

Chapter 1

Introducing Digital Video

In This Chapter

- ▶ What is digital video?
 - ▶ How video editing works
 - ▶ Making your first digital movie
 - ▶ Sharing your movie
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It is often said that we live in the Digital Age. We call each other on digital cell phones, we take snap shots with digital cameras, we download digital music from online digital stores to our digital audio players, and when we make home movies, we make them using digital video.

Digital video first appeared over a decade ago. Sony and Panasonic released the first consumer-oriented digital video camcorders in 1995. Also in 1995, Apple introduced the high-speed FireWire interface. In theory, FireWire would allow camcorders to easily connect to computers, making it easy to store video on your computer and edit that video into professional-style movies. In practice, few computers back then could handle digital video.

If you buy a new camcorder today, chances are it's a digital camcorder. Likewise, so long as your computer isn't more than about four or five years old, you can probably use it to copy digital video from a camcorder, pick and choose scenes, add some special effects, and turn it into a real movie. This chapter introduces you to digital video and shows you how easy it is to edit and share your movies with others.

What Is Digital Video?

Human beings experience the world as an analog environment. When we take in the serene beauty of a rose garden, the mournful song of a cello, or the graceful motion of an eagle in flight, we are receiving a steady stream of infinitely variable data through our various senses. Of course, we don't think of all these things as "data" but rather as light, sound, smell, and touch.

Computers are pretty dumb compared to the human brain. They can't comprehend the analog data of the world; all computers understand are *yes* (one) and *no* (zero). In spite of this limitation, we force our computers to show pictures, play music, and display moving video; infinitely variable sounds, colors, and shapes must be converted into the language of computers — ones and zeros. This conversion process is called *digitizing*. Digital video — often abbreviated as *DV* — is video that has been digitized.

To fully understand the difference between analog data and digital data, suppose you want to draw the profile of a hill. An analog representation of the profile (shown in Figure 1-1) would follow the contour of the hill perfectly because analog values are infinitely variable. However, a digital contour of that same hill would not be able to follow every single detail of the hill because, as shown in Figure 1-2, digital values are made up of specifically defined, individual bits of data.



Figure 1-1:
Analog data
is infinitely
variable.

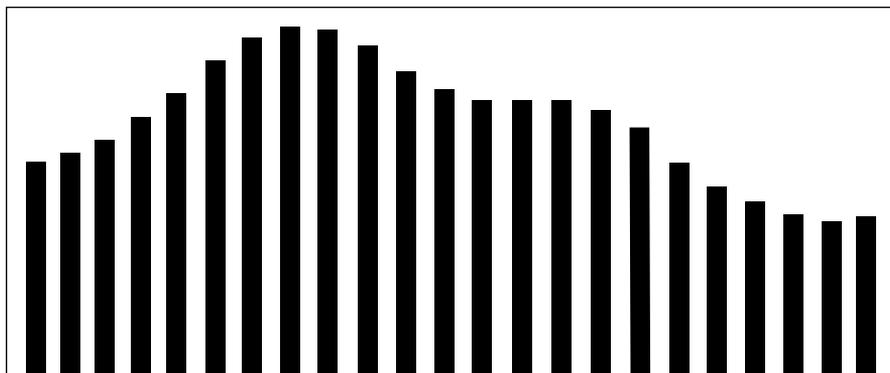


Figure 1-2:
Digital data
contains
specific
values.

Comparing analog and digital video

We're often led to believe that digital is better, but believe it or not, digital recordings are *theoretically* inferior to analog recordings. This is because analog recordings can *theoretically* contain more information. But the truth is, major advances in digital technology mean that this really doesn't matter. Yes, a digital recording must be made up of specific individual values, but modern recordings have so many discrete values packed so closely together that human eyes and ears can barely tell the difference. Casual observation often reveals that digital recordings actually seem to be of a higher quality than analog recordings. Why?

A major problem with analog recordings is that they are highly susceptible to deterioration. Every time analog data is copied, some of the original, infinitely variable data is lost. This phenomenon, called *generational loss*, can be observed in that dark, grainy copy of a copy of a copy of a wedding video that was first shot more than 10 years ago. However, digital data doesn't have this problem. A one is always a one, no matter how many times it is copied, and a zero is always a zero. Likewise, analog recordings are more susceptible to deterioration after every playback, which explains why your 1964-vintage *Meet the Beatles* LP pops, hisses, and has lost many of its highs and lows over the years. Digital recordings are based on instructions that tell the computer how to create the data; as long as the computer can read the instructions, it creates the data the same way every time.



Whether you are editing analog or digital material, always work from a copy of the master and keep the master safe. When adding analog material to your project, the fewer generations your recording is from the original, the better.

When you consider the implications of generational loss on video editing, you begin to see what a blessing digital video really is. You're constantly copying, editing, and recopying content as you edit your movie projects — and with digital video, you can edit to your heart's content, confident that the quality won't diminish with each new copy you make.

Warming up to FireWire

FireWire is one of the technologies that makes digital video so fun and easy to work with. FireWire — also sometimes called IEEE 1394 or i.LINK — was originally developed by Apple Computer and is actually an interface format for computer peripherals. Various peripherals including scanners, CD burners, external hard drives, and of course digital video cameras use FireWire technology. Key features of FireWire include

everything working.

- ✓ **Device control:** OK, this one isn't actually a feature of FireWire, it's just one of the things that makes using FireWire really neat. If your digital camcorder is connected to your computer's FireWire port, most video-editing programs can control the camcorder's playback features. This means you don't have to juggle your fingers and try to press Play on the camcorder and Record in the software at exactly the same time. Just click Capture in a program like Apple iMovie or Windows Movie Maker, and the software automatically starts and stops your camcorder as needed.
- ✓ **Hot-swap capability:** You can connect or disconnect FireWire components whenever you want. You don't need to shut down the computer, unplug power cables, or confer with your local public utility district before connecting or disconnecting a FireWire component.

Most new Macintosh computers come with FireWire ports. Many — but not all — Windows PCs have FireWire ports as well. If your PC does not have a FireWire port, you may be able to add one using an expansion card. (I cover upgrades and adjustments to your system in Chapter 2). Some camcorders use a USB 2.0 port instead of FireWire, but FireWire is easier to use and compatible with more editing programs. If you're buying a new PC for video editing, consider FireWire a must-have feature.

Most digital camcorders offer FireWire ports, although sometimes the port has a different name. Some manufacturers don't want to use Apple's trademarked FireWire name so they call the port "i.LINK," "IEEE-1394," or simply "DV." Whatever name is used, FireWire truly makes video editing easy and I strongly recommend that you buy a camcorder that includes a FireWire port. Chapter 3 provides more detail on choosing a great digital camcorder.



Some camcorders can transfer video using a USB (Universal Serial Bus) 2.0 port instead of FireWire. In fact, a few digital camcorders on the market offer only USB 2.0 connectivity, and not FireWire. The reason for this is that USB 2.0 ports are more common on modern Windows PCs than FireWire ports. Video transfer via USB 2.0 might work for you, but if possible I recommend FireWire instead. When it comes to working with digital video, FireWire is less likely to offer unexpected technical surprises than USB 2.0.

Editing Video

Until a few years ago, the only practical way for the average person to edit video was to connect two VCRs and use the Record and Pause buttons to cut out unwanted parts. This was a tedious and inefficient process. The up-to-date (and vastly improved) way to edit video is to use a computer — and the following sections introduce you to the video-editing techniques you're most likely to use. In this chapter, I show how to edit video using Apple iMovie and Windows Movie Maker, the free video-editing programs that come with the Macintosh OS or Microsoft Windows, respectively.

Editing a short video project

Editing video is really cool and easy to do if you have a reasonably modern computer. But why talk about editing when you can jump right into it? Here's the drill:

1. **Open Windows Movie Maker (Windows) or Apple iMovie (Macintosh).**

Comparing editing methods

Video (and audio, for that matter) is considered a linear medium because it comes at you in a linear stream through time. A still picture, on the other hand, just sits there — you take it in all at once — and a Web site lets you jump randomly from page to page. Because neither photos nor Web pages are perceived as linear streams, they're both examples of nonlinear media.

You tweak a linear medium (such as video) by using one of two basic methods — *linear* or *nonlinear* editing. If your approach to editing is linear, you must do all the editing work in chronological order, from the start of the movie to the finish. Here's an old-fashioned example: If you "edit" video by dubbing certain parts from a camcorder tape onto a VHS tape in your VCR, you have to do all your edits in one session, in chronological order. As you probably guessed,

linear editing is terribly inefficient. If you dub a program and then decide to perform an additional edit, subsequent video usually has to be redubbed. (Oh, the pain, the tedium!)

What is the alternative? Thinking outside the line: *nonlinear editing!* You can do nonlinear edits in any order; you don't have to start at the beginning and slog on through to the end every time. The magical gizmo that makes nonlinear editing possible is a combination of the personal computer and programs designed for nonlinear editing (NLE). Using such a program (for example, Apple iMovie or Windows Movie Maker), you can navigate to any scene in the movie, insert scenes, move them around, cut them out of the timeline altogether, and slice, dice, tweak and fine-tune to your heart's content.

2. **Connect your digital camcorder to your computer's FireWire port, and turn the camcorder on to Player or VTR mode.**

If you're not sure how to connect the camcorder, see Chapter 5, where I discuss video capture in greater detail.

3. **Choose File⇨Capture Video in Windows Movie Maker, or slide the Mode button to Camera in iMovie as shown in Figure 1-3.**

In Windows Movie Maker, you are asked to provide a name for your captured video. The name should be descriptive so that you'll be able to identify the file later. Movie Maker also asks you to choose a video quality setting. For now, just choose Digital Device Format (DV-AVI).

4. **Use the Play, Fast Forward, and Rewind buttons in the capture window to locate video you want to capture.**
5. **When you are ready to start capturing, click Import (iMovie) or Start Capture (Movie Maker).**



Figure 1-3:
Use the playback buttons to find some video you want to capture.

Mode button

Storyboard

Clip browser

6. Click **Import (iMovie)** again or **Stop Capture (Movie Maker)** to stop capturing video.
7. In **Windows Movie Maker**, click **Finish** to close the **Video Capture Wizard**. In **Apple iMovie**, slide the **Mode** button over to **Edit**.

You should now see a selection of video clips in the clip browser.

8. Click and drag a clip from the clip browser and drop it on the storyboard.
9. Click and drag a second clip from the clip browser and drop it on the storyboard just after the first clip.

Congratulations! You've just made your first movie edit. You should now have two clips on the storyboard, looking similar to Figure 1-4.



If your **Windows Movie Maker** window doesn't look quite like this, click the **Show Storyboard** button (if you see it onscreen).

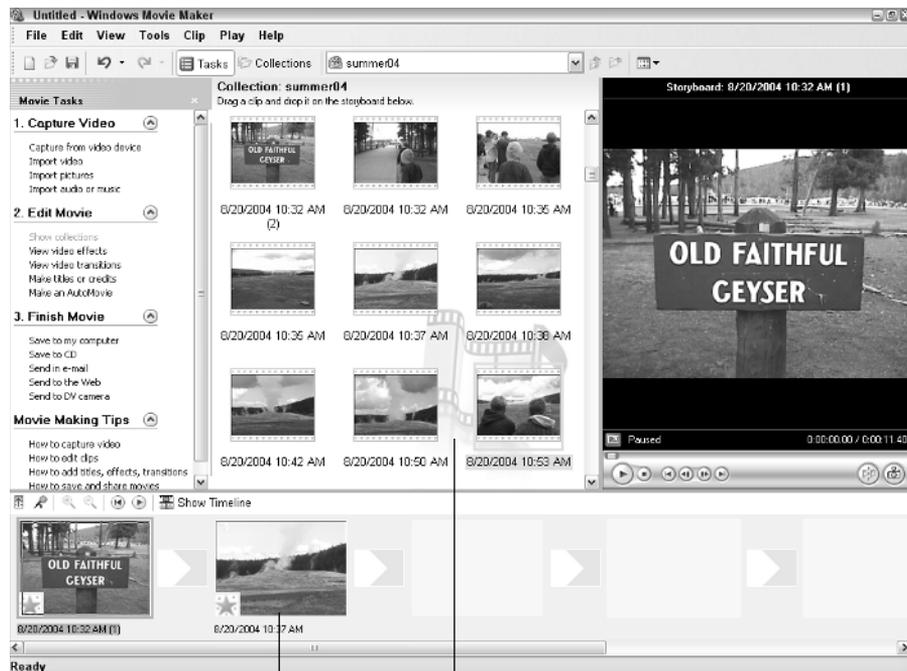


Figure 1-4:
Two clips
have been
placed
in the
storyboard.

Storyboard

Clip browser

After you've added a couple of scenes to your movie, you may decide that you want to insert a scene between them. With a nonlinear editing program like iMovie or Windows Movie Maker, this edit is easy. Just click and drag a clip and drop it right between two clips that are already in the storyboard. The software automatically shifts clips over to make room for the inserted clip, as shown in Figure 1-5. Almost as easy as shuffling cards, edits like these are the essence of nonlinear video editing.

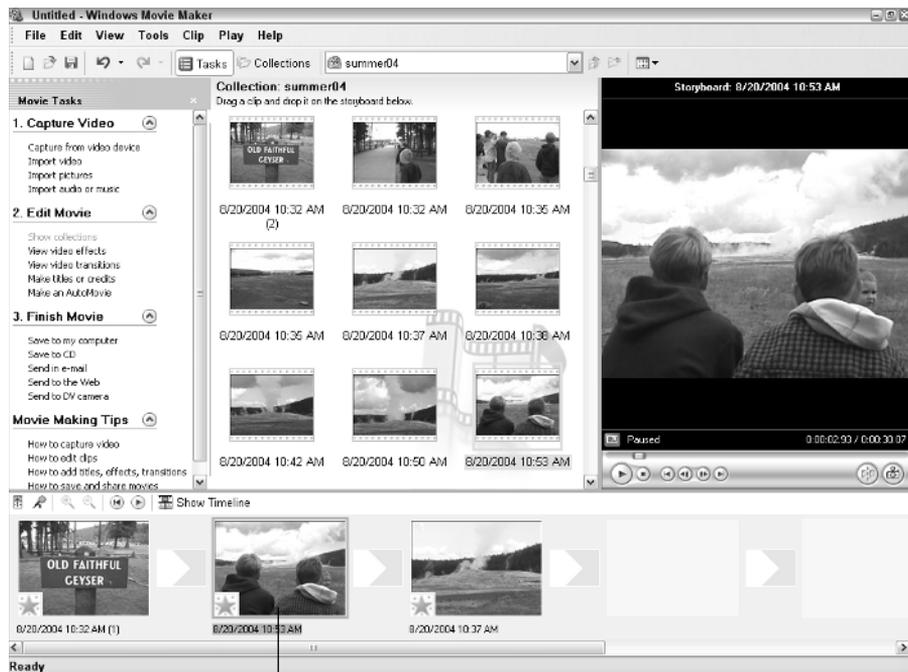


Figure 1-5:
A clip
has been
inserted in
the middle
of the
storyboard.

Inserted clip

Performing Hollywood magic at the click of a mouse

The previous section shows the basics of making a movie by assembling clips in a specific order — and frankly, most of your editing work will probably consist of simple tasks like that. But when you want to go beyond ordinary, you can really spice up your movies by adding special effects or transitions between clips. (Special effects are covered in Chapter 11, and I show you just about everything you'll ever need to know about transitions in Chapter 9.)

Of course, there's no need to wait until later. Modern video-editing programs make it really easy to add special creative touches to your movies.

Creating a transition

You can add a transition to the simple movie you put together in the previous section by following these steps:



- 1. Create a movie project with a couple of clips in the storyboard, as described in the previous section.**

You can follow these steps using any movie project that includes two or more clips.

- 2. Open the list of video transitions in your editing program.**

In Apple iMovie, click the Trans button just below the browser window. In Windows Movie Maker, click View Video Transitions in the Movie Tasks list on the left side of the screen, or choose Tools⇨Transitions.

- 3. Click and drag one of the Circle transitions to a spot between two clips on the storyboard.**

A transition indicator appears between the two clips, as shown in Figure 1-6.

- 4. Click Play in the preview window to preview the transition.**

If you are using iMovie, the transition may not appear immediately. If you see a tiny red progress bar under the transition, wait a few seconds for it to finish. When the progress bar is complete, you should be able to preview the transition.

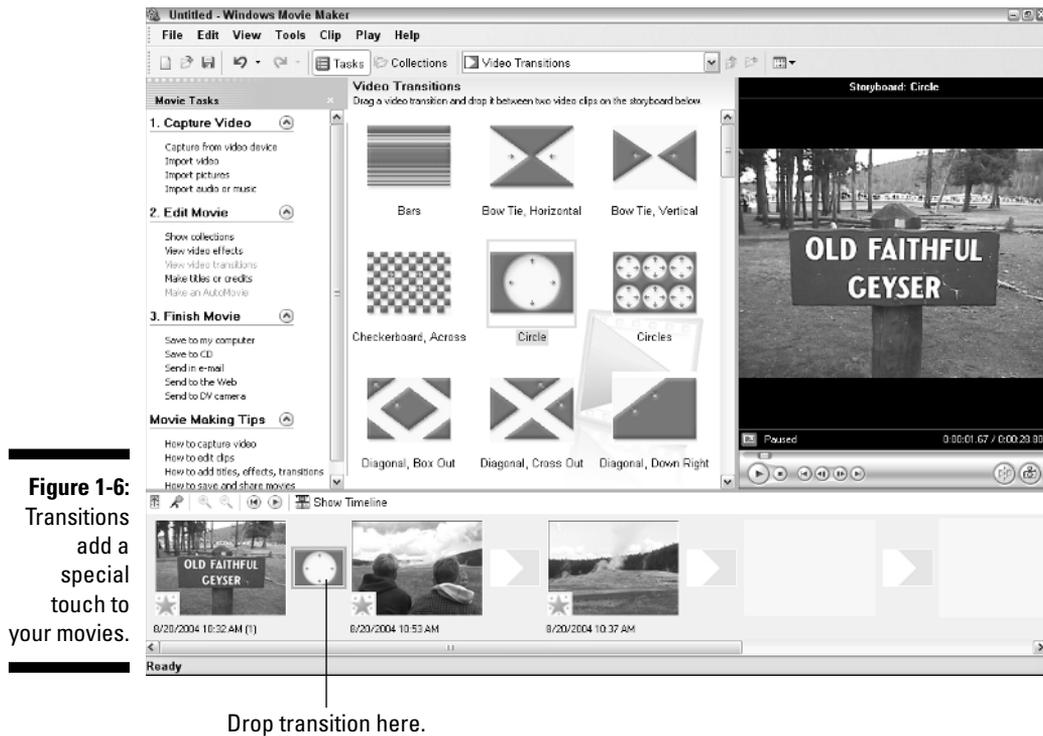


Figure 1-6: Transitions add a special touch to your movies.

Pretty cool, huh? But wait, that's not all!

Creating special effects

Adding special effects to your video is pretty easy too. Here's one that makes a video clip look like it came from a really old reel of film:

- 1. Click a clip in the storyboard to select it.**
- 2. Open the list of video effects in your video-editing program.**

In iMovie, click the Effects button under the browser window. In Windows Movie Maker, click View Video Effects in the Movie Tasks list, or choose Tools→Video Effects.

- 3. Click an Aged Film effect to select it.**

In iMovie, there is only one Aged Film effect. In Windows Movie Maker, scroll down in the list of effects and choose one of the Film Age effects. It doesn't matter if you choose Old, Older, or Oldest.

4. Apply the effect to the clip.

In iMovie, click Apply at the top of the effects window. In Windows Movie Maker, click and drag the effect onto the clip on the storyboard.

5. Click Play in the preview window to preview the effect as shown in Figure 1-7.

Again, if you're using iMovie, you will probably have to wait for the tiny red progress bar on the clip to finish before you can preview the effect.

These are just a couple of the cool things you can do with digital video. Part III of this book helps you explore the wonders of video editing in greater detail. So break out your director's chair and get ready to make some movie magic!



Figure 1-7:
Making video look like aged film is just one of many special video effects you can use.

Sharing Video

One of the best things about digital video is that it enables you to get really creative with your own movie projects. To make your work worthwhile, you may want to share your video work with others. Thankfully, sharing digital video is pretty easy too. Part IV of this book shows you all the details of sharing video on tape, DVD, or the Internet, but the following sections provide a handy, brief glimpse of what you can do.

Exporting a movie

Modern video-editing programs are designed to make it as easy as possible to share your movie projects — often with no more than a couple of mouse clicks. For now, I show you how to export a movie that is suitable for viewing over the Internet. The steps for exporting your movie are a little different depending on whether you are using Apple iMovie or Windows Movie Maker, so I'll address each program separately.

Exporting from Apple iMovie

Apple iMovie exports movies in QuickTime format, or you can export directly to your camcorder's videotape or Apple iDVD. To export your project in iMovie, follow these steps:

- 1. Open the project you want to export.**
- 2. Choose File→Export.**

The iMovie Export dialog box appears.
- 3. Choose how you want to export your movie from the Export menu.**

For now, I recommend that you choose To QuickTime (as shown in Figure 1-8).
- 4. Choose a Format, such as Web.**
- 5. Click Export.**
- 6. Give a name for your movie file in the Save As box.**

Make a note of the folder in which you are saving the movie. Choose a different folder if you wish.

If you remove the `.mov` filename extension, Windows users (you probably know a few) will have a hard time viewing your movie.

- 7. Click Save.**



Figure 1-8:
Choose
export
settings
in this
dialog box.



iMovie exports your movie. The export process may take a few minutes, depending on how long your movie is.

Exporting from Windows Movie Maker

Like iMovie, Windows Movie Maker also enables you to export video for a variety of applications. Windows Movie Maker is especially well suited to exporting movies for Internet playback. To export a movie for online viewing, follow these steps:

- 1. Open the project that you want to export.**
- 2. Choose File→Save Movie File.**

The Save Movie Wizard appears.
- 3. Choose an export format for your movie and then click Next.**

For now, I recommend choosing My Computer.
- 4. Enter a filename for your movie and choose a location in which to save the file.**
- 5. Click Next again.**

The Save Movie Wizard shows details about the file, including the file size (see Figure 1-9).
- 6. Click Next again.**

The export process begins.
- 7. When export is done, click Finish.**

Your movie will probably begin playing in Windows Media Player. Enjoy!

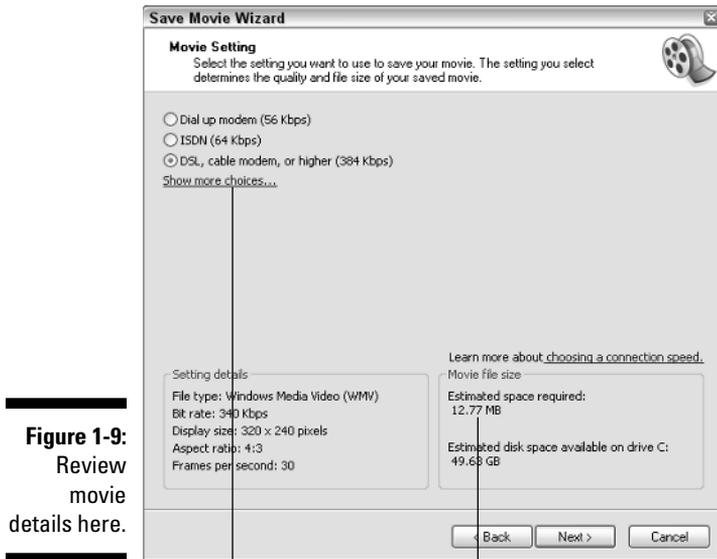


Figure 1-9:
Review
movie
details here.

Estimated file size

Click for more quality options.

Playing your movie

After your movie has been exported, playing it is pretty easy. Simply locate the file on your hard drive and double-click its name. The movie should automatically open and start to play, as shown in Figure 1-10.

If you exported your movie from Windows Movie Maker, the movie file will be in Windows Media (WMV) format. Despite the name, you don't have to be a Windows user to view Windows Media video. You do need Windows Media Player to view Windows Media files, but Microsoft does offer a version of Windows Media Player for Macintosh. Figure 1-10 shows a Windows Media version of the Chapter 1 movie, playing contentedly on my Mac.

Movies created on a Mac are also cross-platform-friendly. iMovie outputs videos in Apple QuickTime format, and Windows versions of QuickTime (shown in Figure 1-11) have been available for years. Chapter 14 tells you more about available video-player programs.

Figure 1-10:
Windows
Media
Media
movies can
be played
on a Mac...



Figure 1-11:
... and
QuickTime
files can be
played in
Windows.



After you have previewed your movie, you can either share it with others or edit it some more. I usually go through the preview and re-edit process dozens of times before I decide that a movie project is ready for release, but thanks to digital video, re-editing is no problem at all. Chapter 13 offers some tips for previewing your movies more effectively.

