

The Hardware Setup

It used to be the case that an editing suite contained a giant flatbed film editor, shelves crammed with film reels, and cavernous trim bins bulging over with loose strips of film. This was the original nonlinear editing system. Over the past decade, as digital editing has become more available and affordable, the editing room has changed. Now instead of film reels and splicers, the editing suite is filled with computers, monitors, video decks, maybe an extra hard disk and, of course, Final Cut Express. In this chapter, we discuss the best way to set up an editing suite for digital video editing in Final Cut Express, and the various peripheral elements you can add depending on your needs and budget.

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- Knowing what peripherals you need and how to pick them
- Choosing your camera
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Finding the Right Mac

Your computer is your tool. It is the device you will be using to create—to sculpt—your video. More than likely, you did not purchase this book unless you already own a computer, so we are not going to waste time telling you what to buy. However, you might not be sure whether your computer can handle Final Cut Express. Not all computers sporting the Mac logo will be able to run Final Cut Express, so you'll need to make sure that your Macintosh has the following:

G3 or G4 processor (300MHz or faster) You will need a G4 processor to use real-time effects. Obviously, the faster your processor, the faster you will be able to work. However, don't be afraid to use older machines if that's what you have to edit with. What counts are your skills.

OS X Jaguar (v.10.2) or higher This is the standard Mac OS shipping with all new machines. If you are using OS 9 or older versions of OS X (10.0–10.1), you will need to upgrade.

256MB of RAM This is the bare minimum you need for OS X and Final Cut Express, but you will need at least 384 megabytes (MB) if you want G4 real-time effects to work correctly. It is especially true with digital filmmaking that the more memory you have, the faster you can edit. In addition, more memory will help prevent the problem of dropped frames. Memory is relatively cheap these days, so stock up.

40MB free hard-disk space This is the bare minimum needed to install Final Cut Express, but you will obviously need more space while working to house the large media files.

One or more FireWire ports These ports are used to capture and export video. (Although useful for downloading digital photographs, USB (Universal Serial Bus) is too slow for video.)

QuickTime 6.1 or higher installed You will need to install or upgrade to QuickTime Pro, but the software is included with Final Cut Express.

Apple Computer offers several Mac models that either come out-of-the-box ready for video editing or can be tricked out to at least the bare minimum. Generally speaking, all new Macs will be able to handle Final Cut Express to varying degrees of proficiency. However, older models might or might not be able to handle the program:

iMac Although thought of as a consumer-level machine, iMacs (see Figure 1.1), even the older multicolored ones, are often used as basic video editing stations. Also keep in mind that the newer flat-panel iMacs are at least as fast as the fastest Macs of just a few years ago. The major drawbacks of the iMac for video editing are lack of expandability, slower speed, and small screen size on older iMacs.



Note: The cable television channel Oxygen uses multiple iMacs running Final Cut Pro to enable producers and editors to quickly create rough-cuts of their programs.



Figure 1.1
The Apple iMac

eMac Primarily intended for the education audience (which is where it gets that cute little *e* from), the eMac (see Figure 1.2) has the basics needed for Final Cut Express, although you might need to add more RAM. The major drawbacks of the eMac for video editing are lack of speed and expandability.



Figure 1.2
The Apple eMac

iBook Older (clamshell) iMacs are not recommended because of their lack of speed, smaller hard drives and lack of FireWire support. However, newer iBooks (see Figure 1.3) have the bare minimum credentials for video editing. The major drawbacks of the iBook for video editing are small screen size (on smaller iBooks), lack of speed, and lack of expandability.



Figure 1.3
The Apple iBook

PowerBook If you need to edit on the road, the PowerBook is your best bet. It provides most of the power of the desktop Power Mac and incredible portability. Final Cut Express will work on later model “Bronze” PowerBooks (black casing) or with any of the newer “Titanium” PowerBooks (see Figure 1.4). The major drawback for video editing with PowerBooks is lack of expandability.



Figure 1.4
The Apple (Titanium)
PowerBook with a
whopping 17-inch monitor



Note: Most of the video created for this book was edited on Titanium PowerBooks.

Power Mac The powerhouse for video editing is the desktop Power Mac (see Figure 1.5). Newer models include dual processors, which will speed any editing job. In addition, Power Macs are far more expandable than any other Mac model, enabling you to add or change graphic cards, use internal disks, or add other third-party expansion cards such as an analog-to-digital capture card. The major drawback of the Power Mac for video editing is lack of portability.



Figure 1.5
The desktop-bound
Apple Power Mac

Using Powerful Hard Disks

Digital video consumes massive amounts of disk space. Just 15 minutes of uncompressed video footage can eat 3 gigabytes (GB) of disk space. You will also need extra hard-disk space to store your raw media as you capture it from your digital video tapes. Although computers are coming with increasingly large hard disks, we strongly recommend that you use an external or separate internal hard disk to devote exclusively to media storage. This is because capturing media to your primary internal hard disk (the one that came with the machine) can cause problems such as program crashes and corrupted video files if that disk is also being used to run programs (including Final Cut Express).

You have two basic choices for adding extra hard disks:

Internal disk (Power Macs only.) This type of disk is installed in any empty media bay. The advantage is that internal disks take up less space than external disks and do not require an extra power socket. Internal disks tend to be cheaper, but you lose out on the portability factor of the external. Although it might seem daunting to pry open your precious computer to install a new internal hard disk, it is actually remarkably easy. Desktop Macs are designed to be easily opened, and additions can be simply snapped into place.

External FireWire disk (Requires FireWire.) This disk is installed by plugging into any open FireWire port. The advantage of external disks is that they are hot-swappable,

which means you can plug in and unplug the disks while the computer is running and you can link multiple disks together to create a chain of disks, cameras, or other devices all accessible at the same time.

FireWire disks are relatively cheap. You can now buy disks with storage in the range of 120GB for only a few hundred dollars. When you are deciding how much space you need, remember that 1GB can hold roughly 5 minutes of captured video.

Because digital video relies on timing, you need to consider several features about any hard disk you are using. These are listed in Table 1.1.

► **Table 1.1** Recommended Hard-Disk Features

Feature	Value
Rotational speed	5,400rpm minimum but 7,200rpm or higher recommended. Hard-disk speed is measured in rpm (rounds per minute), just like a vinyl record. FireWire video runs at 4,200 rpm, so you'll want to make sure the disk you buy is faster than that.
Buffer	2MB minimum, but 6MB or higher recommended
Access time	8.9 milliseconds (ms)
Data transfer rate	50MB



Note: Although designed as a highly portable MP3 player, Apple's iPod includes a FireWire hookup that enables you to transfer any file type (even video), enabling it to double as a pocket-size hard disk. The iPod can store up to 20GB, which is plenty of space for a short film, even uncompressed.

Older Technology: SCSI Hard Disks

Another, costlier option is to use SCSI disks, which can have a faster and more reliable connection than FireWire. SCSI disks are also much more expensive by several hundred dollars and require a SCSI PCI card on your computer. For the most efficient editing, you can get SCSI disks that spin as fast as 10,000rpm.

Like FireWire disks, SCSI disks can be linked in a chain, but are not hot-swappable (this means you have to reboot your computer to plug in the disk). SCSI disks also require special software to daisy-chain them together if you want to link more than one disk to the computer at the same time. SCSI disks have the advantage of being more reliable than FireWire. FireWire disks will more likely "drop frames" when capturing media. This means that not all of the frames from the source tape are making it onto the computer, which is obviously a big problem you will want to avoid!

Choosing a DVD Burner

In addition to your hard disks, you will also need a DVD-RW (read and write)—often referred to as a DVD burner—if you plan on putting your films on DVD. Many Macs come with the SuperDrive, which allows for CD and DVD burning. However, if you

have purchased a Mac without a DVD burner, then you will need to purchase an external disk or, if you have a desktop machine with an open bay (a slot for media disks), you can purchase an internal disk. External DVD disks will hook up to your machine through a FireWire connection, but will have a separate power supply requiring its own plug in your electrical outlet, not to mention space on your desktop. Internal DVD disks, on the other hand, are mounted within a Power Mac desktop machine in any of the available media bays, thus not taking any additional desk space or requiring a power plug.

Note: For more information on DVD burning, see Chapter 10, “Outputting Your Video.”



If you are purchasing a DVD burner, look for the following features:

Is compatible with Macs Not all DVD players on the market can run with the Macs.

Can use 4.7GB DVD-R discs This is the standard DVD disc format that you will find in most stores.

Reads DVDs at 8x or greater This is how fast the DVD drive can play DVDs back. Slower speeds will skip more often.

Writes DVDs at 4x This is how fast the DVD drive can burn information to the disc.

Has a 4MB buffer or greater Although 2MB will do, for serious video encoding it might slow you down.

You will also want to make sure that your DVD burner supports DVD-Video and DVD-ROM, as well as DVD-R formats.

In addition to the DVD features, most DVD burners also double as CD burners. When evaluating your DVD burner, don't forget to check the CD features and make sure they are up to standard. Make sure that it supports the common CD formats: CD-ROM, CD-Audio, CD-R, CD-RW, CDI, CD Bridge, CD Extended, CD Mixed Mode, and Photo CD media.

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 disks and DV cameras) and computers. Data transfer rates reached up to 400 megabits per second (Mbps), with some newer devices allowing transfer rates up to 800Mbps. 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.

By using FireWire, you can connect as many as 63 independent devices to a single computer. 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 disk to one computer and use it over an office Ethernet with no difficulty.

Continues

What Is FireWire? *(Continued)*

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 enable various peripherals to talk to one another.

Using Multiple Monitors and Speakers

You need only one monitor to work with Final Cut Express. However, having only one computer monitor is much like having only one eye: it limits your vision and can slow you down. You have two distinct options (which are not mutually exclusive) for adding monitors to your editing suite: you can add a second computer monitor, effectively creating a larger workspace, and/or add a reference monitor to watch the signal coming from your DV deck.

Adding a Second Monitor

Although you can get by with a single computer monitor, your life (and editing capabilities) will be much improved with a second computer monitor. This simply gives you more desktop space, which can be invaluable when editing larger projects. When you are editing with Final Cut Express, you will be able to watch the progress of your cuts on one computer screen. This is certainly enough to edit competently, but the image is small and cramped. A second computer monitor will enable you to spread out your work area, especially useful for the timeline, and enables you to display the video screen at larger sizes. In fact, you can simply place your tools in one screen and your video window in the other.

Most desktop models have a port for a second monitor so that you need simply plug it in, and OS X makes it insanely easy to control two monitors. To set up a second monitor, plug the monitor into your computer, open the Display control panel (see Figure 1.6), and click the Detect Displays button. All monitors currently connected to the machine will appear.



Note: Mirroring displays enables you to have both monitors show the same image, which is useful when teaching. However, you will generally want to make sure that mirroring is off when working in Final Cut Express.

In the Display control panel, you can also click the Show Displays In Menu Bar option to select it (see Figure 1.7). A new icon will appear in your menu bar, in the top-right corner of the screen, and will display extra monitors if they are connected to your computer. This menu provides quick access to the Detect Displays option and enables you to set the monitor resolutions independently or use mirroring to have both monitors show the same signal.

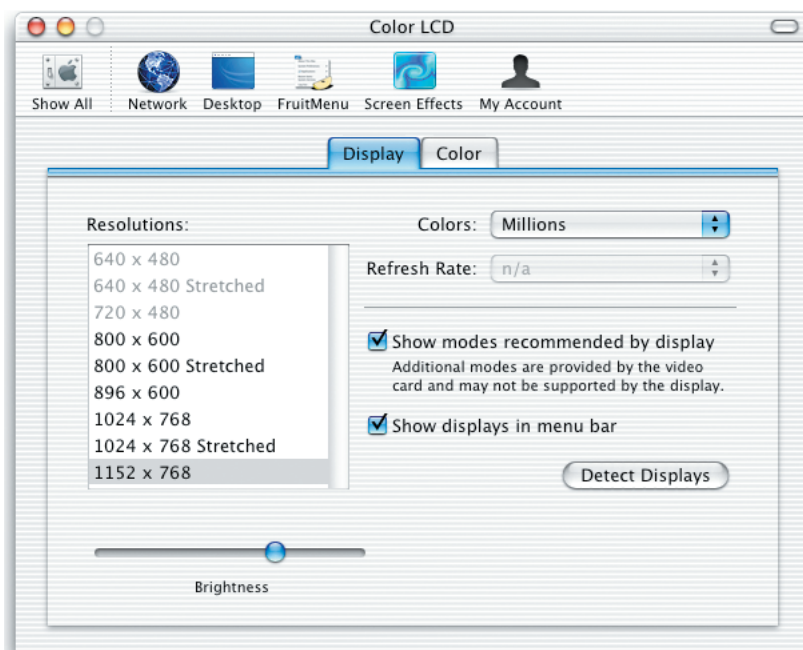


Figure 1.6
The Display
control panel

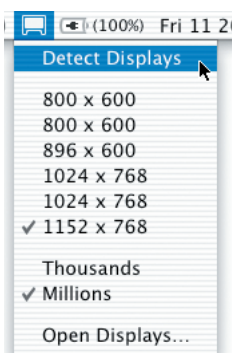


Figure 1.7
The Displays menu

Using a Reference Monitor

In addition to recommending a second computer monitor, we highly recommend getting a reference monitor. Although the computer monitor can display your video, if your work will eventually be viewed on a TV screen, you need something that will show the video as it will look for a broadcast audience. But this is not just any TV. Reference monitors have been calibrated to display the image at the correct color and contrast levels. You can buy reference monitors at different screen sizes and portability, and can also use the monitor when shooting to get a better view of your shots outside the camera viewfinder.

Video Standards: NTSC and PAL

In the United States, the standard is for you to use an NTSC reference monitor. NTSC stands for National Television Standards Committee and is the recognized standard for North America and parts of Asia. The NTSC standard is a composite video signal that runs at 60 interlaced half-frames per second. There are 525 lines in each frame.

The other major standard is PAL, which is the dominant European system. PAL stands for Phase Alternating Line and runs at 50 half-frames per second. PAL has 625 lines in each frame, which gives it a higher resolution than the NTSC standard. You'll find that a lot of American productions shooting on DV will shoot PAL because of this higher resolution, especially if the project is going to be blown up to film.

After you have your external reference monitor, you'll want to connect it to your DV deck or camera. Most DV decks and cameras have a composite (standard VCR plug) and an S-Video output. You should use S-Video if you have it, because the signal is vastly superior to composite. You can connect your deck/camera with an S-Video cable to the external monitor. Some more professional decks will have a component output, which sends a higher-quality signal than S-Video.

With your reference monitor hooked up to your DV deck, and your DV deck in kind hooked up to your computer via FireWire, you'll now be able to view your edits on the external reference monitor in real time as you cut with Final Cut Express. But be warned, there might be a slight delay between the image on the reference monitor and the image on the computer screen. This is normal, and due to the lag time of sending the signal over so many cables.

Adding Speakers

It's a real luxury to have external speakers to edit with. Let's face it, the computer's built-in speakers sound tinny, and if you're cutting anything to music or are doing any kind of audio cleanup work, it can be difficult to make informed audio edits with built-in speakers are. Buying external speakers or a good set of head phones can really change the impact of your piece, so you can make informed decisions about sound design as you cut.

We recommend the Monsoon speakers set (www.monsoonpower.com/index_mmedia.htm), which comes in a left and right package with a subwoofer box. If you are editing with a reference monitor, you'll need to plug the mini-plug from the speaker system directly into your deck or camera (the same place where you would plug in headphones), and your audio will now be played over a nice set of speakers with a real range and depth of bass instead of the tinny computer speakers. If you are not using a reference monitor, then after you've captured, you'll want to plug your speakers' plug directly into the computer's mini-plug input.

Choosing Your Camera

Unless you are simply going to be editing footage shot by someone else, you are also going to need a digital video camera (DV camera). DV cameras can range from cheap home use models that are very small and portable with built-in microphones, to professional cameras that take in microphone inputs, sport excellent lenses, and offer a host of in-camera effects. When looking for a Mini-DV camera, determine what kind of features you need (see the following section on DV formats) and how much you're willing to pay. Digital video cameras can be divided into three broad categories based on cost and quality:

Consumer Primarily intended for home and nonprofessional uses, these cameras will cost less than cameras in the other two categories but have lower resolutions and thus produce lower-quality images.

Prosumer Although a step up in quality (and price), these cameras are directed at amateur filmmakers who are shooting more than home movies. Sony's TRV line of cameras are comparatively inexpensive (\$800–\$1,500), but still good-quality cameras producing great results in the right hands.

Professional Although not quite film, professional DV cameras can get pretty close. The cameras are expensive (several thousand dollars at least) but worth it if you are a full-time filmmaker. The Canon XLS cameras and Sony's PD cameras are great for broadcast-quality shooting.

Which DV Format Should I Use?

Another important consideration is the format that the camera records in. There are three main formats:

Digital 8 This is an older format that is a holdover from Hi8. Digital 8 (D8) was created so that digital video cameras could also use the more traditional Hi8 tapes. Although still used in many consumer and a few prosumer cameras, this format is being phased out in favor of Mini-DV.

Mini-DV The most common digital video cameras support the Mini-DV format. Mini-DV records the digital signal on tape. Tapes can come in a variety of lengths, but the most common tapes run 60 minutes at SP (standard play) speed.

DVCAM This is a platform that records on the same kind of tape as Mini-DV, with one difference. Unlike Mini-DV, the DVCAM tape has an intrinsic link between the audio and video. This allows for crystal sync while capturing long clips of video, whereas Mini-DV can drift sync as the sound and video run side by side with the same timecode, but are not locked together. Sony's PD-150 supports both Mini-DV and DVCAM. DVCAM tapes use more tape stock to record the same amount of footage than Mini-DV tapes. For example, a tape that runs 60 minutes recording Mini-DV will run only 40 minutes recording DVCAM.

Although Final Cut Express will work with any of these formats, we recommend purchasing a camera with the Mini-DV format, unless you still need to work with older Hi8 tapes. We shot video for this book by using the Canon XLS (Mini-DV) and the Sony DCR-TRV320 (D8).

Hooking Up a DV Deck

Although you can use your camera as the playback device while capturing your video, this can dramatically add to the wear and tear of your camera, substantially shortening its useful lifetime as a recording device. So, what you need is a device devoted to playing back the video. What you need is a DV deck (see Figure 1.8). A DV deck enables you to play and record DV tapes, and comes with a four-pin FireWire connection that will connect directly into your computer. The advantage of DV decks is that they can communicate directly with Final Cut Express and be controlled from within the program.



Note: In reality, you might not be able to afford a separate deck; a camera works fine, especially when you are on a budget or on the road!



Figure 1.8 We recommend the Sony DV clams, which provides quality Mini-DV and DVCAM playback and recording and can come with an LCD display.

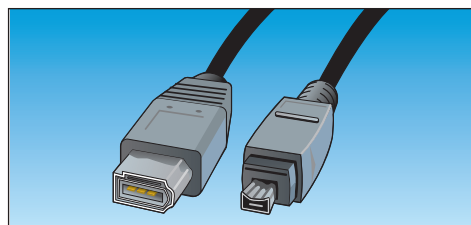


Figure 1.9 FireWire cables with the 6-pin connection that goes to your computer (left) and the 4-pin connection for your deck (right).

Whether you use a DV deck or a camera as a deck, you will need to connect it to your computer with a FireWire cable. FireWire plugs come in two sizes: four-pin and six-pin. The plug on your computer is the larger six-pin connection, and the connection on your deck or camera is the smaller four-pin (see Figure 1.9). This means you'll need to make sure that the cable you get has a four-pin plug on one end and a six-pin on the other.

To connect your deck or camera to your computer, simply plug the four-pin end of your FireWire cable into the deck/camera, and plug the six-pin end of the cable into your computer. Your computer will immediately recognize the connection, and when you start Final Cut Express, it will acknowledge the connection to the deck/camera. If it can't find the deck, it will tell you and prompt you to hook one up.

After you've successfully connected your camera/deck to your computer, you're ready to bring in media from your digital video tapes and edit them with Final Cut Express!

The Supporting Cast: Other Useful Equipment You Might Need on a Shoot

Although all you need to create video is a camera, a good computer, and the right editing software, you might need other equipment to create high-quality work:

Lights If you are shooting, for example, an interview for a documentary or a scene for a short narrative film, you might want to bring in special lighting. Often the available light (the term for the daylight, lamps, and so forth, that already provide illumination in a location) might not be bright enough or in the right places for your shoot. Digital video is more sensitive than film to light, and so you can get by with minimal lighting and still get a good exposure by opening the aperture. Typically, lighting a single subject works in a three-point lighting system: a brighter key light and a softer fill light in front of the subject on either side, and one light behind and off to the side to bring relief between the subject and the background. Good quality DV lights that are portable and affordable are the Omni lights, which can be bought individually or in kits.

Microphones The internal microphones of most DV cameras aren't bad, but if you need to use a boom (a pole with a microphone on the end that can pick up sound from a specific spot) or want to use a lavalier (a special tiny microphone that hooks onto a person's collar—the standard sit-down interview microphone), you'll have to buy an external microphone. If your DV camera has a special XLR input (like the Sony PD-150 cameras), then you can plug any standard professional microphone directly into your camera. If your camera, like most commercial cameras, doesn't have the XLR input, then you'll need to buy a Beechtek box. This little black box fastens to the bottom of your camera and converts XLR to mini—the small plug that is the audio input plug on most commercial cameras.

Movie Night!

Breathless (À Bout de Souffle), 1960

Director: Jean-Luc Godard

Starring: Jean-Paul Belmondo, Jean Seberg

The movies were never the same after Godard's first feature film. Ushering in the French New Wave along with other filmmakers such as Agnes Varda and Francois Truffaut, Godard made a lyric homage to American gangster movies that took the conventions of a Hollywood crime thriller and turned them inside out. The editing of *Breathless* is perhaps its biggest legacy, as Godard's use of jarring jump cuts and rapid montage opened the door to a looser and more playful kind of moviemaking. When it was released, the film's unorthodox structure and irreverent style caused quite a stir and almost overnight changed the way a movie could be made. Everything from Arthur Penn's *Bonnie and Clyde* to today's omnipresent jittery MTV cutting style owe something to *Breathless*. But half a century of imitations haven't dulled its impact.

When you watch the film, notice how Godard shortens scenes by snipping out middle sections and how this affects the rhythm and tone of the scenes. The editing style not only gives an immediate, documentary feel but also emphasizes the mechanics of movie-making.