normally run OS 9 applications). Final Cut Pro 3, however, runs fine in either OS X or in OS 9.2.2, although the interface will vary slightly. If you are using a version earlier than Final Cut Pro 3 and you need OS X installed on your computer, it is a good idea to partition your hard drive and use one partition for OS X and the other strictly for OS 9 and Final Cut Pro.

External and Internal Hard Drives

In addition to the computer, you will need a lot of hard drive space. A single minute of uncompressed (high quality) DV-format video requires 216MB. While the storage size of internal hard drives is going up—most Macs ship with hard drives between 20GB and 80GB—you may want to consider using an external FireWire hard drive to store footage and dedicate the internal drive to run Final Cut Pro. You can also purchase additional internal hard drives if your system has the physical space. It's important to remember that if you are capturing analog using the capture card (this doesn't apply to a media converter box), you must capture to a SCSI drive over a SCSI PCI card, and not the ATA drive that comes with the standard G4s.

The reason for this is quite simple. Video editing requires precise timing, and a delay of even a few milliseconds can throw your video out of synch. If you are using the same hard drive both to run Final Cut Pro *and* store and access the video footage, this may require the hard drive to be, essentially, in two places at the same time. Playback may suffer, frames may get dropped, and the audio may stutter as the hard drive switches back and forth. Adding an internal or an external hard drive—using the FireWire connection—and placing all of your DV footage on this additional drive will alleviate this problem and improve the overall performance of Final Cut Pro.

An external hard drive is also a much better idea if you will be working on several different projects concurrently or if you are sharing a workstation with other editors. You can hook and unhook the hard drive to switch between projects and not have to worry about filling up the fixed hard drive space.

Monitors

While Final Cut Pro can display your sequence in the Canvas window on the computer monitor, it is highly recommended that you have a reference NTSC or PAL monitor on which to view your edit because NTSC and PAL handle color differently than the way a computer monitor handles color. The Canvas window will certainly give you a usable image, but an external reference monitor will help you make important decisions about contrast, color, and brightness that the computer screen cannot. If you're going to be doing heavy image control effects or color correction, a reference monitor is crucial.

You can hook up Final Cut Pro to any external reference monitor, including most regular, consumer-grade TVs, as long as the TV input plugs are compatible with your system. You can also buy adapters if your monitor's inputs are not compatible. For professional use, you should get a reference monitor with S-Video or Component inputs so that the image quality is at the highest grade.

It is also helpful, but not necessary, to have a second computer monitor. Final Cut Pro uses four main windows to navigate the interface, and these can sometimes be cramped on one screen even at a high resolution. If you have a second computer monitor, you can open up your space and divide your palettes between the two screens, keeping your viewer in one and your controls and browser in the other. If you are using the Matrox converter card, note that its port for a second monitor is not compatible with the Apple flat-panel monitor. If you desire a second flat-panel, you must also purchase an additional Radeon PCI card.

The DV Deck or Camera

Most likely you will be using a digital video camera to shoot footage for use in Final Cut Pro. If the footage you are capturing was shot on a DV camera, a DV camera can also be used as a DV deck system (basically a mini-VCR that plays and records DV tapes). This is sometimes a financial necessity, but we recommend that you purchase a separate professional DV deck, such as the Sony Mini-DV VCR Walkman or the Panasonic DV Compact Recorder/Player, if you are working on a lot of projects that require a hefty amount of digitizing. The strain of capturing, especially batch capturing, is not good for a DV camera's internal transport

mechanisms, and DV cameras can run slower than DV decks when cueing up clips for capture. Also, if you're using the camera as a capturing deck as well as for shooting, it can cause greater wear on the camera's head, which will inevitably lead to poorer video quality when recording.

Other Peripherals

The rest of this chapter will teach you how to hook up different peripherals that you may find helpful when using Final Cut Pro. These include different capture setups for analog and digital source tapes, as well as speakers for optimal sound.

LESSONS

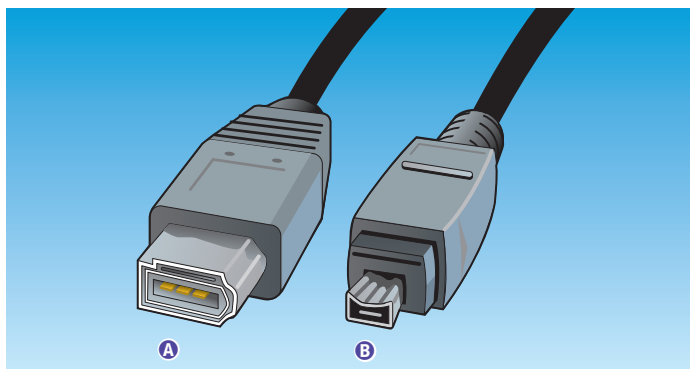
Hooking Up to a DV Deck or Camera



The most common setup for a Final Cut Pro station is with a *digital video deck*. As stated earlier, a DV deck is like a mini-VCR that plays and records digital videotapes and can output that signal to your computer via a FireWire cable. It can also receive video through FireWire, so that you can record your sequences onto

DV tape. Many people use a DV camera as a deck, but if you're doing a lot of capturing as well as using the camera for shooting, it's a good idea to invest in a deck so as not to wear out the heads on the camera. In this section, we'll go over the best ways to hook your DV deck or camera up to your computer. Make sure you've got all the necessary equipment in front of you. The bare bones here are your computer, a FireWire cable, and the DV deck. You may also have a reference monitor and external speakers. Hooking up your system with a FireWire connection to a DV deck ensures device control, which means you can control the VCR functions of the deck from within Final Cut Pro and also mark In and Out points on the raw footage to log your clips (see Chapter 4).

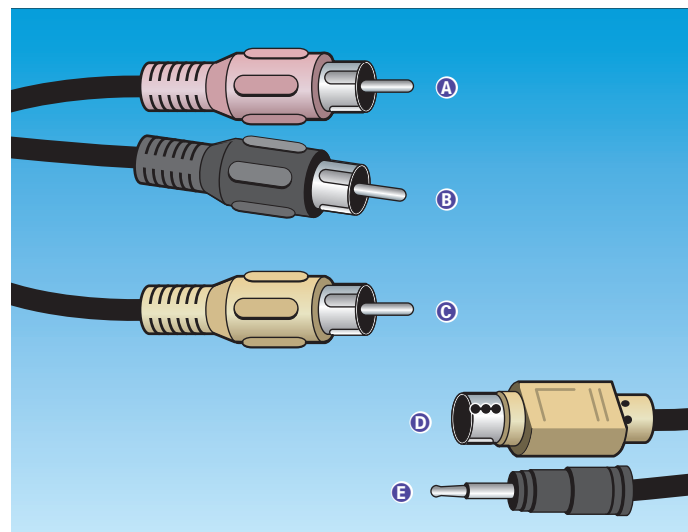
1. Plug in one end of the FireWire cable into the FireWire port on the deck. Plug in the other end into the FireWire port on your computer. If you are using a DV camera, make sure it is in VTR mode, not Camera mode. There are two different kinds of FireWire plug: 4-pin and 6-pin. Computers and external hard drives generally use the 6-pin configuration while DV cameras and decks use the 4-pin configuration, but it is fairly easy to tell the difference as the 6-pin plug is larger. If you are purchasing a FireWire cable, make sure you get type that has a 4-pin configuration on one end and a 6-pin configuration on the other.



- A** Firewire to computer
- B** Firewire to device

2. If you have an exterior reference monitor, first identify what kind of inputs your monitor can accept. This could be Composite, S-Video, or another kind of video signal cable. Most DV decks and cameras have Composite and S-Video outputs. High-end professional DV decks, like the Sony DV Studio Player/Recorder, use

Component Video outputs. Once connected with the appropriate cable, your monitor will now display whatever you play in your deck, and also what plays in the Timeline and Canvas within Final Cut Pro as long as the FireWire cable remains connected to the computer.

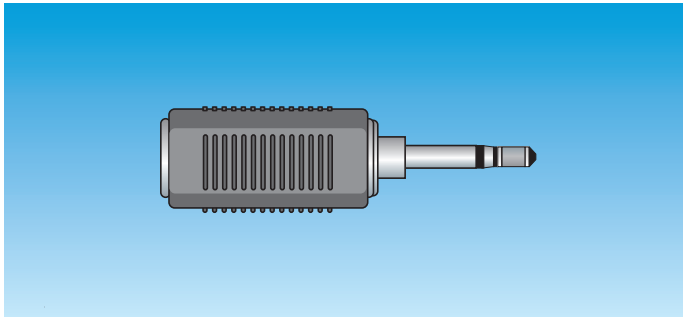


- A** Right Audio
- B** Left Audio
- C** Video
- D** S-Video
- E** Composite

3. If you are hooking up external speakers, you can do a number of things. If you are using a deck, find the Audio Out jacks, determine what type of cable they require, and route a cable between the deck and your speakers. If you are using a deck that

does not have RCA audio output, plug a mini cable into the Headphones output of the deck and attach the other end to your speakers. You can, of course, just use actual headphones here if you prefer.

If you plug in your speakers through the camera or deck, your sound will be synched with the exterior monitor and not with the image on the computer monitor. There is a time delay of a few frames, so you should only hook up your speakers through the deck if you have an external reference monitor. Otherwise, use the internal computer sound via the headphone jack on your computer.



4. Now boot up Final Cut Pro. Make sure your DV camera or deck is on and the FireWire cable is plugged in or the program will not register the deck. If it's not, you can plug it in after you've booted the computer. If there is a problem, the program will alert you that there is no device hooked to the FireWire (see *Running Final Cut Pro for the First Time* in Chapter 2). Otherwise, you'll see this screen, which means you are ready to start exploring the Final Cut Pro interface, which is the main focus of Chapter 2.



FAQ What is FireWire?

FireWire is the trademarked name Apple Computer uses to refer to the input/output (I/O) industry standard known as *IEEE 1394*. Apple originally developed this standard to allow high-speed connections between peripherals (such as hard drives and DV cameras) and computers, with data transfer rates of up to 400Mbps. This speed is FireWire's most important advantage for video applications.

In addition, FireWire allows hot swapping. That is, you can plug and unplug peripherals without having to turn your computer off, and the device will be immediately available to your computer with no further effort on your part.

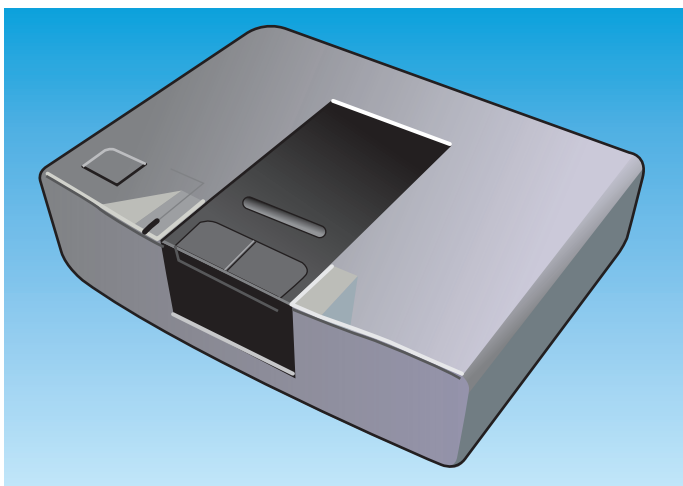
Using FireWire you can connect as many as 63 independent devices to a

single computer, where each device hooks into the previous device, and these devices can be seen by any other computer on your network. So, you can hook a hard drive to one computer, and use it over an office Ethernet with no difficulty.

Sony also uses the IEEE 1394 standard in most of its DV cameras; however, they call their product *i.LINK* instead of FireWire. Don't worry, though; whether you see FireWire, i.LINK, or IEEE 1394, these names all refer to the same thing and will use similar (if not always identical) cables and plugs to allow various peripherals to talk to each other.

To find out more, visit the 1394 Trade Association (www.1394ta.org) or the Apple FireWire web site (www.apple.com/firewire).

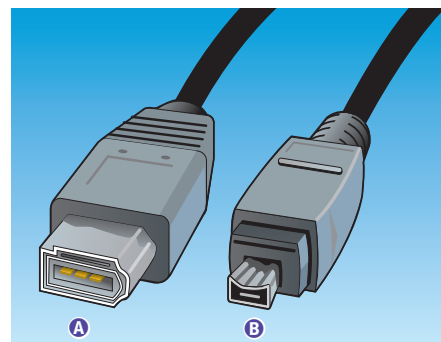
Hooking Up to a Media Converter Box



If you are capturing from an analog source (such as VHS, 3/4-inch tape, or Beta-SP) instead of mini-DV, you will need either a media converter or a special internal capture card. A media converter—such as the Matrox RTMac or the Sony Media Converter—is a device that converts an analog signal to digital and vice-versa. It uses a FireWire cable to connect to a computer and S-Video and Composite analog video cables to connect to a video deck. This section will outline how to hook up your system so that you can successfully digitize from analog source

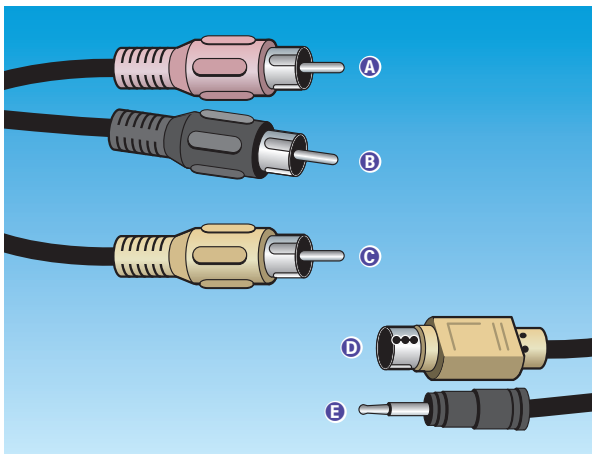
material with a converter box. A converter box is a cheap way to translate your footage, but you should use a capture card if you want the more professional transfer via Component. Using a media converter can affect the color quality of the image, and also degrade the audio. The biggest disadvantage is that the media converter box will not capture your footage with source timecode through FireWire, and therefore does not allow device control, logging, or batch-capturing.

1. Hook the FireWire cable into the FireWire port on your converter box. Attach the other end to the FireWire port on your computer. Remember that there are two different kinds of FireWire plugs: 4-pin and 6-pin.



- A Firewire to computer
- B Firewire to device

2. Determine what audio and video outputs are available on your analog deck. Most media converter boxes can accept S-Video, Composite, and RCA stereo cables. Hook a cable from the video output on your analog deck to the video input on the converter box. Do the same with the audio; hook the outputs on the deck to the input on the converter box.



- A** Right Audio
- B** Left Audio
- C** Video
- D** S-Video
- E** Composite

3. When you boot up Final Cut Pro, make sure the converter box is on so that the program will recognize the FireWire connection and can communicate with the converter box. Also make sure you configure the converter to import analog, as the signal you are inputting is analog and the signal you are bringing into your computer is digital. This means you'll want the Input source within Final Cut Pro to be set to DV.

This setup will allow you to capture from your analog source deck and convert the video and audio signals into digital files that will work with the DV codec in Final Cut Pro. If you want to go the other way and export digital files onto the analog deck (for example, to make VHS dubs of your work), configure the converter to input digital. If necessary, change the cables between the analog deck and converter box so that the audio and video signals come from the output of the converter and go into the input plugs of the analog deck.

FAQ

Editing Film, Digital Video, and Analog Video

analog *adj* (1948) : of, relating to, or being a mechanism in which data is represented by continuously variable physical quantities.

digital *adj* (1656) : of or relating to data in the form of numeric digits.

With all the talk about the digital revolution and the changing tides of video and film production to a digital world, let's look at what exactly is different about making and editing movies digitally. There are three main types of production media: film, analog video, and digital video.

Film is a strip of celluloid that records image through a chemical process based on exposure to light. Originally, editing was done entirely on film. Working prints of raw film footage were spliced together on an editing machine, which shuttled the footage back and forth on spools. When the editor was finished cutting and splicing, the original camera negative was cut to conform to the spliced working print, and a clean, unspliced print was made from this. Sound was added on a stripe along the side of the film, and voila, the film was ready for projection.

Both analog and digital video store their information on magnetic tape, by electrically charging the magnetic particles on the tape. The difference lies in the way the two methods represent information. With analog video-tape, images and sound are represented by continuous variations in the electrical properties of the magnetic particles. Digital video records the image by charging the magnetic particles into on/off voltages that can be read as ones and zeros. Digital video can therefore directly interface with your computer, and it does not lose quality as it is copied. Both advantages are significant.

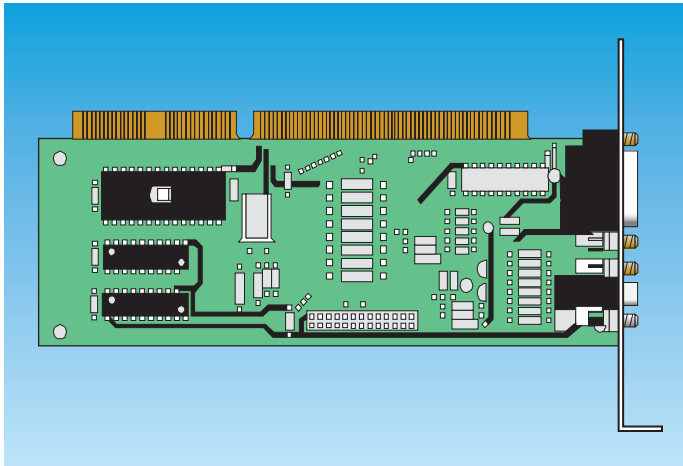
With analog video technology, editing was done tape-to-tape. One tape held the raw, unedited footage, and the second tape held the assembled cuts in order; it was the final edited piece. Unfortunately, analog video

degrades with every copy, as the signal from the magnetic particles on the tape becomes weaker with each dub. Analog editing therefore meant that the final version never had quite the image or sound quality of the original footage. This form of editing was called *linear editing* because shots were taped onto a master video one after the other, in a long "line" of video that could not be moved or shifted, only erased. If you wanted to make changes in shots you had already laid down, you had to go back and redo everything.

Because digital information can be stored and manipulated in computer memory, digital editing gives you the freedom to rearrange shots and shorten or lengthen them at will. This is called *nonlinear* editing because you are not trapped into a linear—one shot laid after the other—method of editing. What separates digital editing from editing on film is that the digital editing style is *nondestructive*. This means that when you are cutting on your computer, you are not actually doing anything to the stored master media file. You are working with a representation of that file as a media clip, so no matter how many times you cut it or alter it, the clip stays intact as a file. All of your edited clips derive from that original media file, but they do not change it at all. With editing on film, every time you made a splice, you were actually cutting the film, so if you wanted to put a shot back together, you would have to re-splice it. Nonlinear digital editing saves you from having to keep track of all your snippets of stray film, because the media file stays intact no matter what you do editorially.

All of these formats can be converted to any of the other formats with various results. Digital video can be blown up to film, and footage shot on film can be transferred to DV and analog stocks and edited digitally. With each transfer, however, the footage will be affected by the characteristics of its current medium.

Hooking Up to an Analog-to-Digital Capture Card



For a more professional way of working with analog source material in Final Cut Pro than using a media converter box, consider an analog-to-digital capture card. These cards maximize color quality by utilizing Component inputs and outputs. Like a converter box, a capture card converts the analog video into ones and zeros like the process in the converter boxes, but instead of using the DV codec, each capture card has its own proprietary codec. (*Codec* is an abbreviation for *compression/decompression* and refers to a type of extension software that allows

QuickTime to communicate with Final Cut Pro so that it can capture, play back, and print to video. Codecs used by a capture card capture video without the degradation that DV converters perform on source material not originally shot on mini-DV.) Final Cut Pro supports three capture cards and their codecs: the Aurora Igniter, Pinnacle Cinewave, and Digital Voodoo.

This method alone, however, does not allow you to capture with *device control*. Device control is a technology that allows Final Cut Pro to read the timecode on the source tape and that lets you shuttle through the footage and mark in and out points from the control panel in the program. With digital video, device control is already set up through the FireWire cable and timecodes are inserted automatically, but with analog, you will need a serial adapter. This section shows how to set up a video capture card and serial adapter. At the time of this writing, no capture cards currently support Mac OS X.

TIP**Using a Serial Port with an Analog-to-DV Capture Card**

If you are logging and capturing video with a high-end analog video deck (such as Beta SP, S-VHS, 3/4 inch, or digital Beta), you will need a serial port added to your Macintosh to import timecode from the video deck. There are two serial port devices that perform this function: the Gee Three Stealth Port (see <http://www.geethree.com>) and the Griffin Technology G-port (see <http://www.griffintechology.com/serial/>). Serial technologies are the only way to gain device control when capturing from an analog source.

In order to use the serial port, however, you must remove the internal 56K modem and install the serial port in its place. Instructions will be provided in the accompanying products' manual, so be sure to follow them closely as you perform the surgery. Neither of these two products comes with its own logging cable, so you must purchase this in addition to the port. This cable connects from the Time Code slot on the back of the analog video deck to the newly installed serial port on your Macintosh. While this device keeps a PCI slot open, it does prevent 56K dialup, leaving the only way for your computer to connect to the Internet through the Ethernet port (which is what DSL, cable, and T1 use).

Don't forget to change your Device Control tab in the Log/Capture window to the Serial Port when using this option!

1. Follow the instructions provided by the manufacturer to install the capture card. This will generally require that you open your Mac and slide the card into a particular PCI slot. Be careful when doing this, however, since the slightest static electricity may damage your computer. We generally recommend using a grounding strip when tinkering around with the inside of your computer. At the very least, touch a piece of grounded metal before you begin to discharge any static buildup.

2. Hook the audio and video cables into the output plugs on the back of your analog deck. These plugs should be clearly labeled. Most analog decks will have composite and RCA jacks. High-end professional decks like Beta-SP include Component jacks. You will need to make sure that the cable type accepted by the analog deck's output is compatible with the capture card's input plugs. See the *Video Cables* sidebar for information on the difference between the cables you can use.

3. Attach the other ends of the audio and video cables plugged into your analog deck into the inputs on the capture card you inserted in step 1.

4. To allow device control over an analog capture card, you must install a serial port in place of the internal modem, attach a logging cable to your computer's freshly installed serial port, and connect the other end to the analog deck's timecode port. This will activate device control of the analog deck. See *Using a Serial Port with an Analog-to-DV Capture Card* for details.

5. If you are using an external reference monitor and speakers, you will need to connect them to the audio and video cables into the outputs of the analog deck as well as the capture card. There are usually two audio/video outputs on these analog decks. For the video signal, you should route signal 1 into the capture card on the computer, and route signal 2 into the external reference monitor to compare the color between what's being captured through signal 1 and what the source material looks like through

signal 2. (Note that you can manipulate the color control levels in the Clips Settings tab of the Log and Capture window, which are grayed out when capturing DV.)

6. You will also need to connect the audio cables that come attached to the capture card into your deck's outputs. You must also change the Sound settings on your computer so that it knows to channel the sound through the capture card you have installed. Go into the Apple menu, scroll to Control Panels > Sound and, in the Input and Output tabs, select the appropriate source (whichever analog capture card you have installed) in place of the default output. This will allow you to print to video, and also to hear the sound from the computer itself as the video source is played on the deck.

7. When you boot up Final Cut Pro, make sure the analog deck is on, and if you are using an analog camcorder as a deck, make sure it is in VTR mode. If you are using device control, you

will need to have the device control toggle on the analog deck set to Remote.

FAQ What is USB?

Like FireWire, Universal Serial Bus (USB for those of us in a hurry) is an industry standard technology used to hook peripherals to computers. It is also hot-swappable, allowing you to hook and unhook peripherals without having to turn your computer off. Although it is much slower than FireWire (1.5 to 12Mbps as compared to FireWire's 400Mbps), USB has been more widely adapted. Generally, USB is used to hook up peripherals such as printers, keyboards, and mice. An analog-to-digital capture card can gain device control by hooking up a USB-to-serial adapter cable (such as the Keyspan Twin Serial Adapter) to your computer and your analog video deck. However, we strongly recommend the Gee Three Stealth port over this option, as the Gee Three has proven much more reliable and is actually a cheaper buy.

USB ports can be identified by the USB icon located near the port. To find out more, visit the Apple USB Web site (www.apple.com/usb).

FAQ What Are the Different Video Cables Used with Analog?

There are three main types of video cables that you might use with Final Cut Pro when capturing from analog sources: Component, S-Video, and Composite.

Composite Composite cables provide the poorest quality of the three analog options, as they run all video information through a single RCA wire. Virtually all decks have composite RCA outputs, and this technology is useful for making tests.

S-Video Also known as Y/C, S-Video is a video input/output port that splits the video signal into four pins through one cord. It provides a signal that is better than Composite, but not as good as Component. Most higher-end decks have S-Video capabilities.

Component Component is the most high-end type of port. It splits the video signal into the three YUV signals or RGB signals, requiring three separate composite wires. These wires connect to the analog decks through BNC adapter ports. This is the standard for high-end professional projects, and gives the best quality transfer, with the least degradation to the color information of the original analog video. Many higher-end decks, such as a Beta-SP deck, will have Component jacks. Note that not all analog capture cards come with Component as part of the standard package. If Component is what you need, you may have to purchase an additional supplement to augment Component input and output for your capture card.