Selected excerpts from

Exploring Digital Video
Second Edition

by Lisa Rysinger

Prepared expressly for the
31st Annual Trenton Computer Festival

Book available for purchase online @ www.amazon.com

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DIGITAL VIDEO

Second Edition

Viewer Slug

Canvas: Sequence 1 in Exploring Digital Video

| Video | Stereo (a1 a2) | Filters | Motion |

| Sequence 1 | Sequence 1 |

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A Definitive Guide to Digital Video Technology & Techniques Featuring Today's Best Pro Editing Applications

Lisa Rysinger

exploring

DIGITAL VIDEO

Second Edition

Lisa Rysinger

Written specifically for the digital video novice, this comprehensive new edition of *Exploring Digital Video* blends industry experience with practical and informative instruction to create a state-of-the-art introduction to digital video. DV expert Lisa Rysinger explores the fundamental concepts for those new to the field while featuring such popular DV editing programs as Adobe After Effects, Apple Final Cut Pro, and Adobe Premiere Pro. Coverage of these top editing programs for both the Mac and PC makes this the perfect all-in-one guide, bringing together the latest in software instruction and the best in digital video techniques.

Look inside for these outstanding features

- Serves as a valuable resource for both students and consumers who have a serious interest in digital video and want a solid overview of the technology and the field.
- Offers practical and useful information—such as how to configure a digital video editing station and how to evaluate cameras—while examining fundamental techniques like creating transitions, motions, and effects.
- Includes a full-color insert showcasing digital video in action, with stills from Lucasfilm's *Star Wars: Episode II Attack of the Clones* and in-depth interviews with the ILM professionals behind the movie's digital magic.
- Provides an extensive glossary of DV terminology, a troubleshooting guide for common problems, a product guide listing DV hardware and software, and a resource guide with contact information for groups, organizations, Web sites, and training.
- Includes a back-of-book DVD featuring a behind-the-scenes documentary with the Emmy award-winning Philadelphia Eagles Television network *plus* software trials, tutorials, product information, special offers, and more.

About the Author

Lisa Rysinger is the owner of VIDE Productions, a digital video company that produces everything from corporate training videos and television commercials to multimedia and DVDs. Lisa is also the author of *Exploring DV Software on the Mac* and *Exploring DVD Authoring.*

Also Available from Thomson Delmar Learning

- *Exploring Visual Effects*/Woody/Order # 1-4018-7987-X
- *Exploring Sound Design for Interactive Media*/Cancellaro/Order #1-4018-8102-5
- *Exploring Digital Software on the Mac*/Rysinger/Order # 1-4018-7791-5
- *Exploring DVD Authoring*/Rysinger/Order # 1-4018-8020-7

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TEXTBOOK ORGANIZATION

Exploring Digital Video explores the fundamental concepts of DV technology and illustrates how industry professionals use this technology today in the field today. This second edition features popular professional editing programs for both the Macintosh and the PC, like Adobe After Effects, Apple's Final Cut Pro, and Adobe Premiere Pro, in addition to demonstrating must-know editing techniques like adding transitions, applying motion, using layers, and creating effects.

Chapter 1—Understanding Digital Video Technology

Chapter 1 provides a solid overview of digital video technology. It briefly discusses its history and evolution, as well as how it is currently used in the field today. It also delves into the fundamentals of traditional video, which must first be understood before digital video can be fully grasped. Chapter 1 explains the necessary terms, concepts, principles, and conventions governing digital video technology.

Chapter 2—Digital Video Cameras and Tape Formats

Chapter 2 will clearly explain the current videotape formats for both analog and digital video in the consumer, prosumer, and professional arenas. It will also explain the parts and functions of the digital video camera. This chapter will help readers understand and evaluate which type of digital video equipment is required to create digital video at any level.

Chapter 3—Configuring a Digital Video Computer Editing System

Chapter 3 will explain how to configure a digital video computer editing system. It will examine all of the relevant computer technology required to edit digital video at any level—consumer, prosumer, or professional. It will also discuss how to research an editing system, as well as address various budget considerations.

### Chapter 4—Digital Video Preproduction

Chapter 4 will discuss the various stages of preproduction. It will examine the different styles of script writing for video, television, and film. It will also talk about how to create storyboards and production schedules. The importance of obtaining legal permission in writing to shoot video will also be emphasized.

Chapter 5—Digital Video Production

Chapter 5 will discuss the fundamental techniques of video production. Working with the video camera, framing shots, and basic lighting and basic audio will be covered. Shooting for bluescreen and greenscreen will also be addressed.

Chapter 6—Preparing Photographs for Digital Video

Chapter 6 will explain how to properly incorporate photographs into digital video without distorting them. Acquiring photographs and cropping them while maintaining image quality and resolution will be examined step by step in Adobe Photoshop. Panning photographs in Adobe After Effects, Apple's Final Cut Pro, and Adobe Premiere Pro will also be demonstrated.
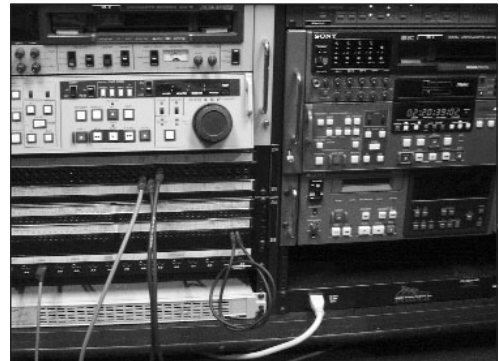
Chapter 7—Incorporating Titles, Graphics, and Audio

Chapter 7 will discuss how to prepare titles, graphics, alpha channels, audio, and music for digital video. Digital video rarely consists of video alone, and this chapter will examine how to successfully incorporate these additional elements into a digital video production.

Chapter 8—Connecting Equipment and Capturing Digital Video

Chapter 8 will discuss how to connect equipment and capture digital video. It will examine how to properly cable and connect digital video cameras, video decks, and monitors to a computer editing station. It will also address the steps to capture digital video and audio in Apple's Final Cut Pro and Adobe Premiere Pro.

Chapter 9—Editing Digital Video

Chapter 9 will demonstrate basic editing techniques, like adding transitions, applying motion, using layers, and creating effects, using Adobe After Effects, Apple's Final Cut Pro, and Adobe Premiere Pro. Important concepts like understanding the project file, importing media files, using the timeline, and working with keyframes will also be addressed.

Chapter 10—Rendering and Outputting Digital Video

Chapter 10 will examine how to render a digital video project in Adobe After Effects, Apple's Final Cut Pro, and Adobe Premiere Pro. Chapter 10 will also explain how to output digital video to tape. Standards for CDs, DVDs, and video for the Internet will also be addressed.

Appendix A—Digital Video Resource Guide

This appendix will be a valuable resource, providing information about digital video-related books, magazines, Web sites, mailing lists, groups and organizations, hardware and software developers, educational classes, seminars, and workshops.

Appendix B—Digital Video Troubleshooting Guide

This appendix will address common problems that occur in digital video and how to solve them.

Appendix C—Digital Video Product Guide

This appendix will help readers evaluate digital video hardware and software at the consumer, prosumer, and professional levels.

Appendix D—ILM's Fred Meyers

See excerpts from an exclusive interview with digital cinema expert and HD supervisor Fred Meyers of Industrial Light & Magic.

Appendix E—ILM's Ben Snow

See excerpts from an exclusive interview with Academy Award-nominated visual effects supervisor Ben Snow of Industrial Light & Magic.

Glossary

The comprehensive glossary includes traditional video, computer, and digital video terms.

Index

An in-depth index provides fast access to information.

Color Insert

A special color insert features *Star Wars*: Episode II *Attack of the Clones*. Learn how the *Star Wars* saga has impacted the field of digital video. Go behind the scenes with exclusive interviews of top Industrial Light & Magic personnel.

Back of Book DVD

A DVD includes digital video tutorials, software, vendor and product information, and much more, including a unique behind-the-scenes look at how the Philadelphia Eagles football franchise is using state-of-the-art digital video technology.

FEATURES

The following list provides some of the salient features of the text:

- Profiles of successful digital video professionals offer important industry advice and inspiration.
- Articles by leading professionals in the field give valuable insight into the creative process.
- Objectives clearly state the learning goals of each chapter.
- Photographs and illustrations supplement the text throughout.
- Review questions reinforce the material presented in each chapter.
- A resource guide provides contact information for groups, organizations, Web sites, training, and more.
- A troubleshooting guide addresses common digital video problems.
- A product guide features current digital video hardware and software.
- A glossary clearly defines both computer and video terminology.
- A reader-friendly index provides quick information.
- A color insert showcases how *Star Wars*: Episode II *Attack of the Clones* used cutting-edge digital video technology to create its special effects.
- A DVD includes software, tutorials, product information, and more, including a behind-the-scenes look at how the Philadelphia Eagles use digital video.

from **CHAPTER 1**

Understanding Digital Video Technology

There are three primary factors that determine file size in digital video: resolution, frame rate, and color depth. **Resolution** is the size of the video frame, which is measured in pixels. Frame rate is the amount of frames that are displayed in one second of video, which is measured in frames per second. Finally, **color depth** is the number of colors represented in a video image, which is measured in bits.

To edit digital video, you have to understand how to manipulate these factors to control file size. If you were creating digital video for the Internet, you would need to work with very small file sizes. If you were creating digital video content for CD-ROMs, file sizes would be moderate. Likewise, if you were creating digital video for broadcast television, your file sizes would be much larger.

The size of a digital video file directly corresponds with how long it takes to render and move that file. The larger the file, the longer it takes to render and move; the smaller the file, the less time it takes to render and move.

It would be counterproductive to work with digital video files large enough for broadcast television, if you only needed to create digital video for the Internet. There are typical standards used to create digital video for broadcast, multimedia, and the Internet.

FACTORS DETERMINING FILE SIZE IN DV

1. Resolution (pixels)
2. Frame Rate (fps)
3. Color Depth (bits)

table | 1-2

NOTE

A **render** is the process a computer takes to carry out a particular set of instructions. The term render is commonly used in digital video and 3D animation because significant amounts of time are required to complete regular tasks in both fields.

BROADCAST

There are several resolutions used today for broadcast digital video. The resolution for video that was originally shot on an analog video camera is 640 x 480 pixels. The resolution for video that was originally shot on a digital video camera is 720 x 480 pixels. Both resolutions are also referred to as **full-screen video**.

BROADCAST

1. 720 x 480 pixels
2. 30 (29.97) fps
3. 32-bit color

table | 1-3

Furthermore, HDTV can be either one of two resolutions: 1280 x 720 pixels (progressive) or 1920 x 1080 pixels (interlaced). Video is 72 **dpi**, or **dots per inch**, be it for broadcast, multimedia, or the Internet. Images created for the print media are typically a much higher DPI than those created for video.

The frame rate for broadcast digital video is 30 (29.97) frames per second. This is also referred to as **full-motion video**. Video for broadcast television must have a color depth of 32 bits. Waveform monitors and vectorscopes are professional test equipment used to measure the quality of video signals. If you were creating a commercial for television, this equipment would be used to test the video signal before it was broadcast.

Full-screen, full-motion video that is not intended for broadcast is typically 24-bit color. This is often the standard for industrial or prosumer digital video.

Audio is also relevant to the size of a digital video file; however, it is much smaller in comparison to the video portion. Nevertheless, it becomes an issue when smaller file sizes are imperative. Typically, broadcast quality audio is either 48 kHz (digital) or 44 kHz (analog), 16-bit stereo.

MULTIMEDIA

The conventional standards for multimedia are more flexible than they are for broadcast. It often depends upon the configuration of the computer that will be playing the digital video. Computers with faster processors, faster CD-ROM drives, and a lot of RAM will play larger digital video files more smoothly than slower systems. Typically, digital video to be played on a computer is often quarter screen video. The resolution is usually either 320 x 240 pixels (analog) or 360 x 240 pixels (digital). Again, the dots per inch will be 72 because the computer monitor, like the television set, is only capable of displaying 72 dpi.

table 1-4

MULTIMEDIA

1. 360 x 240 pixels
2. 15 fps
3. 16-bit color

The frame rate for multimedia is often 15 frames per second. However, this is one of the factors that may be increased to 30 frames per second if the computer system that is playing the digital video is fast enough. It is less taxing to increase the frame rate to full motion than it is to increase the resolution to full screen. Color

depth for multimedia is usually 16 bits, but it can sometimes be increased to 24 bits. Color depth can be adjusted by using the quality slider when compressing digital video. Multimedia audio can be 48 kHz or 32 kHz (digital), or 44 kHz or 22 kHz (analog), 16-bit stereo.

INTERNET

Because many people still connect to the Internet via phone lines, using large digital video files on the Internet is not a viable option. There are two basic methods for transmitting video over the Internet: downloadable video and streaming video.

With **downloadable video**, the user receives a copy of the entire digital video movie on his or her computer. Files are larger and this option takes longer to download, but one advantage is that the user has a copy of the digital video movie. The movie file remains on the user's computer until he or she deletes it. Some downloadable video can be configured to start playing while the actual download is still taking place. This is called a **fast-start** or a **progressive download**.

A second alternative is to stream the video over the Internet. **Streaming video** temporarily loads the video into the user's computer frame by frame while it plays. Files are smaller and this option is faster, but the digital video file is not actually downloaded onto the user's hard drive and cannot be saved and played back. The quality of streaming video is usually lower than downloadable video.

INTERNET	table 1-5
1. 180 x 120 pixels	
2. 10 fps	
3. 8-bit color	

Typical video resolutions for the Internet are varied. They can be as small as 160 x 120 pixels (analog) or 180 x 120 pixels (digital). Often, larger resolutions are made available to users with high-speed Internet connections. These sizes can be 400 x 300 pixels, 360 x 240, or other dimensions, as long as the original aspect ratio of the video is preferred. Frame rate is seldom more than 10 frames per second. Color depth is usually 8-bit color. Audio for the Internet is as low as 11 kHz, 8-bit mono, but can also be 22 kHz (analog) or 32 kHz (digital), 16-bit stereo or higher if audio quality is a priority.

from **CHAPTER 2**

Digital Video Cameras and Tape Formats

Zooms

Most digital video cameras come with a zoom lens. As its name suggests, a zoom lens will allow you to move closer to a subject or magnify an area. A 24x zoom will make the subject appear 24 times closer than it actually is in reality. The better the zoom capability, the more expensive the lens. There are two types of zooms: optical zooms and digital zooms. An **optical zoom** is the built-in capability of the lens to magnify, which is determined by the construction of the lens itself. A **digital zoom** is a computer representation of what the image would look like as it is magnified. Digital zooms can dramatically extend a zoom capability of the lens, but the resolution is not as high quality as that of the optical zoom.
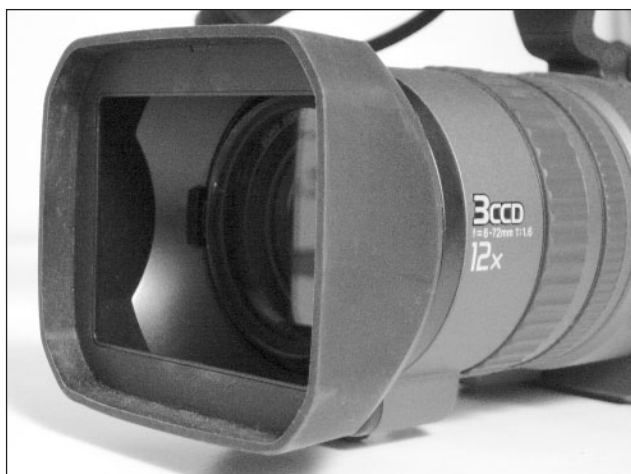
figure | 2-12 |

This zoom lens combines normal, wide-angle, and telephoto capabilities into a single lens.

Exposure Modes

Digital camcorders have automatic exposure modes that are optimized for everything from low light situations to capturing quick actions like those in sports. Exposure regulates the light's intensity over time. Check to see if the camera will allow you to override the automatic settings and adjust your exposure manually.

Exposure is controlled by two factors, aperture and shutter speed. The **aperture** controls the amount of light that is let in by adjusting an opening called the **iris**, which changes sizes to let in more or less light. These sizes are measured in increments known as **f-stops**. The **shutter speed** of the camera controls the rate of exposure of the light. The speed of the shutter is measured in fractions of a second and typically ranges anywhere from 1/4 of a second to 1/10,000 of a second.

Lighting

There are other features of the video camera besides exposure that relate to light. All light has color, which is called **color temperature**. Daylight is a different color from artificial light. Color temperature is measured in degrees Kelvin (K). Daylight is 5,600 K, while artificial tungsten light is 3,200 K.

White Balance

The video camera can adjust to the differences in color temperature by resetting its **white balance**. Most cameras will adjust white balance automatically, but higher-end models will allow you to manually control the white balance.

ND Filter

Another feature that is directly related to lighting is the **neutral density**, or **ND**, **filter**. The ND filter decreases the amount of light to reproduce an image without altering the image's color. ND filters are useful to control overexposure when shooting video outside on a bright, sunny day.

Lux

Lux

The intensity or brightness of light is measured in **lux**. One lux is the amount of light that falls on a surface area of one square meter when a candle is placed one meter away. Video cameras are rated in lux to identify their ability to shoot in low light conditions. A camera rated to shoot at one lux requires less light to produce an image than a camera rated to shoot at three lux.

table **2-5**

This color temperature chart depicts typical light sources and their temperature measurements.

COLOR TEMPERATURE

Typical Light Sources (Measured in degrees Klevin)	
Candle	1200-1500 K
Light Bulb	2500-3000 K
Studio Lights	3200 K
Sunset	3000-4500 K
Sunlight (Noon)	5400-6500 K
HMI Lights	5600 K
Blue Sky	10,000-15,000 K

figure **2-13**

This camera has built-in neutral density (ND) filter capability.

from **CHAPTER 3**

Configuring a Digital Video Computer Editing System

FIREWIRE AND VIDEO CARDS

Either FireWire or a video card is required to capture video and output it to tape again.

FireWire (IEEE 1394)

FireWire is Apple Computer's trade name for the interface IEEE 1394. It is an international standard that allows high-speed connections and transfer rates between a computer and peripherals.

FireWire can be used to connect a digital video camera to a computer. Most major electronics manufacturers have adopted FireWire technology. Sony has its own version called i.LINK, which adheres to the IEEE 1394 standard.

FireWire has revolutionized the digital video industry by allowing digital video cameras to communicate directly with the computer. Digital video hobbyists can purchase a FireWire card for their PCs. FireWire comes built-in on all Macintosh computers, so there is no need to purchase an additional card.

Video Cards

However, the creation of FireWire did not lead to the extinction of the traditional video card, which translated the analog video signal into digital form, rather it led to its evolution. There is a new generation of video cards that do more than just convert the analog signal into a

figure | 3-8 |

Matrox makes video cards that work with popular digital video editing programs for both PC and Macintosh computers.
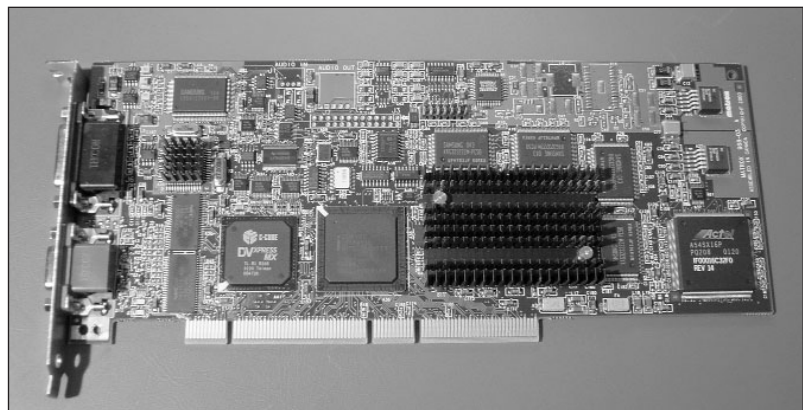
digital one. These new video cards, with both analog and digital video support, offer multiple layers of **real-time** video editing. This means that special effects created in popular video editing software programs, such as basic transitions, motion, and transparency, no longer have to be rendered before they can be viewed.

Many of these video cards also support a second computer monitor and an NTSC video monitor for previewing and playing the video. Without a video card, a FireWire camera must be attached while editing in order to view the video in its actual resolution. Many professional digital video editors will purchase one of these new video cards because the added features will save time and money. The next generation of video cards can range in price from $600 to thousands of dollars. Manufacturers of popular video cards include Avid, Pinnacle Systems, Media 100, and Matrox.

CODECs

Whether you are using FireWire or one of the newer generations of video cards, the digital video files are compressed using a CODEC.

A **CODEC** is a mathematical algorithm used to decrease the file size of a video image. Because digital video files are so large, they need to be compressed to make them more manageable.

Typically, a high-quality, five-minute digital video clip, compressed using the **DV-NTSC** (used by FireWire) CODEC, will occupy over a gigabyte of hard drive space. There are many different types of CODECs; *MPEG* and *Cinepak* are two popular ones. Cinepak is often used for CD-ROMs, while MPEG is used for DVDs. Most CODECs are software-based, meaning they don't require any additional hardware to be viewed.

However, certain video cards require hardware CODECs as well. If you are purchasing a video card, check to see if it requires a hardware CODEC, or if it also has a software CODEC available. If it does not, you will not be able to view digital video files recorded with that model video card's CODEC on any other computer that doesn't have that model video card installed. If the video card has a software CODEC, you can move the digital video files to any computer and view them by installing the software CODEC into the operating system.

| **NOTE** |

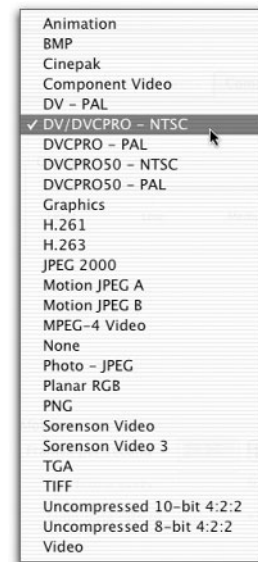CODEC is short for Compression/Decompression.

| figure | 3-9 |

In Adobe Premiere, there are various software CODECs from which to choose using QuickTime.

from **CHAPTER 5**

Digital Video Production

Cables

Maintaining the quality of the video signal is dependent upon the type of cables you use. High-quality cables are more expensive for a reason. They can be shielded to maintain the integrity of the video signal by reducing the amount of interference. Also, gold-plated connectors provide better conductivity, but do add to the cost. Predominantly, the type of cable and connection itself dictates the quality of the video signal.

Professional cables used to transmit the component video signal usually have **BNC connectors**. A separate cable is used for the color red, the color blue, the color green, and the luminance portion of the video signal.

figure | 5-16 |

This shielded, broadcast-quality cable has BNC connectors.

The S-video cable separates the chrominance and luminance portions of the video signal. It is better quality than composite, but not as good as component.

figure | 5-17 |

The S-video cable separates the luminance and chrominance portions of the video signal.

The composite audio video cable typically comes with three interconnected cables using standard **RCA connectors**. The yellow cable is used for video. The red and white cables are used for stereo audio. Sometimes the audio cables are colored red and black. A mono audio video cable only has two cables: yellow for video and white for audio. Typically, if a particular device only has mono audio and you have a stereo audio cable, only the white cable is used.

A four-to-six-pin FireWire cable is usually used to connect a digital video camera or deck to a computer. The four-pin end connects to the camera or deck and the six-pin end connects to the computer.

figure |5-18|

This consumer video cable has gold-plated connectors for improved conductivity.

figure |5-19|

This four-to-six-pin FireWire cable is used to connect a digital video camera to a computer.

Other cables you may encounter when doing digital video are stereo mini audio cables. The **stereo mini** jack is the typical jack used for plugging headsets into portable CD players. Stereo mini jacks are used to import and export built-in audio on Macintosh computers. You may also see an audio cable that has two RCA jacks on one end and a stereo mini jack on the other. You can even purchase audio splitters. A standard **Y splitter** takes a mono audio signal and distributes it to both stereo channels. Adapters can also be used to convert cables. You can purchase adapters to go from RCA to BNC, from RCA to stereo mini, and others.

Cases

Safely transporting your expensive video equipment is an issue. You can purchase hard or soft cases for video cameras, lights, tripods, and other production equipment. Obviously, hard cases provide better protection, and are therefore more expensive. Hard cases can be made out of either plastic or metal. Many come with foam linings. In some cases, the foam can even be

from CHAPTER 7

Incorporating Titles, Graphics, and Audio

TITLES

Titles are popular elements to add to your digital video project. **Titles** are simply text files made up of a single word, multiple words, or phrases, and are used to provide supplementary information such as names and dates. They are also used to reinforce important concepts or to clarify unusual terminology. **Credits**, on the other hand, are a list of names attributing who worked on a project and what their roles were.

Some video editing software programs include a built-in feature for creating titles; others offer additional titling capabilities as third-party plug-ins. Titles can also be generated in image design programs like Adobe Photoshop and Adobe Illustrator and later imported into the video editing program.

Action and Title Safe Areas

No matter where you create your title, there are some conventions it should adhere to. First of all, like photographs, titles prepared for full-motion digital video need to be 720 x 480 pixels at 72 dpi. However, never extend your type completely to the edges of the title window, or you'll run the risk of having letters cut off. On the computer, you see the entire video window, including the border. However, televisions and other video equipment were designed to overscan the video image deliberately so any imperfections around the edges would not be seen.

To compensate for the overscanning, action and title safe areas were designated for the NTSC video frame. These safe areas are marked by a set of two lines forming a rectangle within a rectangle inside the video frame. The outermost line is called the **action safe area**, and any video image within the action safe area will be displayed in its entirety. The innermost line is called the **title safe area**. A separate line was created just for titles because they run a higher risk of becoming distorted if they get too close to the edges of the video frame.

Most video editing software programs that include titling capability designate the action and title safe areas. However, if you are creating titles in another software program that does not provide these boundaries, be sure to import the title into a video editing program to verify that the title adheres to the safe areas designated by the NTSC video frame.

figure | 7-1 |

LiveType is an animated titling application bundled with Apple's Final Cut Pro.

figure 7-2

The composition window in Adobe After Effects can be configured to show the action and title safe areas.

Broadcast Colors

In addition to the differences between the techniques the computer monitor and the television use to display video frames, there is also a difference in the way they display color. The computer monitor has a much greater color depth, or the ability to display more colors, than a television set. Therefore, the color you see on a computer monitor may not be the same color you see on the television. Certain colors are outside of the gamut, or range, of colors that video can accurately reproduce.

Video editing software programs have built-in warnings that inform you when you are selecting a color that is not safe for broadcast. Even some image editing software programs, like Adobe Photoshop, have a special filter that makes certain all the colors are broadcast safe. Most people who edit digital video professionally use an NTSC video monitor to preview their work; this monitor also assists them in selecting colors.
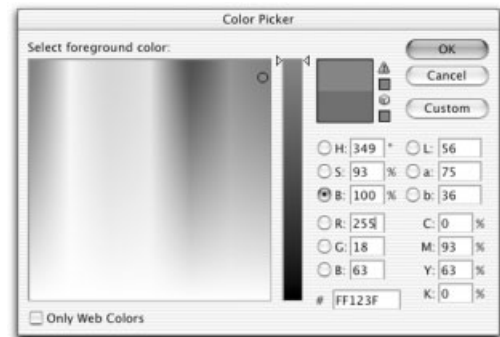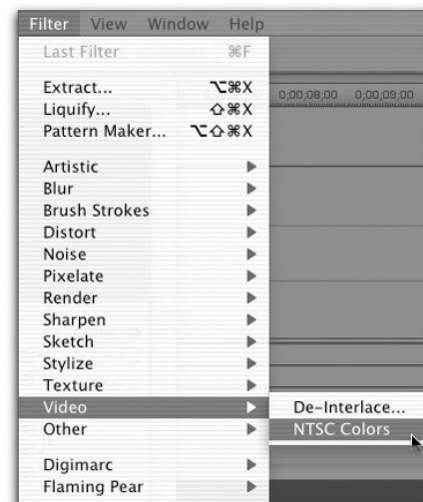

figure 7-3

The Color Picker in Adobe Photoshop will warn you with an exclamation point if you select a color that is out of gamut.

figure 7-4

You can use a filter in Adobe Photoshop to make certain your colors are safe for video.

Stylistic Concerns

Since you are now aware that video has a problem producing certain colors, you should also know that thin lines are difficult for video to display. Thin lines tend to flicker when they are reproduced on video and should be avoided. Likewise, **serif** fonts, which have thin lines on the points of the letters, can also be a problem. **Sans-serif** fonts do not have these thin lines around the edges of the letters, so they reproduce better.

figure | 7-5 |

Sans-serif fonts like Arial Black should be used in titles for digital video.

Serif Font: Times
(Not ideal for video.)

Sans-serif Font: Arial Black
(Ideal for video.)

Once you have chosen the right font and selected the right color, you want to be certain that the title can be read clearly. Titles are often combined with other video images. To make titles stand out from potentially interfering backgrounds, drop shadows, outlines, shapes, and gradients are often applied.

figure | 7-6 |

Color is one way to set apart a title from its background. In this black-and-white photograph, the title has a similar luminance value, making it difficult to see against this busy background.

In addition to selecting a distinguishable color, you can separate a title from its background by adding a drop shadow and/or outline color.

Another technique used to set a title apart from its background is to add a gradient. Solid colored shapes such as rectangles are also used, or a combination of both gradients and shapes, using one or more colors.

from **CHAPTER 8**

Connecting Equipment and Capturing Digital Video

VIDEO CAPTURE USING FIREWIRE

To capture video using FireWire, you need a computer with either built-in FireWire or a FireWire PCI card, and a digital video camera. You will also need a four-to-six-pin FireWire cable. The four-pin connector attaches to the digital video camera and the six-pin connector attaches to the FireWire port in the computer. Six-to-six-pin FireWire cables are used to attach devices like FireWire hard drives to the computer. One of the more reasonably priced places to purchase a four-to-six-pin FireWire cable is through a computer store. You can also purchase them at most places that sell video equipment.

figure 8-1

Using a FireWire cable, this Sony DCR-VX2000 digital video camera is linked to a Macintosh computer.
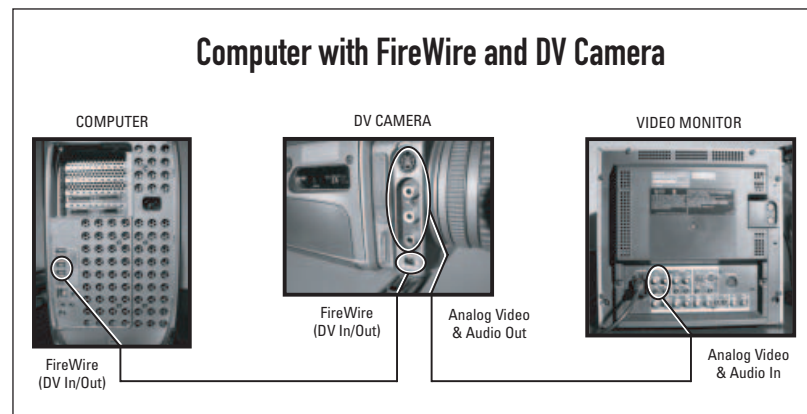
NOTE

Most digital video cameras do NOT come with a FireWire cable, but rather come with a USB cable. You usually need to purchase the four-to-six-pin FireWire cable separately. The USB cable is used for digital still photographs, not full-motion video. Be careful not to mistake the USB port for the FireWire port!

Attaching a Digital Video Camera

One of the easiest ways to get video into a computer is to attach a digital video camera directly to the FireWire port.

figure 8-2

This diagram depicts the typical connections for linking a computer with FireWire to a digital video camera.

Computer with FireWire and DV Camera

COMPUTER

DV CAMERA

VIDEO MONITOR

FireWire (DV In/Out)

FireWire (DV In/Out)

Analog Video & Audio Out

Analog Video & Audio In

To attach a digital video camera to the FireWire port of your computer, do the following:

1. Identify the FireWire port on the back of your computer. This could be a built-in port on the Mac, or the port on a PCI card on the PC. It is typically a six-pin connector.

2. Identify the FireWire port on your digital video camera. This is typically a four-pin connector. It may say DV In/Out. Be sure you do not mistake a USB port for the FireWire port. (Sony calls this connection i.LINK.)

3. Connect the four-to-six-pin FireWire cable from the digital video camera (four-pin) to the FireWire port of the computer (six-pin). FireWire is **hot swappable**, which means that the devices (computer, video camera, etc.) can be turned on and off while the cables are plugged in and the power is on.

4. Turn your devices on, if they are not on already. Put the digital video camera in VTR or VCR mode. Make sure there is a tape with footage on it in the camera.

5. Launch your video editing software program and any third-party device control software. Adobe Premiere versions 6 and higher have device control software built in. Companies like Pipeline Digital sell third-party device control software.

6. If you are using a video monitor, attach the *analog video out* of your camera to the monitor's *analog video in*. Make sure the monitor is plugged in and turned on.

7. Make sure the computer recognizes the video camera and the tape's timecode before continuing. Then proceed with the video capture instructions specified later in this chapter.

Attaching a Video Deck

You can also use a digital video deck instead of a digital video camera to capture video to and export video from your computer. Just connect the FireWire cable from your digital video deck (four-pin) to the FireWire port on your computer (six-pin). Many digital video decks also have additional interfaces for connecting equipment, such as the RS-422 protocol.

figure | 8-3 |

The FireWire port (DV In/Out) uses the IEEE 1394 standard.

| NOTE |

If the computer does not recognize the video camera, play the tape manually and relaunch the software. If a connection between the digital video camera and the computer is still not established, see the DV Troubleshooting Guide at the back of this book for more information.

| NOTE |

High-end digital video cameras, decks, and video cards are equipped with **SDI, serial digital interface**. This connection provides lossless quality and is superior to standard DV In/Out (FireWire, IEEE 1394).

from **CHAPTER 10**

Rendering and Outputting Digital Video

RENDERING DIGITAL VIDEO

There are many settings to take into consideration when rendering. Before you make any choices, you must determine how the video will be viewed. For example, digital video that will be displayed over the Internet will be treated differently from digital video that will be exported to tape using FireWire (IEEE 1394).

This chapter will explore how to export video in Adobe After Effects, Apple's Final Cut Pro, and Adobe Premiere Pro; other digital video programs have similar options. The primary focus will be on customizing the render settings for FireWire video; however, standards for CDs, DVDs, and the Internet will also be discussed.

| TIP |

In addition to saving your project before you render, you should also update your backup project file.

Saving the Project

Once you have determined how your digital video will be displayed, you can begin making preparations to render. The first thing you should do is save your project file. This is an important step that needs to be emphasized. If an unforeseen event should happen during the rendering process, such as a computer crash or a power outage, you don't want to run the risk of losing any last minute editing changes. After you have saved your project and made any last minute preparations, you can begin exporting your movie.

Designating a Hard Drive

Before you go any further, take this opportunity to name your movie file and decide where it will be saved. (However, DO NOT CLICK SAVE at this time! You will want to adjust your settings first.) You may want to consider putting the word "movie" in the file name so you can easily tell it apart from your other video clips. Also, be sure to designate the appropriate file extension. For QuickTime movies the extension is .mov. For AVI movies, the extension is .avi.

It is very important to render your movie to a hard drive with adequate file space. You don't want to run out of space in the middle of a render. Keep in mind that full-screen, full-motion digital video files are big! Depending upon which type of video CODEC you use, the quality of the source footage, and the quality setting of the render, sizes can fluctuate. Uncompressed video files can take up a significant amount of hard drive space.

Adobe After Effects

figure | 10-1 |

To export a project in Adobe After Effects, select File | Export | QuickTime Movie from the menu bar.

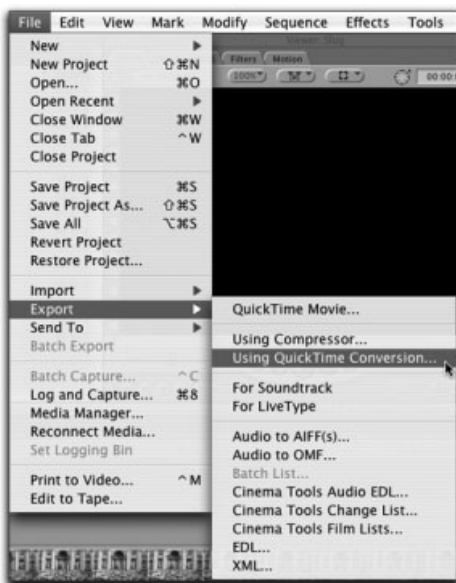## Apple's Final Cut Pro

figure | 10-2 |

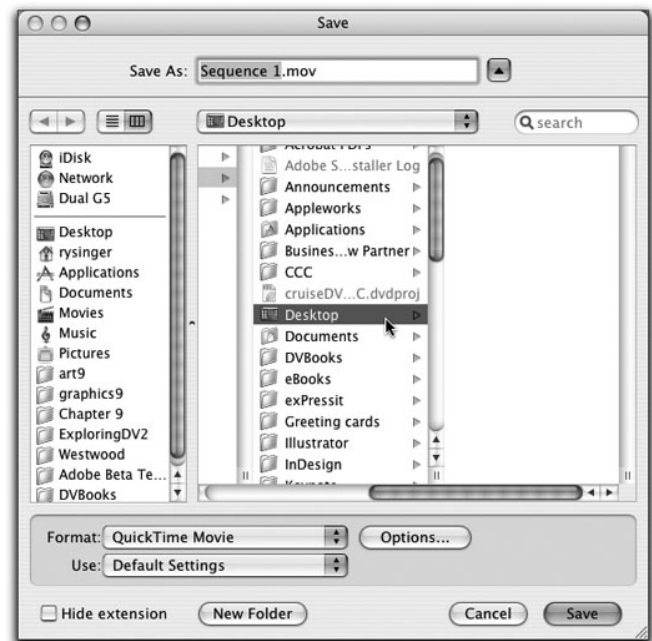To export a project in Apple's Final Cut Pro, select File | Export | Using QuickTime Conversion from the menu bar.

figure | 10-3 |

The Save dialog box will appear, prompting you to name the movie and designate a location to save it to. Then click on the Options button to customize the movie's audio and video settings.

Adobe Premiere Pro

figure |10-4|

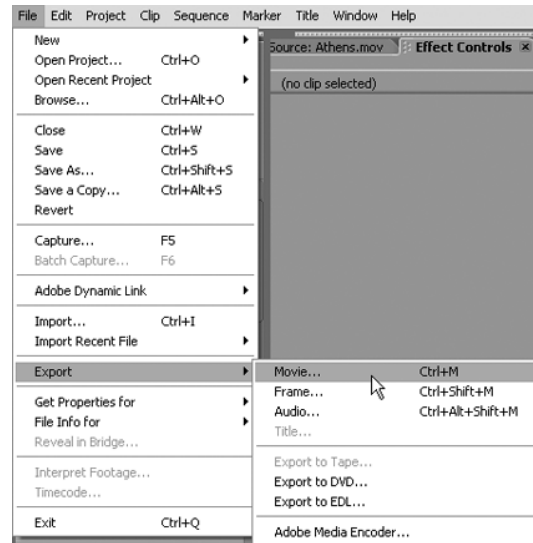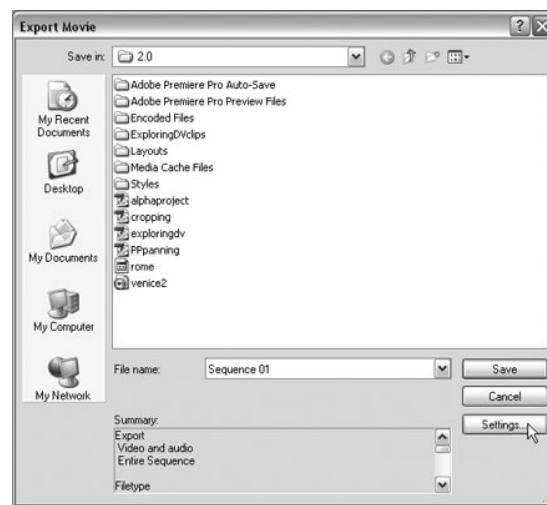To export a project in Adobe Premiere Pro, select File | Export | Movie from the menu bar.

figure |10-5|

The Export Movie dialog box will appear, prompting you to name the movie and designate a location to save it to. Then click on the Settings button to customize the movie's audio and video settings.

| TIP |

If you are using a PC and do not have QuickTime installed, this option will not be available. QuickTime is a free download from Apple's Web site (*www. apple.com*). It is available for both Macs and PCs.

Export Settings

Before you save your movie, you will want to check the render settings. When the project file example shown in these figures was first created, the settings for DV-NTSC were chosen. These settings automatically customized video capture and output specifically for DV-NTSC. However, you should get into the habit of verifying your settings before you start a render. This way, if you inadvertently made any changes, you will be able to catch the mistake before wasting time rendering at the