CHAPTER 6

Using Digital Video

In This Chapter

Understanding digital video

Adding digital videos to your movie

Managing video cast members

Exporting as digital video

Using QuickTime VR

Digital video is simply the result of capturing, storing, transmitting, and displaying a rapid succession of digitized images on a computer. The *why* of digital video is perhaps as important as the *what*. As mentioned earlier in this book, it is by appealing to multiple senses that multimedia enhances communications and increases the effective retention rate of the user. Digital video provides a superior means of transmitting images and sounds of real-world events and animations in your Director movies. The result, of course, is that the impact of your movies on your audience increases.

Director movies containing digital video are appearing with increasing regularity in our world. Using digital video enables you to create:

- Interactive kiosks
- Training CD-ROMs that display complex procedures
- High-impact sales presentations
- *Edutainment* titles (movies that entertain as well as educate)
- Virtual 3D worlds, using Apple's QuickTime VR technology.

The variety of movies that you can create with Director is limited only by your imagination. Whether your movie will grace a boardroom or a home computer, that movie can be enhanced with digital video.

Director uses two video formats, AVI (Video for Windows) and QuickTime. AVI movies can be imported into Director only from the Windows platform — they will play back on both platforms, though. An AVI movie is converted to a QuickTime movie when it's played on the Macintosh platform. The AVI

format has other severe limitations as well. AVI digital video movies, for example, can be played only in Direct to Stage mode (discussed later in this chapter). There are also very few Lingo commands that you can use to control AVI videos.

Director offers much more support for the QuickTime video format on both the Windows and Macintosh platforms. Using the QuickTime video format enables you to take advantage of the wide range of QuickTime movies that you can create, including audio-only movies and 360-degree QuickTime VR panoramas. Director also gives you much more Lingo control over digital videos that use the QuickTime format.

QuickTime is the industry standard for digital video, and it is very prevalent on the Web. If possible, you should use QuickTime digital videos for your movies to take full advantage of all the features that Director provides for incorporating digital movies into your multimedia applications.

To get the most out of the exercises in this chapter, you should have QuickTime 3.0 or 4.0 installed on your computer. If you need QuickTime 4.0, you can find the installer for both Windows and the Macintosh on the companion CD-ROM in the UTILITIES&SHAREWARE:APPLE:QUICKTIME (UTILITIES&SHAREWARE\APPLE\QUICKTIME) folder. There are also several QuickTime movies that you can use for the exercises in this chapter. They are in the EXERCISE:CH06:VIDEO (EXERCISE\CH06\VIDEO) folder.

The topics in this chapter introduce working with digital video. Director is a robust program that offers features for all levels of users, and in Chapter 19 you work with digital video at a more advanced level by learning to manage this medium with Lingo.

Working with Digital Video

A series of factors is involved in the creation of any digital video. In terms of Director movies, the most important of these factors are frame rate, image dimensions, color depth, file size and compression, and image quality.

Determining an effective frame rate

Frame rate is the number of frames per second (fps) that are displayed on a screen. A rate of 30 fps represents high quality, but it's unrealistic. Most computers don't have the resources to display video at that rate, and the amount of hard disk space required to store such data is prohibitive.

For any system to display digital video without disruption to quality, it must be capable of transferring data at a consistent rate of 150,000 bits (150K) per second. The amount of data contained in a digital video with a frame rate of 30 fps is enormous. Consequently, lower-end computer systems are incapable of transferring and rendering this amount of data at the required rate to maintain quality.

A frame rate of 15 fps is much more realistic. Most computers can display this information without too much difficulty, enabling you to widen the range of your potential audience by choosing this lower rate.

Working with image dimensions

When you are planning a Director movie, a key consideration is the final resolution at which the movie will be displayed. Director offers a variety of preset stage sizes, or you can specify a custom size that meets your needs. Before choosing a screen size, you should consider the typical computer configuration of your audience. For example, if you are developing a multimedia application that will be used in a corporate environment, you can safely assume that users will have 17-inch monitors set at 800 × 600 resolution. If you are developing for schools, which tend to have older computers, you may want to use a resolution of 640 × 480 to match the resolution of older 15-inch monitors.

Director displays digital video in a window placed on the Stage. The default size of the window is equal to the exterior dimensions of the digital video frame. Although you can display a digital video at 640 × 480 pixels or larger, the file size would be prohibitive and might cause resource problems on low-end computers. Most computers are capable of playing back digital video at a resolution of 320 × 240 (the default size for a QuickTime movie) without any difficulty. You can also create your digital video at a smaller or custom frame size.

Director enables you to crop digital videos. For more information on cropping, see the later section “Scaling and Cropping a Digital Video.”

Considering color depth

By default, Director for Windows plays all video in Direct to Stage mode (discussed later in this chapter) at a 24-bit color depth. On a Macintosh, the video is displayed at either 8-bit or 24-bit color depth. If your video hardware on a computer running the Windows operating system is set for 8-bit or 16-bit color depth, Director has to recomposite the image display to 24-bit. The result is a performance reduction in your movies. The digital video may appear jerky or slow. For best results in Windows, then, use digital videos that are set at 24-bit. If you get jerkiness or slowness in your 8- or 16-bit digital video, you can improve performance by sequencing images by using image and movie editors, or by respecifying cast member settings. The next exercise explains how to resequence images to improve performance. The section “Adding Digital Videos to Your Movies” later in this chapter discusses setting member properties.

Sequencing images to improve video performance

Editing 8-bit and 16-bit images to improve video performance in Director is a somewhat tedious task, but if performance is a critical issue, it’s worth the effort. If the frames of the video are already stored as individual images, you are one step into the process. If they are not, you need to break your video into individual frames.

The following instructions for sequencing are very general. For more targeted instructions, consult the user manuals for your video and image editors.

Sequencing Images for Your Video

1. Import your video into a video editor, such as Adobe Premier (see Figure 6-1). If you already have the images set up as individual frames, skip to Step 5.

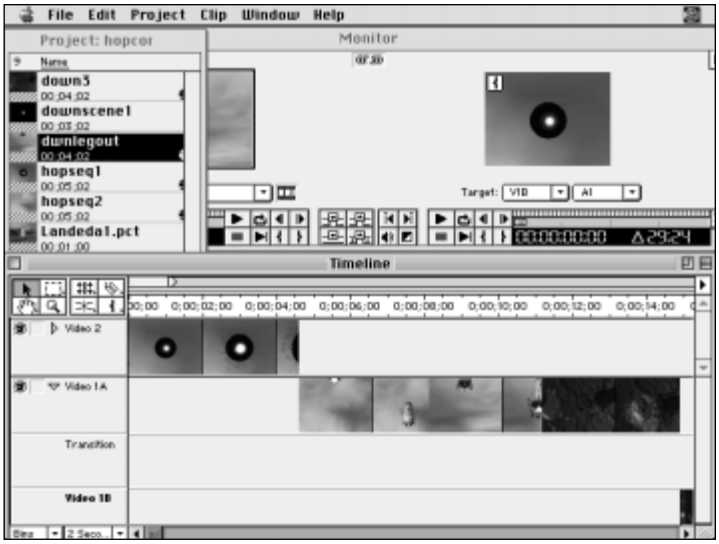

Figure 6-1: You can use a video editor such as Adobe Premier to convert an image into a sequence.

2. Export the video as a sequence of individual bitmap images or frames. Windows users will find it easier to save the images as BMP files, and Macintosh users should save the images as PICT files.

3. Open the sequence of images in a bitmap image editor or image converter, such as Equilibrium's Debabelizer or Adobe Photoshop version 5.0 or later. (If your bitmap image editor or image converter allows for batch functions, this process will go more rapidly.)

4. Convert the images to RGB 24-bit images and save them.

5. Reimport the sequential images into your video editor.

6. Create a video file from the images. The video file is ready to import into Director.

Getting the best performance from animated sprites

We all like to see the exotic. Sometimes, however, exotic animated sprites cause a movie to slow too much and to play at less than the desired frame rate. Suppose that your movie has a 24-bit sprite of a colorful parrot wildly flapping its wings. The bit depth of the color and the animation might reduce the performance of your movie, especially if other sprites are active at the same time. To adjust for this problem, you could reduce the color depth of the parrot or create a film loop. Neither of those options, however, is as effective as exporting the animation sequence as a digital video. After the digital video is created, you can import it and place it in your movie. The parrot maintains its color, the animation is smoother, and the performance of your movie improves.

Be aware that this method can be a formidable task if your image editor or converter doesn't support batch functions. For instance, sequencing 20 seconds of digital video that has a frame rate of 15 fps requires converting 300 frames!

For more information on exporting frames as digital videos, see the section "Exporting Digital Video," near the end of this chapter.

Controlling file size and choosing compression

Like other graphics and sound files, digital video files tend to be on the large side. The average video that plays in your VCR requires 10 inches of videotape for each minute of play at 30 fps. An equivalent digital video file could take as much as 1.6GB of hard disk space. The amount of space required varies, depending on other factors in the creation of computer imagery, such as color depth and resolution. Even with the frame rate reduced to 15 fps, an uncompressed digital video file can consume several hundred megabytes of disk space.

The issue of file size has prompted substantial research to find a standardized means of compressing the data to an acceptable size. A variety of *codec* (compression/decompression) methods are available. At the time of this writing, however, there is no standardized file compression method that works with all platforms. Director does support some file-compression techniques employed in conjunction with Apple's QuickTime and Microsoft's Video for Windows AVI (Audio Video Interleave) format. It's important, nevertheless, that you design your movie carefully to use a codec that is cross-platform if you intend to incorporate digital video files.

To achieve compression, most codecs reduce the amount of information stored with the file. Like the proverbial cutting room floor, bits and pieces of the original data are cut out to create a smaller file. A hierarchy determines which data is cut. The human eye is extremely discerning of color but doesn't as readily perceive

slight differences in brightness or motion. Compression schemes, therefore, typically cut information that refers to minor changes in both brightness and motion. Many digital video files contain sound, and — again, because people tend to notice a disruption in sound before they notice a disruption in image quality — frames of the video may be sacrificed in order to maintain the sound quality.

QuickTime is designed to give audio priority, whereas AVI is not. If the audio quality is important, you might want to use the QuickTime Video format for your digital video.

MPEG format

Director doesn't directly support the MPEG (Motion Picture Experts Group) format for digital video files. Xtras are available, however, that enable MPEG video to be imported into Director. MPEG uses *interframe compression* to achieve compression rates of up to 200:1. Interframe compression analyzes each frame of a video for redundancy, to create what are called *reference frames*. By comparing previous and subsequent frames in a video, only the difference between the frames is stored. Redundant information is removed, and the result is a smaller file.

Like most compression schemes, files compressed using MPEG can be lossy (as the compression ratio goes up, the quality of the video is reduced). MPEG is less lossy, however, than compression schemes employed by the QuickTime or AVI formats. You can play MPEG in your Director movies with the assistance of any of the following: an Xtra, Lingo MCI messages, a Windows driver, or a Macintosh system extension designed for this purpose. The drawback with MPEG is that each type of software implements the compression differently, and this can make it difficult to control the quality of playback on all types and platforms of computers.

Selecting an image quality

Probably the most important factor in making decisions regarding digital video in Director is image quality. We've saved discussion of this final factor for the last because it determines your final decision. You must decide what look is acceptable for your movie, given the constraints of file size and performance.

The decision on how you use digital video is subjective, but should be influenced by your client's needs, the characteristics of the target audience, and the content of your end product. Ask yourself these questions:

- Is there a truly valid need for the digital video to be full-screen and, if so, will the end-user's computer system support the required data transfer rates without choking?
- Using a smaller digital video window would lose what content? Would there be a significant loss of clarity, or detail, or both?

- ✦ Is there supplemental content that should be concurrently displayed on screen with the digital video — which might necessitate less than a full-screen digital video window?
- ✦ How will the end product be delivered (over the Internet, on CD-ROM, in a stand-alone kiosk format, and so on)? Will that medium handle the quantity of digital video?

With the range of possibilities available (various codecs, frame rates, image size, and so on), only you can determine how much of your movie's resources should be dedicated to the delivery of digital video.

Be sure to consider what's happening in the rest of the screen(s) across which the digital video plays. In most cases, your Director movie and the video in it will have more consistent performance and greater impact if you design the layout for the video to play in a smaller window.

Adding Digital Videos to Your Movies

Digital video files are imported and placed in the Cast window in the same manner as other files, but Director manages digital videos differently. By default, all digital videos are imported in Direct to Stage mode as linked files rather than contained in the movie. When Director links a file to your movie, it places a thumbnail of the cast member into the internal cast, as it would for any other cast member. In reality, the thumbnail doesn't represent the actual file, however. It is a pointer to the location where the file is stored. When you save the movie, the location is stored with the movie. If you move the file to another location, Director won't be able to find the file, and your movie won't run correctly. To avoid this problem, store linked files, such as digital videos, in the same folder as your movie. Alternately, for better organization, you can store all the video files in a folder that is "down directory" from the movie. In other words, they will be in the same folder, just one layer deeper.

Unlike sound files, you cannot include digital video sprites in a film loop. Although the video will appear at the appointed time in the film loop, it won't play.

There are two QuickTime digital video movies on the accompanying CD-ROM, landing.mov and radar.mov, that you can use for this exercise. They are in the EXERCISE:CH06:VIDEO (EXERCISE\CH06\VIDEO) folder. For better performance, you may want to copy the files to your hard drive.

Importing a Digital Video Cast Member

1. Open a new movie in Director and choose File➪Import to display the Import Files dialog box (see Figure 6-2).

Figure 6-2: You select the digital video files that you want to place in your movie in the Import Files dialog box.

2. In the Show: File Type menu, choose QuickTime (Mac) or Video Clip (Windows). This restricts the file list to only those digital video files that are supported by Director.
3. In the Media list menu at the bottom of the window, choose Include Original Data for Editing if you want Director to include a pointer back to the video editor you specified in the Editor Preferences dialog box. This enables you to quickly access your video editor by double-clicking the associated cast member in the Cast window.
4. To import a single file, select it in the file list and then click the Import button. Or, if you want to choose more than one file or choose files from several folders, click the Add button instead, and the files will be listed in the file list window. When you've finished selecting your files, click Import to complete the operation and return to Director's main window. The digital video cast members appear in the active cast.

You can also insert QuickTime movies by choosing Insert ➪ Media Element ➪ QuickTime. When you choose this operation, an empty cast member appears. Click on the Properties button to display the Cast Member Properties dialog box, and then click on the Options button. When the QuickTime Xtra Properties dialog box appears, click on the Browse button, and locate the movie that you want to import into Director.

After your files are placed in the cast, you can put the videos on the Stage and test their performance. Similar to other sprites, Director extends the video sprite across the number of frames you specified in the Sprite Preferences dialog box (displayed by choose File ➪ Preferences ➪ Sprite).

Placing a Digital Video on Stage

1. Import a video file into your movie, and then click the frame in the Score where you want the digital video to start.
2. Drag the digital video from the Cast window to the location you selected in the Score. Alternatively, you can drag the digital video cast member to the Stage. Director places the video sprite in the first open channel of the active frame (see Figure 6-3).

   When you place the video into the Score and play the movie, the cast member appears on top of any other elements on Stage, regardless of its channel position. This is because Director, by default, imports digital videos with the Direct to Stage property set to TRUE. The Macintosh version of Director enables you to turn off the Direct to Stage option, but Director for Windows does not.

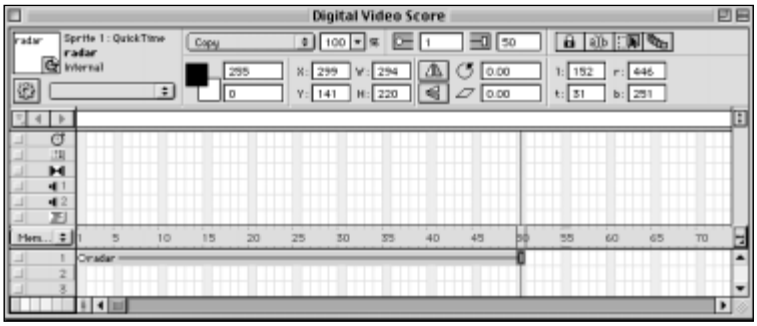

Figure 6-3: Place your digital video cast member in the Score, and extend the sprite to make sure that the video plays completely.

3. Rewind your movie and play it. If the video doesn't play completely, click the end frame of the video sprite and drag it to the right to extend it. The sprite must extend through sufficient frames for it to play completely.

You can also set the Tempo to a slower frame rate by double-clicking a frame in the Tempo channel in the Score window and selecting a slower frame rate. A slower tempo setting does not affect the playback speed on the video, only the speed of the playback head as it moves across the frames in the Director movie.

4. Rewind and play your movie again. Repeat Step 3 as needed to ensure that the video plays completely.

If you'd like to preview your video, you can choose Window➪Video, or press Command+9 (Ctrl+9). Your video appears in the Video window. If the video is a QuickTime (.mov) file, a control bar appears at the bottom of the window, enabling you to play, stop, advance, or rewind the movie. When the movie is stopped, you can cut, copy, and paste frames from one video to another.

Understanding Direct to Stage mode

Director supports QuickTime movies for both Macintosh and Windows. You can also import Video for Windows (AVI) files for use in the Windows version of Director. Both QuickTime and AVI formats enable you to incorporate audio effects in the file. When you place videos on the Stage, Director displays them using the default Direct to Stage option. This option allows for the best speed and smoothest display of digital video in a Director movie. Because this is the recommended way to use video in a Director movie, it is important to design the layout of your presentation so that the space required to play the video doesn't interfere with other elements on the Stage.

Direct to Stage has both advantages and drawbacks, however. When this option is enabled, you can sync your video to the soundtrack, effectively modifying the speed with which frames are displayed. You can also specify that Director play every frame, and set the maximum speed for the playback of your video. As noted earlier in this chapter, if you specify a frame rate, the video will play at the fastest speed possible, given resources and the frame rate of the video. It won't play faster than the embedded frame rate, however.

One drawback to the Direct to Stage option is that it places the digital video in front of every sprite on the Stage, regardless of the channel in which the video sprite is placed in the Score. Another limitation is that ink effects and transitions don't work. Without the use of ink effects, it's nearly impossible to conceal the perimeter rectangle that surrounds the movie window.

It's possible to have a QuickTime movie play in Direct to Stage mode, and yet still have it display in a nonrectangular format, by assigning a 1-bit cast member to act as a mask for the video. The default setting enables the video to show through the black pixels of the image. This advanced technique can only be accomplished using Lingo.

You can enable or disable the Direct to Stage option in the Digital Video Cast Member Properties dialog box.

Enabling or Disabling Direct to Stage

1. With the video cast member selected, choose Modify ➪ Cast Member ➪ Properties or click the Cast Member Properties button in the Cast window to display the Digital Video Cast Member Properties tab in the Property Inspector (see Figure 6-4).
2. Click on the Direct to Stage check box to enable or disable the option. If a check mark appears in the box, the option is enabled.

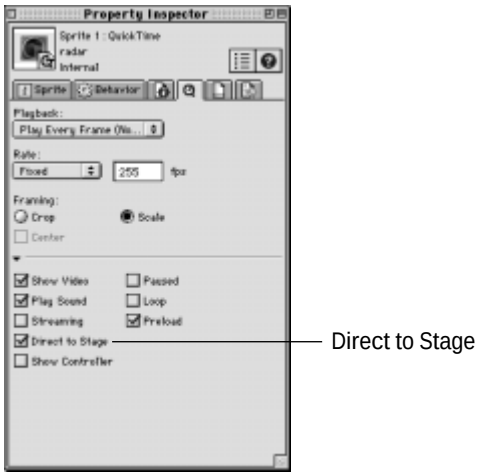

Figure 6-4: The Direct to Stage check box is located in the QuickTime Tab of the Property Inspector.

Note

The name of this dialog box reflects the format in which the video was created. A QuickTime movie was used when creating Figure 6-4, so the tab box is called QuickTime.

Choosing whether to use Direct to Stage is a matter of assessing the needs of your movie. If the video has audio properties and you need to sync the video to the sound, leave Direct to Stage enabled. If it's more important that your video blend in with the background, or if you have sprites that need to animate above the video, you'll want to disable Direct to Stage. Remember that when this feature is disabled, you'll be able to apply ink effects to your video and transitions to the frame.

Syncing video to sound

If you are creating a video with sound for use in a Director movie, it's a good idea to map or sync the audio file to the video *before* importing it into Director. Adobe Premiere and other video editors provide the tools to ensure that the sound plays at the same frame rate as the associated video portion of the file.

Taking the time to sync your video and sound beforehand helps you manage the way Director processes such files. By default, Director syncs the frame rate of your video to match the embedded audio track. This syncing makes your movie appear more polished, but Director will skip playing frames in your video, if necessary, to achieve syncing; and skipping frames can produce undesirable results. You can avoid this by telling Director not to skip frames (if the video has no sound or you don't need the sound to play). Do this by choosing Play Every Frame for the Video selection in the cast member's Properties dialog box. Be aware, however, that choosing Play Every Frame disables sound.

Digital video properties

As you saw in the preceding exercise, you can set several other properties for your QuickTime digital videos. As with most other cast member properties, the List View mode of the Property Inspector, shown in Figure 6-5, labels the properties as they are referred to in Lingo scripts. It's important to understand how each of these properties affects the way that digital video files will play back in your movies. Table 6-1 describes all of the properties you can set for QuickTime digital video.

Figure 6-5: The List View mode of the digital video member properties labels them as they are referred to in Lingo scripts.

The properties in Table 6-1 are listed as they appear in the List View mode of the Property Inspector.

Table 6-1
QuickTime Digital Video Properties

Property	*Description*
sound	Plays the embedded sound in a video if enabled.
pausedAtStart	When enabled, causes the video to remain on its first frame when it appears on the Stage. You need to use Lingo to set some kind of event to trigger it.

Property	***Description***
loop	When checked, the video loops back to the first frame and plays again continuously.
preload	Enables a video to preload into system memory before it's played. This allows for better playback performance but increases the memory demands of your movie. Use with the Lingo command preloadRam to control how much of the video file is loaded into memory.
frameRate	Determines the frame rate at which the movie will attempt to play back. The user's system resources will have as much, if not more, effect on the frame rate. Set this property by clicking on the arrow and adjusting the slider to the desired frame rate. To have the video synchronize to an embedded soundtrack, set the value to **0**. To set the frame rate to the Normal setting, type **–1** into the value; for the Maximum playback setting, type **–2** into the field.
streaming	Determines whether a video will stream when played back over the Web. This feature is only supported on systems that have QuickTime 4 installed. It will have no effect on systems that have older versions of QuickTime. Can be set in both the Playback Properties and the Display Properties sections.
percentStreamed	Available only in List View. If streaming is enabled, it returns the percentage of the file that has been downloaded to the user's computer. This property cannot be set. It only returns a value.
directToStage	Renders the video directly to the user's screen. Plays the video at optimum performance but cannot be used if other sprites need to appear on top of the video or if ink effects need to be applied
crop	Enables the video to be cropped on the Stage. Set it to false if you want to scale a digital video.
center	When set to true, the video appears in the center of the rectangle created when cropped. Has no effect unless crop is enabled.
video	Enables the video of a digital video member to play. Set to false if you only want the audio to play.
controller	Enables the standard QuickTime controller to be displayed. Defaults the pausedAtStart property to true when enabled.
Mask	Available only in List View. Assigns a 1-bit cast member—used as a mask—in which the video will appear. The default setting is for the video to appear in the black pixels of the member.
invertMask	When a 1-bit cast member is assigned as a mask for a video, the video appears in the white pixels of the cast member instead of in the black pixels of the member.

Director now supports QuickTime 4.0's streaming capabilities.

Other options for controlling digital video in your Director movies are available through Lingo commands. See Chapter 19 for further details.

Scaling and cropping a digital video

Director enables you to scale and crop digital video cast members. Because the scale and crop options are cast member options, they affect the entire sprite rather than a single frame.

Normally it's not a good idea to scale any type of bitmap image, even a digital video, by a large amount. Scaling degrades the quality of the image, especially if you increase the size. Video editors don't always enable users to create custom frame sizes, though, and your movie might call for a size that fits a specific area of your movie's layout. If you can live with some degradation of quality to get a custom fit, then try scaling and see what you get. First, use your video editor to create the closest size for your needs. Then you can scale the video in small amounts to create the custom size, while minimizing the loss of quality.

For the next three exercises, start with the sim.dir movie located on the CD-ROM in the EXERCISE:CH06 (EXERCISE\CH06) folder. This Director movie contains two QuickTime digital movies. If you move the movies to your hard drive, make sure that you include the folder called video at the same level as the sim.dir Director movie.

Scaling a Digital Video

1. In the Cast window, select the video cast member called landing and drag it onto the Stage so that the video sprite is positioned as shown in Figure 6-6.
2. Choose Modify ➪ Cast Member ➪ Properties (or press Command+I or Ctrl+I) to display the Property Inspector. You may have to click on the QuickTime member tab to make it the active window.
3. In the Framing section, click the Scale radio button to enable the option. Click OK to return to Director's main window.
4. On the Stage, drag the handle in the lower right corner to resize the video sprite so that it fits inside the black box. The video appears scaled on the Stage (see Figure 6-7).
5. Save the movie as **sim1.dir**.

You can also crop a video. This capability is useful if you want to display a portion of the video within its bounding box. Although cropping has a similar appearance to scaling, it doesn't actually resize the image. It merely hides a portion of the image. If you stretch the bounding box of the video later, it will reveal portions of the image that were previously hidden.

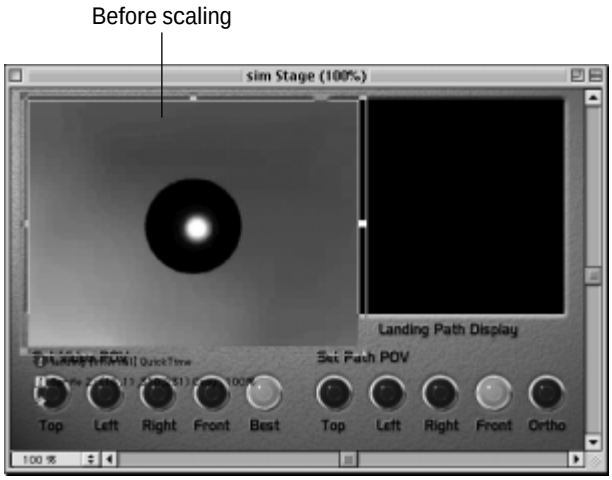

Figure 6-6: Position the video sprite on the Stage.

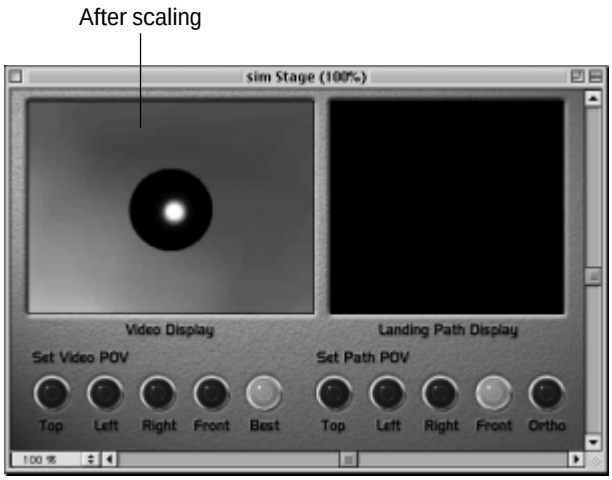

Figure 6-7: Scale the video sprite so that it fits in the window.

By cropping your videos, you can reduce a distracting background. Cropping is also useful for creating special effects within your movies by enabling you to focus on a particular section of an image.

Cropping a Video

1. Open the sim1.dir movie from the last exercise, if it's not already open. Select the video cast member named radar in the Cast window.

2. Click the Properties button in the Cast window to display the Digital Video Cast Member Properties tab in the Property Inspector.
3. Under Framing, click the Crop radio button to enable the option, and then click the Center check box so that the video remains centered inside the bounding box after it is cropped. Then click OK to return to Director's main window.
4. Drag the radar video cast member onto the stage. Note that there is a distracting yellow background surrounding the video (see Figure 6-8).

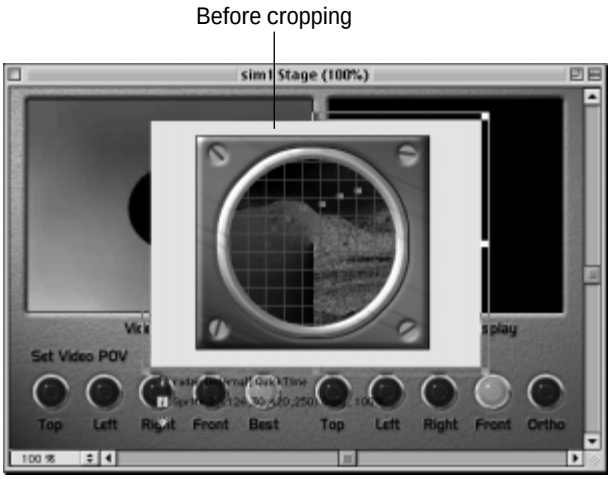

Figure 6-8: Remove the yellow background by cropping the video sprite.

5. On the Stage, drag the handles of the video sprite's bounding box so that the yellow background is eliminated. Position the sprite in the window on the right, as shown in Figure 6-9.
6. Save the movie as **sim2.dir**. Rewind the movie and play it back.

When you scale the Stage, the video sprite appears at its original size. If you try to crop a video with the Stage set at a zoom level other than 100%, you will get unexpected results.

Setting looping and controller preferences

When you played back the movie in the preceding exercise, you were probably thinking that it would be nice to have the radar video constantly looping to create a more realistic effect. The Digital Video Cast Member Properties dialog box also enables you to specify looping and whether you want a visible controller for the video. Both of these settings affect the behavior of your movie.

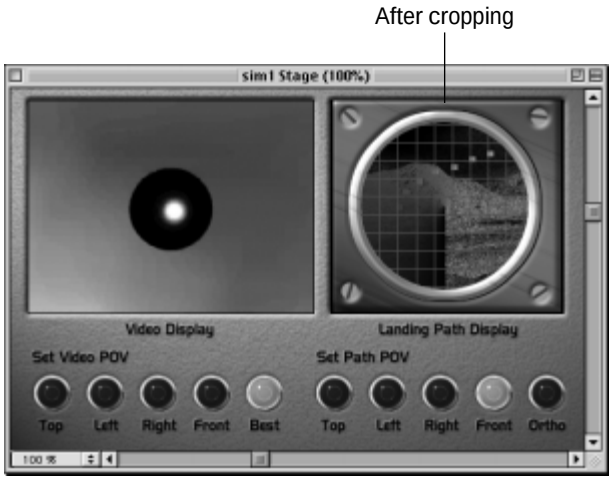

Figure 6-9: The video sprite is cropped and moved into position.

If you set a video to loop, the action repeats until the playback head goes beyond the number of frames you've allotted for your video. If looping is not enabled, the video plays to the end and then displays the last frame of the video until the playback head moves beyond the last frame you allotted for your video. To enable/disable looping, check the Loop check box in the Playback options.

If you enable Show Controller, a control bar appears below your movie that enables the user to start, stop, and step through the movie. The Show Controller check box option is available only if Direct to Stage is enabled.

It's not a good idea to enable the controller for a video cast member if it will be scaled, cropped, or used while another video is playing. This puts a huge demand on the system resources and can cause all kinds of strange things to happen.

Looping a Digital Video

1. Open the sim2.dir movie in Director if it's not already open, and then select the radar video cast member.
2. Click the Properties button in the Sprite Overlay to display the Digital Video Cast Member tab in the Property Inspector.
3. Click the Loop check box to enable the option. Then click OK to return to Director's main window.
4. Rewind the movie and play it. The radar screen now continuously rotates while the other video is playing.
5. Save the movie as **sim3.dir**.

Specifying an external editor for Video cast members

You can specify an external editor for a video cast member, so that you can quickly jump to an editing application outside of Director to modify your digital video. Double-click a cast member for which you've specified an external editor, and Director starts the editor and opens the video in it. After you've modified your video, save the changes and click Exit; the video cast member is updated automatically with the modifications that you made in the editor.

You can edit a QuickTime movie in Director. This technique is discussed later in this section.

Specifying an External Video Editor for Video Files

1. Choose File ➪ Preferences ➪ Editors to display the Editors Preferences dialog box.
2. Scroll through the file type list, and select Video Clip (see Figure 6-10).

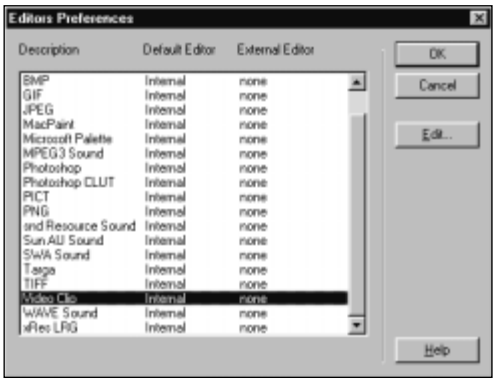

Figure 6-10: Choose the file type for which you want to use an external video editor.

3. Click the Edit button to display the Select Editor for Video Clip dialog box.
4. Select the Use External Editor option, and then click either the Browse button or the Scan button (shown in Figure 6-11). If you click Browse, the Open dialog box appears; this is where you can navigate to the executable file that starts your video editor. If you click Scan, Director scans your computer for possible editors by searching for program files, and presents you with a list from which to choose.
5. Select the editor that you want to use, and click Open to return to the Editors Preferences dialog box. Click OK again to complete the operation and return to Director's main window.

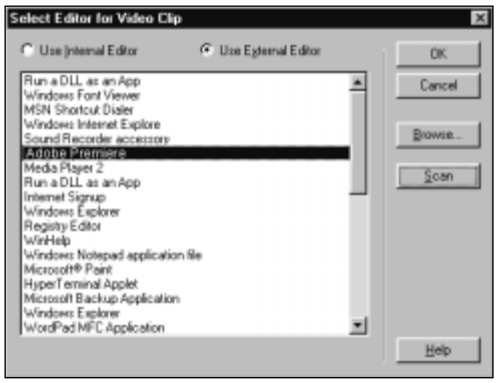

Figure 6-11: Choosing an external video editor

Note

Normally, double-clicking opens a QuickTime digital video in Director's Video window. If you assign an editor, however, this action opens your video in the external editor you specified.

Editing a digital video within Director

There are times when you need to resequence images, or use only a portion of a digital video that you have imported into your movie. You can use an application that is capable of editing the video file, or you can perform some editing operations within Director itself. Although the process is a bit cumbersome — and you don't have the accuracy and special effects capability that video-editing programs such as Adobe Premiere have — it's very useful to be able to perform these operations in Director, especially if you don't have a video-editing application on your computer.

When you double-click on a QuickTime video cast member — provided you have not assigned an external editor for QuickTime — the QuickTime window opens up, as shown in Figure 6-12. The video appears in the window, along with a controller that enables you to play the entire movie, step through the movie one frame at a time, or jump to a particular section of the movie. You can also use the controller to select a specific range of frames and then copy the frames into a new video cast member.

Caution

When you modify a video cast member, you are actually changing the original file to which the cast member is linked. It's a good idea to make a copy of the movie that you are about to modify so that you have the original version of the movie in case you need to use it again.

On the CD-ROM

For this exercise, you can import the QuickTime movie called landing.mov, located on the CD-ROM in the EXERCISE:CH06:VIDEO (EXERCISE\CH06\VIDEO) folder.

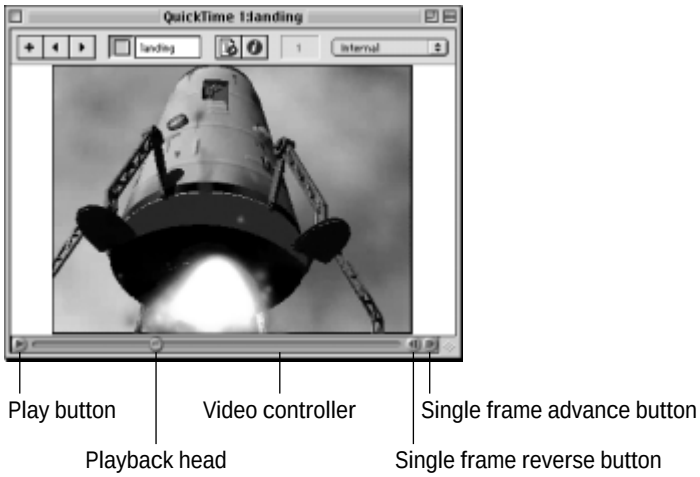

Figure 6-12: Double-clicking on a video cast member opens the QuickTime window.

Resequencing a QuickTime Movie

1. Double-click on a QuickTime video cast member to open it in the Video Cast Member window.
2. Select the beginning section of the video by moving the playback slider in the controller to the point where you want the selection to begin.
3. Hold the Shift key down and move the playback slider to the point in the movie where you want the selection to end. The section of the video that is selected shows up as a black area in the controller bar (see Figure 6-13).

Figure 6-13: You can select a section of the video.

Use the single-frame buttons or the arrow keys on the keyboard to fine-tune the selection.

4. Copy the selection to the Clipboard, and then click on the New Cast Member (+) button to create a new video cast member.
5. Paste the selection in the new window, and a dialog box appears, prompting you to create a new QuickTime movie file (see Figure 6-14). Select the location where you want to store the movie, and then type in a name for the file.

Figure 6-14: Select a location to store the new movie and type in a name for the file.

Even though the movie was created in Director, it is still stored as an external file that is linked to the Director movie. Make sure that you don't move the file to a new location after it is created or it will not play in the Director movie.

6. Back up to the previous video cast member by clicking the Previous Cast Member (left arrow) button at the top of the window, and repeat Step 3 to select another section of the video.
7. Copy the section, and then advance to the new video cast member by pressing the Next Cast member (right arrow) button.
8. Move the playback head to the position in the movie that you want to be the *endpoint* of the selection that you are pasting in. An alert message appears, warning you that you are about to change a linked file (see Figure 6-15). Click OK. The selection is then inserted into the movie.

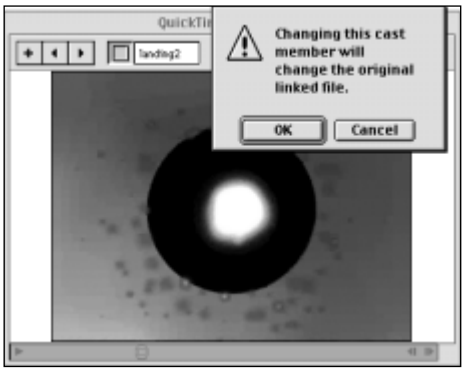

Figure 6-15: This alert message warns you that you are about to modify a linked cast member.

You cannot undo this operation because it is being performed on an external file. It's a good idea to create a copy of the cast member so that you don't accidentally ruin the original one.

9. Press the Play button in the controller to view the changes that you have made to the video cast member.

Controlling Video Cast Members

Often you need to have the movie wait on a particular frame until a video has reached a specific point or has finished playing. Suppose that you have several sprites that represent status lights on the Stage that need to change color as the video progresses. It would be almost impossible to accurately synchronize the lights changing with the video, due to the variety of computer systems your Director movie might be played on. As you already know, digital video can be quite the resource hog and it's difficult to accurately predict how it will play on any given system.

The most straightforward way to accomplish this without using Lingo is by setting tempo settings that tell Director to wait on a frame until a specified point in the video has played.

Specifying tempo settings

Director enables you to specify tempo settings to control the way your movie interacts with video cast members. This is useful for pausing the movie while waiting for a video to finish playing.

You can also use tempo settings to control the video and interactive portions of the movie. By setting cue points in the digital video, you can have the Director movie pause until the video has reached the predetermined cue point. After the digital video has reached the cue point, the Director movie continues. Before Director can recognize a cue point set within a video, however, you must first define the cue point, using an application that is capable of inserting cue point into a digital video. Both BIAS Peak LE 2 on the Macintosh and SoundForge XP4 on Windows — the default sound-editing applications supplied with the Director Studio — are capable of performing this operation. The QuickTime movie landing.mov that you have used in previous exercises has several cue points added to it. You use the landing.mov file in the next two exercises to insert tempo settings that control the playback of the Director movie

You can use the vidcue1.dir and vidcue2.dir movies on the CD-ROM located in the EXERCISE:CH06:VIDEO (EXERCISE\CH06\VIDEO) folder for these exercises. If you copy the movies from the CD-ROM to your hard disk, *make sure* that you also put a copy of the folder called video, which contains the imported landing.mov QuickTime movie, into the same folder on your hard disk into which you copied the Director movies.

Pausing a Movie to Wait for a Video to Finish Playing

1. Open the vidcue1.dir movie in Director, and display the Score window. If the effects channels are not visible, click on the Hide/Show Effects channel button to display the effects channels.
2. Double-click the Tempo channel in frame 60, located directly below the marker named "end" (shown in Figure 6-16) to display the Frame Properties: Tempo dialog box.

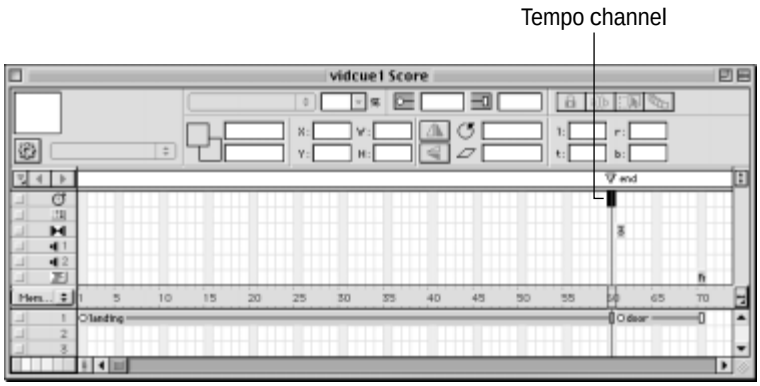

Figure 6-16: Double-clicking in the Tempo channel of a frame that contains a video sprite causes the Frame Properties: Tempo dialog box to appear.

3. Click the Wait for Cue Point radio button to enable that option, and select the video from the Channel list.
4. In the Cue Point list, choose {End}, as shown in Figure 6-17. Click OK to return to Director's main window.

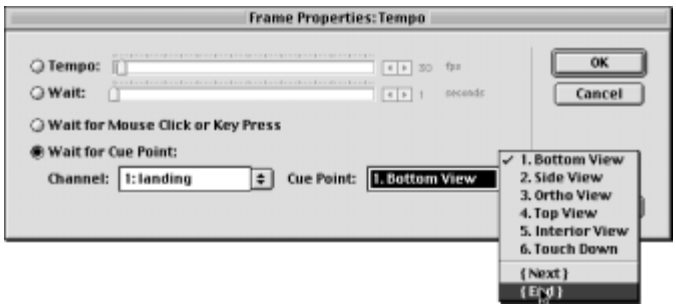

Figure 6-17: Choosing {End} as the Cue Point forces Director to wait for your video to finish before continuing to the next frame of your movie.

5. Drag the Score toward the bottom of the screen so that both the video sprite and the Score window are visible on the Stage; then rewind the movie and play it. In the Score window, the play head pauses at the {End} cue point you inserted in the Tempo channel until the QuickTime movie finishes playing, and then advances to the next frame.

Even if you don't have any cue points in your video, choosing {End} for the cue point setting causes Director to wait for the video to finish playing before continuing to the next frame of your movie.

It's not necessary to add markers to your movie in order to insert a cue point. Putting markers in your movie at the frames where you will insert cue points, however, makes it much easier to organize the movie if you're adding more events that need to occur when the movie reaches a cue point.

Pausing a Movie to Wait for a Specific Cue Point in the Video

1. Open the vidcue2.dir movie in Director, and then make the Score window active. If the effects channels are not visible, click on the Hide/Show Effects channel button to display the effects channels.
2. Note the markers that have been placed in the Marker channel of the Score (see Figure 6-18). These markers are labeled with the same name as the actual cue points that you will insert into the Tempo channel.

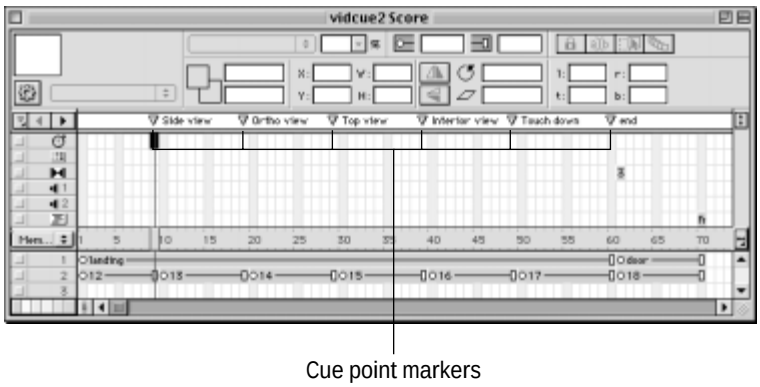

Figure 6-18: Adding markers to the frames where you want to add cue points makes it easy to identify the frames where the cue points will be inserted.

3. Double-click the Tempo channel in frame 9, directly below the marker called Side view. The Frame Properties: Tempo dialog box appears.
4. Click the Wait for Cue Point radio button to enable the option, and then select the Side View cue from the Cue Point pop-up menu (see Figure 6-19).

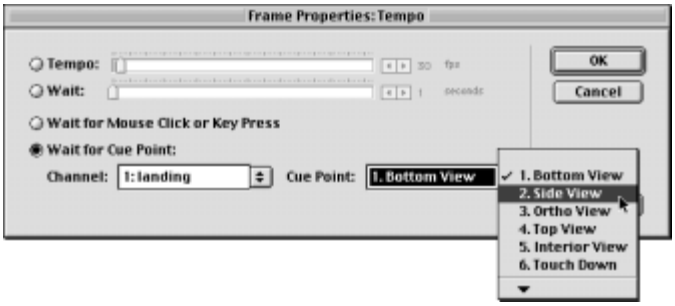

Figure 6-19: Select a cue point from the Cue Point pop-up menu.

5. Repeat Steps 3 and 4 to insert cue points underneath the Ortho view, Top view, Interior view, and Touch down markers.

The markers are labeled with the same names as the cue points that you're going to insert.

6. Double-click on the Tempo channel in frame 60 (directly below the marker named end) and insert an {End} cue point.
7. Drag the Score window toward the bottom of the frame so that the video and text sprites are visible on the Stage. Rewind the movie and play it. Note that the text sprite is changing along with the scene changes in the QuickTime movie.

Using cue points enables you to pace your movie and coordinate video events. To stop or pause a video, however, you need to add video controls by using Lingo or the Video Behaviors located in the Library Palette.

More sophisticated integration of video, sound, and interactivity is accomplished by using Lingo statements within your movie. Chapter 19 discusses using Lingo to control digital video.

Working with video behaviors

Behaviors are small Lingo scripts that control interactivity and the behavior of sprites. The video behaviors are located on the Library Palette. Open the Library Palette by choosing Window ➪ Library Palette. To access the video behaviors, click the Library List button in the upper-right corner of the palette and then choose Media ➪ QuickTime. When you apply a video behavior, a dialog box prompts you to enter parameters that control the behavior. Examples of parameters are the channel number of the video sprite or the number of frames the video occupies.

Chapter 5 introduced you to behaviors for sound. Behaviors are prepackaged Lingo scripts with which you can quickly and easily control cast members. You just select

the behavior that you want to use and drop it onto the sprite in the Score window or on the Stage. Director then prompts you for the parameters that define the action you want to apply.

The advantage of using these two new features is the ease with which you can quickly create scripts. For example, you can create a custom control bar for your QuickTime cast member that enables the user to play, stop, or pause the video.

The Library Palette contains two built-in Behaviors that you can use to control several different properties of QuickTime movies:

- The QuickTime Control Button behavior can be applied to a sprite that will act as a button to control the QuickTime video sprite. The parameters that you can set with this behavior are: Play, Rewind to the beginning of the video, Jump to the end of the video, Fast Forward at 2X the speed, or Fast Rewind at 2X the speed. You could easily make a VCR-like control panel to control QuickTime movies with this behavior.
- The QuickTime Control Slider behavior is used to create a custom slider that functions much the same way as the standard controller that can be displayed with QuickTime movies.

Behaviors are a quick way to add simple Lingo scripts to your sprites and cast members. They guide you through the process of applying a script by requesting the information required. Attach as many behaviors to a sprite as you want to get the effect you want.

Learn more about Director's built-in behaviors in Chapter 7.

Exporting Digital Video

Director enables you to export any range of frames as a digital video. After you've exported the frames as a digital video, you can import that video back into Director as a single cast member. The Radar QuickTime movie that you used earlier in this chapter was created using this technique. It started its life a series of sprites that were animated in Director and then exported as a QuickTime video. When you export a Director movie, it retains tempo settings, palette effects, and transitions; however, any interactivity that is in the selected range of frames is lost. In addition, if you choose to export the frames as a Video for Windows (AVI) file, Director doesn't save any sounds with your video. Director only exports sounds using the QuickTime file format.

Executing Director transitions in a QuickTime or AVI movie can bring a computer's system resources to its knees. It's much safer to remove the Director transitions when you export the Director movie as a video file, and then add transitions to the exported file with a video-editing program such as Adobe Premiere.

When you export a range of frames as a digital video, Director internally plays that portion of your movie, capturing the action as it would appear on Stage. Any scripts or other elements that have a visible effect during that playback time are captured, as well.

It's important to remember that Director captures the entire Stage at its current size. If the action you want to save as a video is smaller than the current Stage size, you need to resize the Stage accordingly. Any elements that are off the Stage but still visible in the Stage window will not be visible in the exported video. Before resizing the Stage, be sure to use the Save As command to save your movie using a new name. This way, you can avoid resizing the Stage back to its original settings before importing your digital video back into your movie. It also provides you with a backup file of the original movie if the results of your export are unsatisfactory.

If the Stage is zoomed, it will have no effect on the final size of the video file.

If you are exporting your Director movie as a QuickTime digital video, you need to consider the compression format that you are planning to use. The compression setting that you choose can greatly affect the way the digital video will play back. Table 6-2 lists the compression settings that are available with QuickTime and describes the best use for each one.

Table 6-2
QuickTime Compression Settings

Compressor	***Description***
Animation	This compression scheme works best for computer-generated animations that contain flat colors. It doesn't work well for a scene that has gradient colors or photographic-type scenes in it.
BMP	Used for exporting a sequence of BMP images. This scheme does very little compression and shouldn't be used for video output.
Cinepak	This compression method is ideal for videos that will be played back from CD-ROM.
Component Video	This compression scheme should be used if the movie you are exporting will be incorporated in a video presentation using a high-end video-editing system, such as an AVID.
DV - NTSC DV - PAL	Formats used for digital video cameras. They are not recommended for exporting video from Director.
Graphics	This scheme is good for exporting 8-bit graphics, although the decompression time is very slow.

Continued

Table 6-2 *(continued)*

Compressor	*Description*
H.263	This scheme was designed for video conferencing. It uses very high compression ratios. Movies compressed with this method lose quite a bit of quality.
Intel Indeo Video Interactive	Although a very high quality compressor, this scheme requires a Pentium processor for compression and decompression and is available only on the Windows platform.
Motion JPEG A Motion JPEG B	These compression schemes require a special motion-JPEG card to be installed in order to play back videos that use these compression formats.
None	Good for capturing video or exporting movies that will be captured by a high-end video-editing system, such as the AVID.
Photo JPEG	This scheme is good for exporting still images and QuickTime VR files. The decompression is very slow, so it's not good for motion video.
Planar RGB	This scheme supports graphics with alpha channels. It's good to use if you are exporting a series of images that will be composited (combined) with other video segments.
Sorenson Video	This scheme offers very high compression ratios with good image quality. It's ideal for digital video that will be played back over the Web.
Video	This is a very fast compression/decompression scheme that is good for video that will be played back from a hard disk.

You can use the radar.dir movie on the companion CD-ROM for this exercise. The radar.dir movie is in the EXERCISE:CH06 (EXERCISE\CH06) folder.

Exporting a Range of Frames as a Digital Video

1. Open the radar.dir movie in Director.
2. Choose the File ➪ Export or press Command+Shift+R (Ctrl+Shift+R). The Export dialog box appears (see Figure 6-20).

Prepare your movie for export by checking and testing all media. Don't waste time by allowing a spelling error or a misplaced sprite to be discovered on the Stage after you've already exported to video!

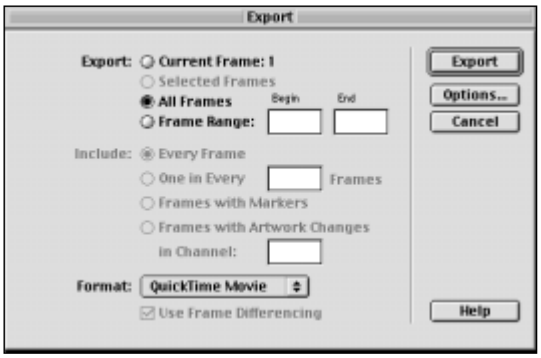

Figure 6-20: The Export dialog box

3. Set the Format field at the bottom of the dialog box to the desired export format (Video for Windows, DIB File Sequence, PICT, Scrapbook, PICS, or QuickTime Movie). Different options are available, depending on the platform with which you are using Director.

4. Using the radio buttons at the top of the dialog box, indicate whether you want to export the Current Frame, Selected Frames (which you must have selected *before* you open the Export dialog box), All Frames, or a Frame Range. If you choose the Frame Range option, enter the starting and ending frame numbers in the Begin and End fields next to the Frame Range radio button.

5. Click the Options button.

a. If you are using Director for Windows and exporting to Video for Windows, the Video for Windows Export Options dialog appears, prompting you to enter the frame rate for the video.

b. If you are exporting a QuickTime 4 movie, the QuickTime Options dialog box appears, as shown in Figure 6-21.

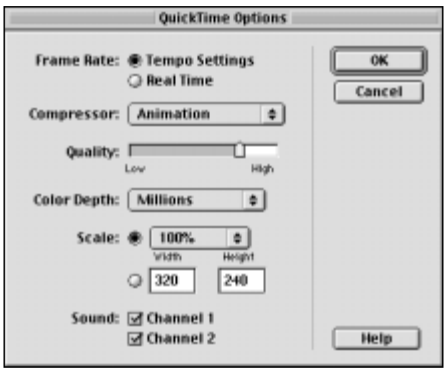

Figure 6-21: The QuickTime Options dialog box appears for exporting to QuickTime.

Before exporting frames as digital video, disable any screensavers that might be active. Exporting to digital video can take time, and if your screensaver comes on during the process, it will be included in your video.

6. If you are exporting as a Video for Windows movie:

   a. Enter the fps (frames per second) in the Frame Rate field and click OK to close the dialog box and return to the Export dialog box.

   b. Click the Export button, and enter a filename for your video.

   c. A Video Compression dialog box appears in which you choose the codec to use, the compression quality, and the placement of keyframes.

   d. Click OK, and the movie is exported to video. Be prepared for a wait; video compression takes time.

   If you are exporting as a QuickTime 4.0 movie:

   a. Choose the compressor or codec type in the QuickTime Options dialog box. See Table 6-2 for more details on each of these settings. In addition, choose the Quality, Color Depth, Scale (such as 25%, 50%, 75%, or 100% of the movie's Stage size), and whether sound channels are to be exported. When you have finished setting options, click OK.

   b. In the Export dialog box, click the Export button. Enter a filename for the digital video file and click the Save button.

   c. An Alert box reminds you that screensavers should be turned off during the file export. Click OK to dismiss the alert and the export process begins.

To stop an export that is in progress, press Command+. (period) (Ctrl+.).

Exporting frames as a video is one way of keeping your movie compact, by replacing several sprites with a single sprite. Exporting frames of your Director movie as a digital video offers all the advantages — and the disadvantages — associated with including digital video in your movies. It can increase the file size of your movie, but it can also reduce the file size if the video is replacing several large cast members with a single, more compact cast member. You should consider the file sizes of the original cast members versus a digital video before deciding to export frames as a video.

QuickTime VR

One of the more exciting video technologies supported by Director is Apple's QuickTime VR (QTVR) format. QTVRs come in three flavors: panoramas, objects, and scenes. Panoramas are 360-degree images that can be viewed from any point in the 360-degree field of view. QTVR objects are three-dimensional objects that can

be rotated and viewed from any angle. Scenes can contain a series of panoramas and objects that are linked together in what are referred to as *nodes*. All three formats give the user control, enabling them to adjust the view at any time. You can also control the view with Lingo.

QTVRs can add a level of realism to your movies that's not possible with other virtual reality technologies. Technologies such as Virtual Reality Markup Language (VRML) render the three-dimensional images in real time, thereby limiting the amount of information those images can display, such as textures and lighting, due to system resources. Thus, VRML objects tend to contain far less detail and appear crude. QTVRs are created from actual photographs or high-end 3D authoring programs capable of creating very detailed photorealistic images. It's also possible to combine several QTVRs — called a *nodal* movie — into a single movie and create *hotspots* that enable a viewer to jump from one scene to another.

A wonderful example of QuickTime VR used in Director comes on the CD-ROM. Check out the Riddle of the Sphinx game preview. Riddle of the Sphinx is a five CD-ROM game, created in Director, that has taken the folks at Omni International more than five years to create.

Director treats QTVR movies just as it would any other QuickTime digital video. You can set the same properties for a QTVR file as you would for a QuickTime video. QTVR movies have the same limitations as QuickTime video in that you need to take into consideration file size and the resources needed to play them back.

In the following exercise, you import a multinode QTVR movie into Director, place it on the Stage, and set properties that enable the user to navigate from one node to another. Multinode QuickTime VRs are composed of several independent QTVR scenes that are linked together, enabling a user to navigate from one node (QTVR movie) to another.

In this exercise, you import the nodal.mov QTVR file into the nodal.dir movie, which is in the EXERCISE:CH06 (EXERCISE\CH06) folder. The QTVR file is located in the video folder, located in the same folder as the Director movie.

Building a Virtual Tour

1. Open the nodal.dir movie in Director and import the nodal.mov file that is in the video folder. Use the same process you would use when importing a QuickTime video.
2. Click on the Properties button in the Cast window to activate the Property Inspector, shown in Figure 6-22. The video cast properties window should be active; if not, click on the QuickTime tab.
3. In Normal view, set the Playback setting to Play Every Frame (No Sound). Set the Frame rate to Maximum (–2 in the List view). Disable Play Sound (because there is no audio), and check Show Controller to display the controller.

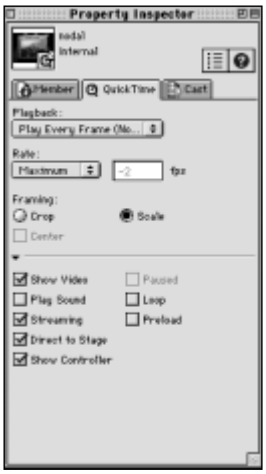

Figure 6-22: The Property Inspector set to the QuickTime tab

4. Make the Cast Window active and choose the nodal.mov cast member. Drag the member onto the Stage and position it inside the opening provided for the movie. The Stage should look like the one shown in Figure 6-23.

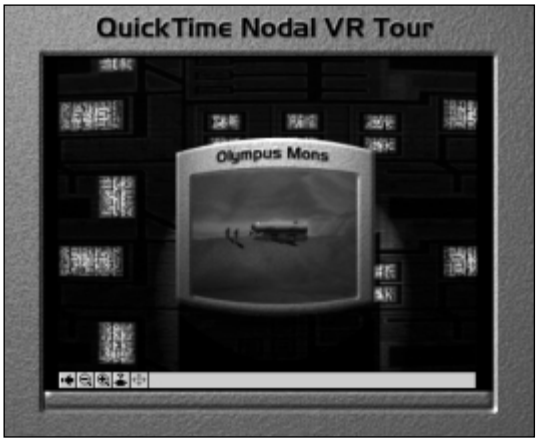

Figure 6-23: Drag the mouse in the VR window to view the scene.

5. Rewind the movie and play it. Drag inside the QTVR window to change the view. The scene will rotate in the direction that you are dragging the mouse. The cursor changes to an arrow when it encounters a hotspot.

6. Click when the cursor changes to an arrow, and the QTVR switches to another node. To get back to main node, click on the small screen that appears in each second-level node.

Using the controller buttons (shown in Figure 6-24) you can also view hotspots, zoom in and out, and navigate back to the previous node. You can control all of these actions through Lingo, so that they occur without the user having to interact with the scene.

You learn to use Lingo to control this same scene in Chapter 19.

Figure 6-24: Click the Show Hotspots button to display the active areas in the QTVR.

Director does not have any capability to edit or create QTVR files. You need to create them with an application such as Apple's QTVR Authoring Studio, and then bring them into Director. You can assign an external editor that opens the file if it is double-clicked; however, the same editor will be opened for all other QuickTime videos in your movie. This could present a problem, because QTVR editors do not generally offer the same kind of functionality as a digital video editor.

Summary

Using digital video in your Director movies can greatly enhance the quality of your multimedia applications. Carefully implementing digital video into your multimedia applications enables you to accomplish effects that would be very difficult, if not impossible, to achieve using another graphics medium. Before moving on to the next chapter, review the aspects of digital video that were covered in this chapter:

- Director supports the QuickTime 3 format on both the Macintosh and Windows platforms.
- Digital video cast members are always linked. Take care when moving the files and when distributing your movies; be sure to include the linked files.
- You can crop and scale a video cast member.

- You can insert cue points into a digital video, which enable you to control the tempo of the movie.
- Director has several built-in behaviors that you can use to control a digital video.
- You can export selected frames in your Director movies as digital video files.
- Director supports Apple's QuickTime VR technology.

In the next chapter, you learn to add interactivity to your movies by using Director's built-in behavior libraries.

✦ ✦ ✦