

# HOUR 10



## Including Sound in Your Animation

Sound really makes a movie come alive, but the power of audio is subtle. People often won't even notice or remember the sounds you use. But create a movie without sound (or with bad sounds), and the audience will notice right away. The effect of audio is often subconscious, and that's what makes it so powerful.

Regardless of why sound is useful, it's very important to use audio effectively because it's invariably the largest portion of your exported movie's file size. There's no reason to allow the audio to add more size than it has to. Unfortunately, there's no "Make the Audio Come out Good" button. The choice between good audio and a small file size is more of a battle than a balancing act. It's simply a matter of understanding the technology, and that's the goal of this hour.

In this hour you will

- Import and use sounds in keyframes
- Learn audio concepts like sample rate, frequency, and compression
- Apply tricks to minimize sound's impact on file size

## Importing Sounds

Flash has great support for audio but no internal way to record or create sounds. You'll need to find an existing sound, have one provided for you, or use sound software to record or create your own. This simply means that, in Flash, you can import sounds but you just can't create them.

Two basic steps are involved in getting audio into your Flash movie. First, you need to import the sound. Then, you need to decide where and how to use it. This is similar to importing raster graphics (like you did in Hour 3, "Importing Graphics into Flash"). When you import a sound, it's stored in the Library like an imported bitmap. But a sound is not quite a symbol. Rather, the item in the Library contains all the individual properties of the particular sound (just like bitmap properties).



There are many sources for existing audio, such as clip media CDs and even Flash's Sounds Common Library (from the Window, Common Libraries, Sounds menu). You may find, however, that rather than searching existing sources, it's often easier to hire a professional musician or narrator who can provide exactly what you need. This is also true for customized graphics or photographs versus clip art. Although in the short term this may mean a much bigger investment, sometimes it's worth it. Consider that you're likely to get the perfect match for your message compared to something you find that's just "close enough" (but not quite right either). Also, you have direct contact with the artist, so you can resolve copyright issues at the start. Finally, by customizing your audio or graphics (and purchasing exclusive rights to its use), you won't risk another company using your art. Several potential problems arise when multiple parties use the same image or sound. Some other company's product or message could reflect poorly on yours, its Web site could be more popular than yours (making you look like a follower), or an image could become overused, making everyone's use look unoriginal and cliché.

## Supported Formats

Flash can import digital audio in the following file formats:

- MP3
- WAV
- AIF (also called AIFF)
- AU

The only catch is that unless you have QuickTime 4 or 5 installed, when running Windows you can't import AIF or AU, and on the Macintosh you can't import WAV. Just download and install the free QuickTime software from [www.apple.com](http://www.apple.com) and you'll be able to import audio in any of these four formats.

People often want to know which format is best. In general, it doesn't matter. You should simply start with the best quality sound possible. Between AIF and WAV there's no inherent quality difference. A high-quality AIF file is the same as a high-quality WAV file. The AU format is nearly always compressed at a low quality, so you can all but forget this format. In the case of MP3 files, they always have some compression, so ultimately these files are not best. However, when MP3s are compressed very little, their quality remains high. There are two valid reasons to use MP3s:

- Your only source is an MP3 file.
- The MP3 file you have has already been compressed (as far as you know) optimally.

MP3s won't get any worse after you bring them into Flash, but they certainly can't get any better. What's more, some MP3s aren't very good to begin with. I recommend avoiding MP3s as source files unless they're all you have or you're totally satisfied with their current quality.

You'll learn more about digital audio later this hour in the section titled "Digital Audio Fundamentals." For now, it's enough to know that just four sound formats can be imported into Flash. What about songs on audio CDs? CD audio tracks aren't in WAV, AIF, AU, or MP3 format, so you can't use them directly. Luckily, most sound-editing software provides the ability to extract music from a CD and save it in WAV or AIF format. Of course, you should realize that significant copyright concerns arise when using audio from a published CD.

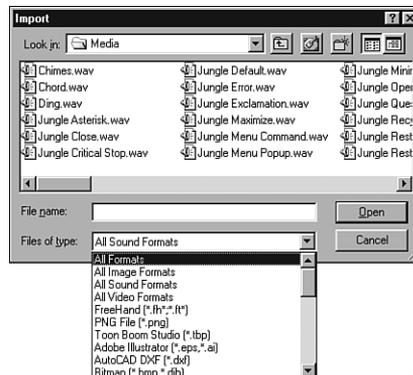
## Task: Import a Sound

The actual process of importing sounds into Flash is very simple. Follow these steps:

1. In a new file, select File, Import... and then select an audio file to import. (In Windows, you'll likely find a few WAV files in the folder C:\Windows\Media, or just search for \*.wav and \*.mp3; Macintosh users can run a Find for Files of Type: Sound.) You can filter the files shown in the Import dialog box by setting the Files of Type drop-down list to All Sound Formats, as shown in Figure 10.1).
2. After selecting an audio file and clicking OK in the Import dialog box, you probably won't see (or hear) anything different. However, the sound has been imported and now resides in the Library. Just open the Library window (Ctrl+L) to see it. Now that your movie contains the sound file, you can use the sound.

**FIGURE 10.1**

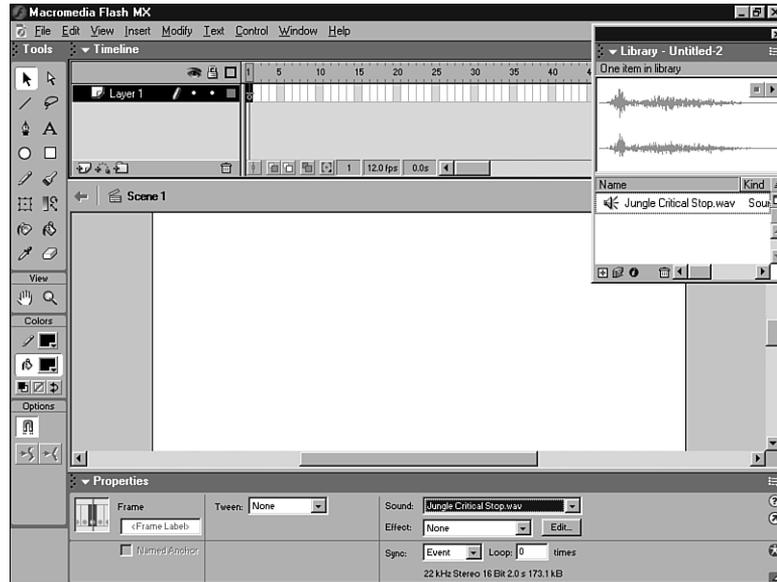
*When importing audio (or any media type for that matter), you can filter the types of files listed to include just sound formats.*



3. Although we're not covering how to "use" sounds in depth until the next section, it's very easy. Let's do it now. There are two basic ways to use the sound in a keyframe. One way is to drag the sound from the Library window onto the stage. However, this method requires an available editable frame (both an unlocked layer marked as editable with pencil and the current frame marker in a non-tweened frame). The other method requires you to select a keyframe (just click under "1" in your timeline) and then in the Properties panel select the sound you imported from the drop-down list (as shown in Figure 10.2). This list will display all the sounds previously imported into your movie.
4. Test the movie, and you should hear the sound. (Of course, your computer speakers and sound card must be functioning.)

**FIGURE 10.2**

*The imported sound appears in both the Library and in the Properties panel (when a keyframe is selected).*



## Importing Sounds from Another Library

I'm sure you'll agree that importing a sound is simple. There is, however, another way to import sounds. You can drag a sound directly from another Flash movie's Library. Either drag the sound item from one Library to the other or drag the sound onto the stage (when the current frame and current layer are open for editing). You can try this by opening the Sounds Library that ships with Flash. Make sure your Library is opened; then select Window, Common Libraries, Sounds. Position both Library windows so you can drag sounds from the Sounds Library to your file's current Library. You may notice that if you try the second method (that is, dragging from the Sounds Library to your stage), each sound will also be added to your file's library. Although a few of the sounds included in the Sounds Library are fun, this method will likely be more helpful when you want to take sounds from older Flash files you've made.

## Using Sounds

Now that we've imported the sounds into our movie, we can explore how to make them play at the correct times. There's really only one place you can use sounds in Flash: in keyframes. (One exception is adding sounds dynamically with the advanced ActionScripting method for sound objects called `attachSound`.) If you want a sound to

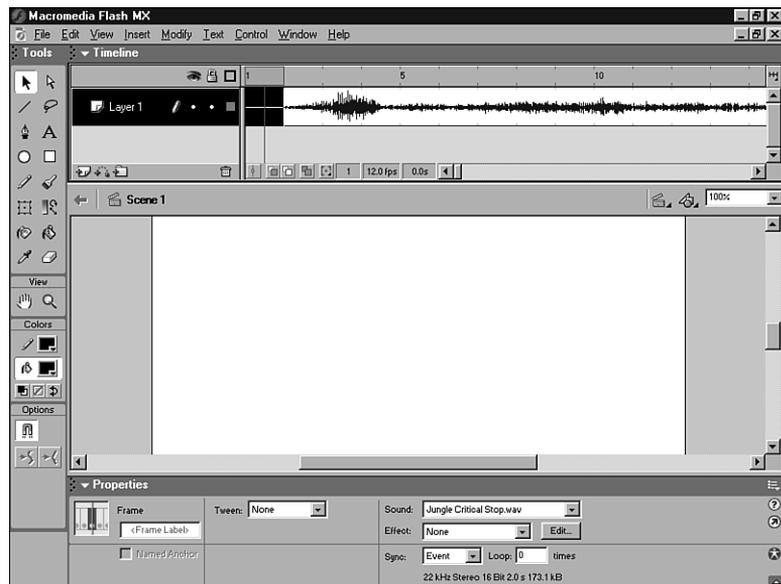
play whenever the user places his or her cursor over a button, you still need to place the sound in a keyframe—it’s just a keyframe in the button. Attaching sounds to a button is a little more complex, and we’ll cover that in depth in Hour 13, “Making Buttons for Your User to Click.”

Now that we know sounds go in keyframes, we need a way to put them there. When you select a keyframe, the Properties panel provides a way to control what sounds play when you reach the selected keyframe. Flash provides other clues for you to “see” where sounds have been placed. For example, if your Timeline is long enough, you’ll see a waveform for the sounds being used (as shown in Figure 10.3).

The Properties panel, however, is your best way to see which sounds have been added to which keyframe. But just like any other panel, the Properties panel displays only the sound used in the *selected* keyframe. Misreading this panel is very easy because it changes when you deselect keyframes. Figure 10.4 looks almost identical to Figure 10.3. However, in Figure 10.4, the Properties panel shows that no sound is being used. When you look closely at the Timeline, there’s a waveform displayed but no keyframe selected. Therefore, it’s necessary to look at the Properties panel *after* you’ve selected a particular keyframe.

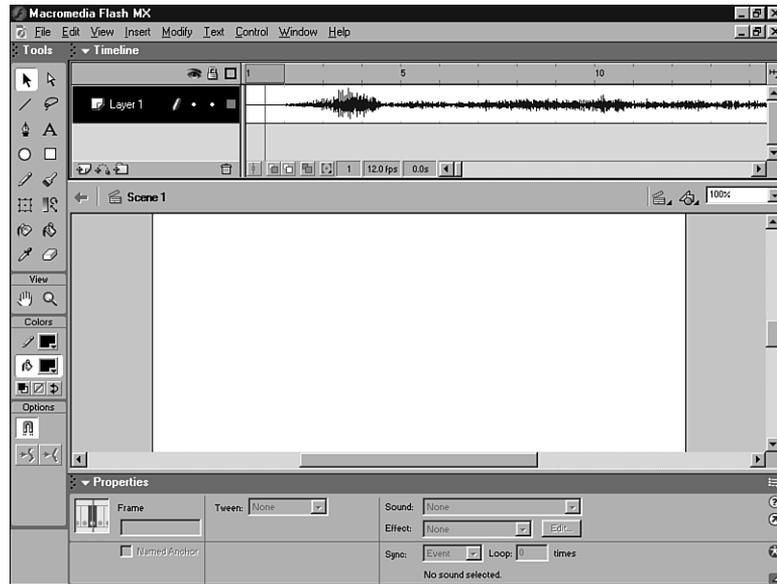
**FIGURE 10.3**

*The waveform (the picture of the sound) is displayed in the Timeline. This will be helpful when you’re trying to synchronize images with specific parts of your sound.*



**FIGURE 10.4**

*The Properties panel can be confusing. It only displays (or lets you specify) sounds when a keyframe is currently selected. Here, the keyframe isn't currently selected, so the Properties panel displays nothing.*



## Sync Settings

After we have the Properties panel reflecting sound for the intended keyframe, we can decide exactly how the sound should play. The most fundamental choice you need to make for each use of a sound is its Sync settings. These control exactly how a particular instance of your sound will play—or, more specifically, the priority of the sound compared to the visual elements in your animation. Before you try them out, see the following list and Figure 10.5 for an explanation of each:

- *Event* is the default setting and, generally, the best performance choice, especially for sound effects and other “incidental” sounds. When Event is chosen, sounds will start to play when the keyframe is reached and keep playing until they’re done. Event sounds might not coincide with visual elements the same way on everyone’s machine. Sounds won’t play slower or faster (that would make them sound funny), but a machine with slower graphics performance may take longer to display visual elements. Suppose you have a one-second Event sound and your framerate is 12fps. You would expect that during the sound, 12 frames would be displayed, but a slow machine might only display six frames a second, in which case the sound would finish in one second, as you would expect, but after only six frames have been displayed.

- *Start* is almost the same as *Event*, except that multiple instances of the same sound are prevented. With *Event*, a sound can be layered on top of itself, similar to singing a “round.” Think of *Start* as playing a sound if it’s not already playing.
- *Stop* is kind of weird—it’s for when you want a specified sound to stop playing. For example, if you import a sound called “background music” and by whatever means have it playing, when a keyframe is encountered with the same sound (background music) set to *Stop*, just that sound will stop. Any other sounds already playing will continue. This is a bit strange because you use the *Properties* panel to specify the sound (just like when you want the sound to play), but you’re specifying it as the particular sound you want to stop. Think of *Stop* as “stop this sound if it’s playing.”
- *Stream* causes the sound to remain perfectly synchronized with the timeline. Because, again, you can’t have sounds playing slowly if the user’s machine can’t draw frames quickly enough, Flash will skip frames to keep up. *Stream* sounds start playing when the first frame is reached and continue to play as long as there is space in the timeline. In other words, if your sound is three seconds long and you’re playing at 12fps, the timeline has to be at least 36 frames; otherwise, part of the sound will never be reached. The benefit of this setting is that synchronization will always be the same. If you place a graphic in frame 12, it will coincide perfectly with the first second of your sound. Just remember that when you’re using *Stream*, you have to ensure there are enough frames in the *Timeline* to accommodate the length of the sound. Finally, *Stream* sounds are previewed as you “scrub,” thus making the process of synchronizing audio to images possible.

**FIGURE 10.5**

For each instance of a sound, you must select a *Sync* setting (via the *Properties* panel).



The decision as to which *Sync* setting to use isn’t terribly difficult. *Event* should be used for any short incidental sounds—such as *rollover sounds*. Actually, I suggest *Event* for all sounds that don’t require critical synchronization. Background music that just plays and loops won’t need to be synchronized. Therefore, you should use *Event*. *Start* is a perfectly good alternative to *Event* and will simply prevent the layering of the same sound. For example, suppose you have a row of five buttons. If each button has the same rollover sound and the user quickly moves across all five, an *Event* sound will play once for each button. If the sounds are short enough, this is probably appropriate. However, if the sounds are quite long, they would become discordant. If you use the *Start* sync

setting, only one instance of the sound would play at a time, regardless of how fast the user moves his or her mouse. Event can be a better choice than Start when a little bit of overlap is okay. Consider a “ding” sound every time a ball bounces on the ground. If you choose Event the ball can bounce a second time and even if the first sound isn’t totally finished, it will play again. In any event, Start and Event are good for the majority of sounds you’ll play.

**NEW TERM**

*Rollover sound* is a sound effect that plays any time a user places his or her cursor over a button. You’ll learn about this later in Hour 13.

The Stop sync setting is very powerful. It gives you a way to stop specific sounds. Using this method can be a little tricky because it will only stop one sound per keyframe. When you learn about Actions (as you will in Hour 14, “Using ActionScript to Create Non-Linear Movies”), you can insert the “Stop All Sounds” Action to stop all sounds at once. Depending on the situation, this may be appropriate. If you’re giving the user the ability to get several sounds going at once, you’ll want to learn Stop All Sounds. However, suppose you have one sound playing in the background, and when a tween starts you want a special sound effect to play (and keep playing) until the tween ends. You can put the background sound in an early keyframe and then, in the first keyframe of the tween, place the sound effect and set its sync to Event or Start. In the last frame of the tween, you can put the same sound effect but set the sync settings to Stop. This way, the sound effect will stop at the end of the tween, but the background sound will continue.

Finally, Stream is good for one thing: synchronizing graphics with sound. This is especially useful for character animation where you want a character’s lips to synchronize with its voice. When trying to synchronize sounds with images, use the “scrub” technique mentioned earlier, but now with Stream sounds you’ll hear the sound as you scrub. Because Stream sounds effectively lock themselves to the Timeline, you probably don’t want to change the movie’s framerate. For example, a three-second sound will take 36 frames at 12fps. If you do some work and then change the framerate to 24fps, the same three-second sound spans 72 frames! Flash automatically spreads the Stream sound out so that it takes three seconds when you change the framerate, but Flash won’t change your graphics, which will now play in 1.5 seconds. See Figure 10.6 for a before-and-after example of changing the framerate after an animation is built.

In spite of this issue, you should stick with a framerate (which, really, isn’t anything new—it comes up even if you don’t use sounds). Stream sounds remain pretty appealing. However, you should realize that frames will be skipped to make sure the sound stays synchronized. Naturally, this only happens to users on slower-performing machines. It’s just that often it’s more important that every frame of your animation appears even if it means the sounds may drift out of synchronization. My point is that you should only use

Stream when the synchronization is critical (and you don't mind dropping frames). Otherwise, use Event or Start.

**FIGURE 10.6**

*The same animation and sound with frame-rates of 18fps (top) and 6fps (bottom). Notice that keyframes and tweening are not affected, but the sound needs to take more room when the Timeline is only advancing six frames per second (the audio can't expand or contract because that would sound funny).*



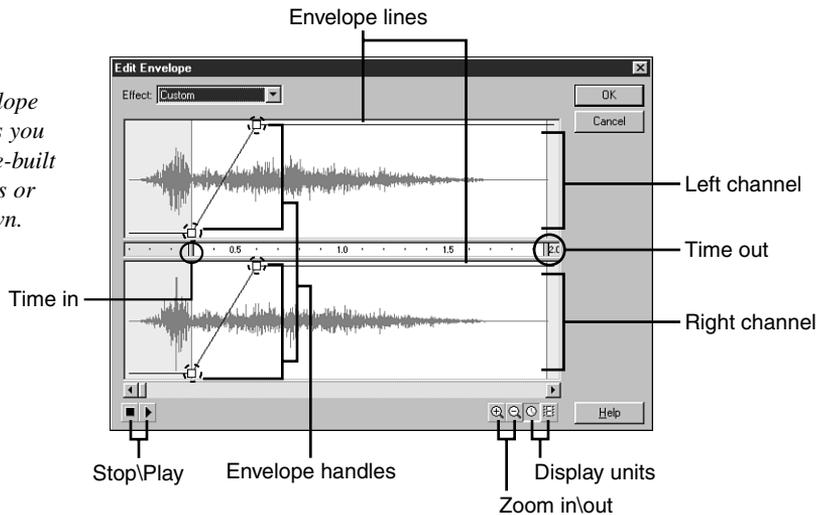
## Effect Settings

The Properties panel provides some pretty fancy effects you can apply to a selected sound. In the drop-down list next to Effect, you'll find effects such as Fade In and Fade Out as well as Fade from Left to Right and Fade from Right to Left. In order to understand and customize these settings further, you can either select Custom from the list or click the Edit... button on the Properties panel to access the Edit Envelope dialog box, as shown in Figure 10.7.

- *Left Channel/Right Channel* will display different wave forms if your original sound was stereo. Even if you only use mono sounds, you'll get the left and right channels so that you can still create *panning* effects. In the case of mono, the same sounds will come out of each speaker—you'll just be able to modify the volume of each.
- *Envelope lines* indicate the volume level at any particular time in the sound. When the line is at the top, the sound plays at full 100% volume. (Some audio tools are different because they use the middle to indicate 100% and anything higher to indicate amplified or boosted sound, but this is not the case in Flash.) If the envelope line is getting higher as you move to the right, the volume will increase.
- *Envelope handles* are like keyframes within the sound. If you want the envelope lines (indicating volume) to change direction, you'll need to insert a handle, which

acts almost like a keyframe for sound. All you need to do is click anywhere on a line and a handle will be inserted. No matter which channel you click, a matching handle is placed in the other channel. A handle in one channel must match the moment in time (left to right) of the handle in the other channel. However, the volume (height) can vary between the two.

**FIGURE 10.7**  
The *Edit Envelope* dialog box lets you select from pre-built panning effects or create your own.



- *Time In* lets you establish the starting point of a sound. You're effectively trimming the extra sound (or silence) at the beginning of the sound file. You're not telling the sound to start any later, but the sound you hear will begin wherever the Time In marker is placed.
- *Time Out* lets you trim extra sound off the end of a sound file. Often you'll see a moment of silence at the end of a sound file, and even if you don't hear anything, it still adds to the file size! You can get rid of it by moving the Time Out marker to the left. You won't actually destroy the source sound in your Library, but when you export the movie, the unused portions of the sound won't be used (so your file stays small).
- *Stop/Play* lets you preview all the settings you've made. This is important because although the waveform can let you "see" a sound, you ultimately want to judge the effect with your ears.
- *Zoom In/Out* lets you zoom out so the entire sound fits in the current window or zoom in for a close up to control precisely how you place the Time In/Out markers or envelope handles.

- *Display units (Time or Frames)* simply changes the units displayed (in the center portion) from time units (seconds) to frame units. Time is not as useful when you want to match your sound to a particular frame (where something visual occurs). If the display shows a peak in the music at 1 second, you have to use framerate to calculate exactly which frame that translates to. With the display set to Frames, Flash will do the calculations for you.

**NEW TERM**

*Panning* is an effect that makes sound seem to move from left to right or right to left. It's simply a trick in which the volume for one channel (left or right) is increased while the volume for the other channel is decreased. When combined with a graphic moving in the same direction, this technique can be very effective. Imagine, for example, a car moving across the screen at the same time the audio pans in the same direction.

Despite all the details in the Edit Envelope dialog box, you really only have two basic ways to use it: You can either use a preset effect or make your own. Actually, you can start with a preset (such as Fade In) and then make modifications to it, essentially making a custom effect based on a preset. Use the effects in any way you think appropriate. Listen to the effect after each change by clicking the Play button. Nothing you do here will affect the master sound in your Library. You can actually use the same sound several times throughout your movie, with different effects in each instance.

One of the most important things to remember is that the Time In and Time Out markers can save file size. Only the sounds and portions of sounds actually used will be exported when you publish your movie. Unused sounds in the Library and portions trimmed from the beginning or end of a sound will not be exported. Trimming a few seconds off the end of a sound can mean many seconds (even minutes) saved in download time for your users. Also, changing the volume of a sound has no impact on file size, so setting the envelope lines to the lowest level makes no sense.

## Loop Settings

Finally, note the Properties panel has a field where you specify the number of loops a particular sound should play. This simply makes the sound repeat the specified number of times without any pauses. This is great for sounds that loop well.

Some sounds loop better than others. Basically, a sound that loops well ends the same way it starts. There's an art to making sounds loop. Although importing a large song and using the Time In and Time Out markers to establish a nice looping sound is possible, it won't be easy. More likely, you'll have to find a sound already prepared by an audio engineer. A professionally prepared sound can loop so seamlessly that you can listen to it and not even notice it's looping; it will just sound like it's endless.

Also, if you have a sound that you want to loop “forever” (and you’re satisfied with its loop quality), the standard and recommended practice in Flash is to just put a very large number into the Loop field. Although it seems strange, that’s how you do it. If you type **9999999999**, Flash changes this entry to 2147483647. I suppose a very patient viewer could outlast the total number of loops, but consider that a one-second sound repeated 2,147,483,647 times takes 68 years to finish!



By the way, creating loops and even songs built from many separate loops isn’t all that difficult. Tools such as Sonic Foundry’s Sound Forge and Acid Pro give you all the tools necessary to create and assemble loops. These are professional tools that go beyond the needs of average Flash users—but you’ll probably be surprised how easy you can create music. Like Flash, you can try Sound Forge and Acid Pro free.

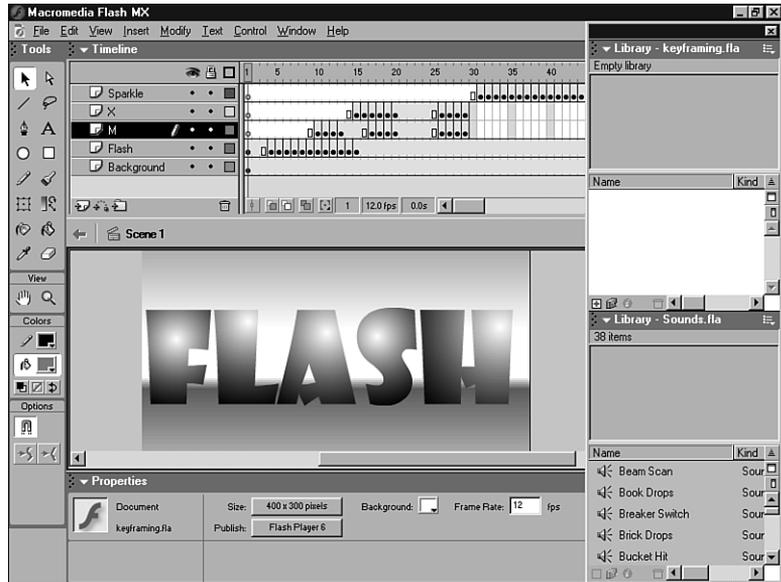
## Task: Add Sounds and Sound Effects to an Animation

In this task we add sounds to a sample movie. Follow these steps:

1. Download the file “keyframing fla” from my Web site. The address is: [www.phillipkerman.com/teachyourself/sourcefiles/keyframing fla](http://www.phillipkerman.com/teachyourself/sourcefiles/keyframing fla). In Flash, open this file and then press Enter to watch the animation. Also, open the Sounds common library from Window, Common Libraries, Sounds.
2. Open the Library for Keyframing by selecting Window, Library (or pressing Ctrl+L). Position the two open libraries so they appear side by side or dock them together as in Figure 10.8.
3. Drag the following sound items from the Sounds library to the Keyframing file’s library: Beam Scan, Smack, Visor Hum Loop.
4. Now these sounds will be available to your file, but we need to put them into keyframes. Let’s first make a new layer just for the sounds. Select Insert, Layer (don’t worry if it puts the layer under all others—it doesn’t really matter where it appears). Name this layer “Background Music”.
5. Select the first frame of Background Music and look at the Properties panel. From the Sound drop-down list, select Visor Hum Loop. To make it loop continuously, type a bunch of nines (**9999999999**) into the Loops field. See Figure 10.9.

**FIGURE 10.8**

*Position the Sounds common library next to the Keyframing sample file so we can transfer sounds.*

**FIGURE 10.9**

*When you type a high number into the Loops field, the sound will play continuously.*



6. Select Control, Test Movie. The sound loops nicely, and it adds a bit of drama to our movie. Let's add some incidental sound effects.

7. Select Insert, Layer and name the layer “Sound Effects”. We’re going to insert a sound effect right when the X smacks the M, which happens at about frame 17. In frame 17 of Sound Effects select Insert, Keyframe (or press F6).
8. Select the keyframe you just inserted and from the Properties panel select Smack from the Sound drop-down list. Just leave the default settings (Event Sync and 0 Loops) because we don’t want this sound to loop.
9. Select Control, Test Movie. The Smack effect is good, but the hum keeps humming throughout the whole movie.
10. To stop the hum, select frame 29 of the Sound Effects layer and select Insert, Keyframe (or press F6). Make sure you’re selecting just this keyframe, and then use the Properties panel to insert the Visor Hum Loop again, but this time select Sync Stop to cause any instances of this sound to stop. (You can Test Movie again to see and hear the results.)
11. Finally, let’s add a sound effect for when the sparkle animates. At frame 30 of Sound Effects select Insert, Keyframe (or press F6), select just this keyframe, and then insert the Beam Scan sound. Test Movie and it should be measurably better than the silent version. By the way, these sounds only add about 3K to the total file size! One thing you can try is to remove the excess silence at the start of the Beam Scan sound. Just select frame 30 in the Sound Effects layer and press Edit... on the Properties panel. Then you can cut sound off the beginning by dragging the Time In marker in the Edit Envelope dialog box (shown in Figure 10.7 earlier).

## Controlling Quality and File Size

Now that you know how to incorporate sound in your movie, it’s time to talk about optimizing it for export. A direct relationship exists between quality and file size. If you want the best quality sound, the file size will grow. Conversely, small file size means lower sound quality. This is just a fact. You ultimately need to make a decision as to how you balance this tradeoff. Is a high-quality sound important enough to make your audience sit through an extended download time? Is a speedy download enough to make your audience ignore a low-quality sound? You should be very deliberate in your decision-making process to end up with the best compromise possible.

While exploring this topic further, we’ll first cover some digital audio fundamentals and then you’ll learn how to apply this knowledge to Flash’s compression settings.

### Digital Audio Fundamentals

Digital sounds on the computer are not continuous. Similar to how a fluorescent light or your computer monitor flickers, digital audio is a series of discrete bursts called samples.

The frequency that these samples occur is so fast that you think you're hearing a continuous sound.

Exactly how fast the samples are occurring is called the *frequency rate* (also sometimes called *sampling rate*). Naturally, a higher frequency rate (many bursts per second) sounds better than a low rate. The frequency rate of all audio CDs, for example, is 44,100 hertz, commonly referred to as 44 kilohertz (KHz). Sound-editing software can convert a song to a lower rate but it won't sound as good. Why not always use the highest frequency rate possible? Simple. Each sample takes up disk space and adds to the file size. A sound with a frequency rate of 22,050Hz, for example, is *half* the size of one at 44,100Hz and may still sound good.

In addition to frequency rate, another important factor is *bit depth*. Similar to how each pixel on your computer monitor can be one of 256 colors (when the color depth is 8 bit) or one of 16.7 million colors (when the color depth is 32 bit), each sample in an audio track can be one of many sound levels (think of these sound levels as "shades of sound"). A sound with an 8-bit depth means that for every sample, the sound can be one of 256 different levels. A 16-bit sound has the potential of being one of 65,536 different levels. The higher the bit depth, the better the sound quality. (By the way, audio CDs have 16-bit depth.)

Frequency rate and bit depth are independent. One sound could have a high frequency rate (such as 44,100) but a low bit depth (maybe 8 bit). When you increase either factor (to improve quality), file size grows. To make matters worse, a stereo sound is always twice as large as the same sound in mono (because it contains information in two channels). Finally, the length of the sound affects file size directly—a longer sound is larger.

There are ways to calculate the exact size impact of frequency rate and bit depth. The bottom line, however, is that audio takes up a lot of disk space. One minute of CD-quality sound, for example, takes about 9 megabytes! The fact that pure CD-quality sound takes up so much space is why you want to find a better way.

One solution is compression. MP3 compression, for example, analyzes the sound file and finds ways to reduce the file size with minimal sacrifice to quality. Using MP3 compression, that same 9 megabytes of CD quality sound might get reduced to about 1 megabyte! Just like how JPG compression reduces the file size by removing parts of the image you don't notice, MP3 uses a technique to remove the parts of a sound that you're not likely to miss. Exactly how it does this, I don't know. It's magic, I guess. However, Flash can perform MP3 compression based on the level to which you would like your sounds brought down (namely, the bit rate). The best quality MP3 that Flash 5 supports is 160Kbps. A lower number means lower quality (but also means the amount of data per second is lower). One last note: When MP3 reaches 160Kbps (or whatever level you

specify), it makes its own decisions regarding the balance between frequency rate and bit depth.

## Export Settings

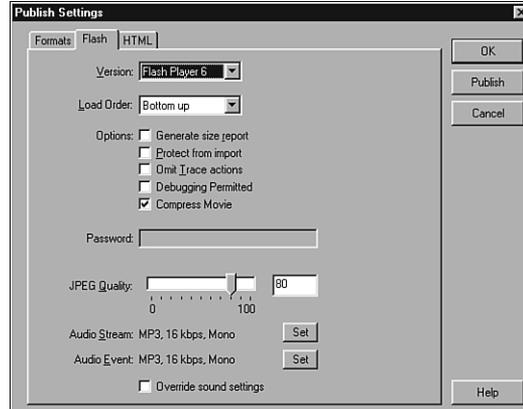
All this theory is interesting, but how do you apply it to your sounds? You have two places in Flash where you can specify quality settings: the Sound Properties dialog box, unique to each imported sound, and the Flash tab of the Publish Settings dialog box.

## Global Publish Settings

To set the default sound format for every sound in a Flash movie, select File, Publish Settings.... Make sure under the Formats tab that you've checked Flash (.swf), and then click the Flash tab (see Figure 10.10). You'll see two different sound settings in this dialog box: Audio Stream and Audio Event. Audio Stream affects sound instances using the Stream sync setting, whereas Audio Event affects sounds using the Event sync setting (it also affects sounds set to Start, although it doesn't say so). If you click the Set button, you can see all the options available, as shown in Figure 10.11. The following list provides a description of each option:

**FIGURE 10.10**

*The Flash tab of the Publish Settings dialog box provides you with a way to set the default sound settings globally for the entire file.*

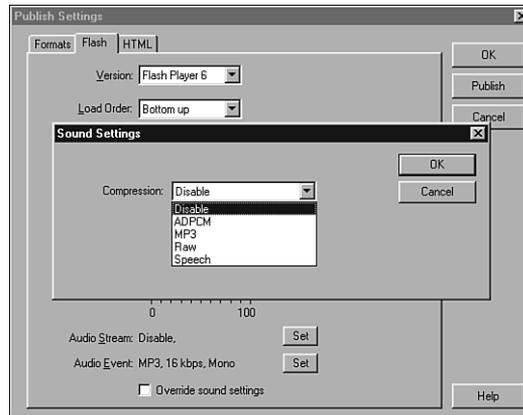


There's a Set button next to both Stream and Event so you can set the compression for sounds used each way separately. There are five choices for sound compression. With the exception of "Raw" (which is really no compression), you'll need to specify additional options for the compression you choose. For example, you can't just say "compress using MP3"—you have to specify how much MP3 compression. As each option has its own unique characteristics, let's look at each in detail:

- *Disable* is pretty simple: It tells Flash not to export any sounds. When you select Disable from the drop-down list, there are no other options to set.

**FIGURE 10.11**

*You can set the type of compression for all sounds in your movie from Publish Settings.*



- *ADPCM* is almost the same as *Raw* (below), except it performs a little bit of compression. The options for *Sample Rate* and *Convert Stereo to Mono* have the same effects as discussed earlier, but the *ADPCM* bits specify the level of compression. A higher number means better quality but not as small a file. Pretty much the only reason to use this option rather than *MP3* is when you have to deliver your movie to the *Flash 3* player (which more people have).
- *MP3* provides great compression. When exporting, always use the *Quality* setting “Best” because it won’t affect the file size but will improve quality. However, while working, you might consider temporarily changing this to “Fast,” because every time you test a movie (using *Test Movie*), it will go quicker. The bit rate is simply how much data per second you’re letting the *MP3* file take. The higher the number, the better. In theory, a bit rate of 56Kbps will be maintainable on a 56K modem, although reality is sometimes different from theory because other factors can slow the download performance. We’ll explore more issues related to downloading in Hour 20, “Optimizing Your Flash Site.” You really just have to test this out and keep lowering the bit rate until just before the sound becomes unacceptable. You can judge the result by testing the movie or (as you’ll see later in “Individual Export Settings”) you can test each sound individually.
- *Speech* is a new *Flash MX* compression setting (which, by the way, requires that your users have the *Flash 6* player). This compression setting is optimized for the human voice. In practice, however, you should always compare the quality/filesize effects of *Speech* compression to *MP3* because you’ll find the best choice varies case by case.
- *Raw* leaves your sounds intact, although you do need to specify a sample rate (frequency rate). Also, if you select *Convert Stereo to Mono*, any stereo sounds will become half their original size.

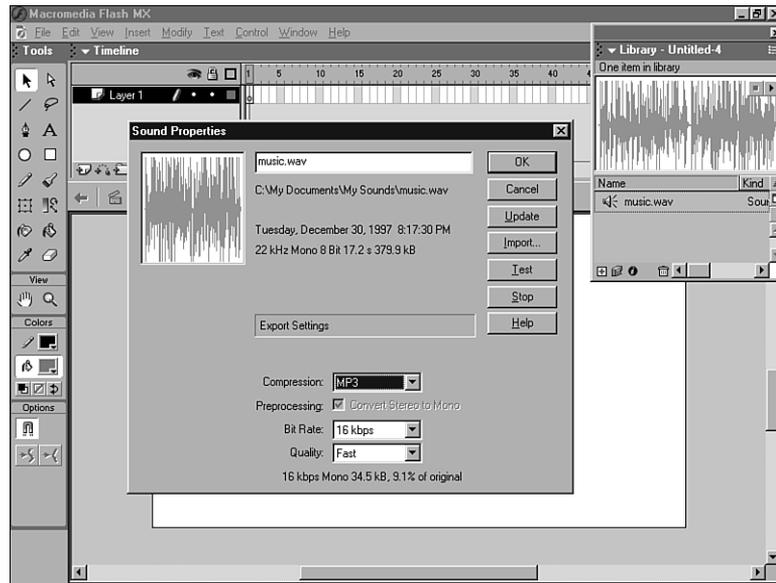
Now you've learned how you can set the default sound settings for both Stream and Event sounds from the Publish Settings dialog box. Also note the Override Sound Settings check box. This will cause the settings you apply here to be imposed on *all* sounds in your movie, regardless of their individual export settings. You're about to see how to specify sound settings individually per sound. Override can be useful when you want to publish a single copy for a special purpose. Say you want a copy to demonstrate from your hard drive—download time isn't an issue, so you could make all the sounds play at their highest quality (Raw).

## Individual Export Settings

In addition to a movie's globally specified sound settings, each sound item in the Library can have its own individual settings, which apply to every instance of that sound. Just double-click a sound in the Library (or from the Options menu, select Properties...), and you'll see the Sound Properties dialog box, as shown in Figure 10.12.

**FIGURE 10.12**

*The Sound Properties dialog box provides individual control of exactly how a sound will be exported (regardless of the default publish settings).*



This dialog box is similar to the Bitmap Properties dialog box you studied in Hour 3. In the same way that individual imported bitmaps can have their own set of compression settings, so, too, can imported audio. The choice of settings is practically identical to the settings under Publish Settings. However, in this dialog box, for each change you make, you're given details of the effect on file size and quality. Down at the bottom you'll see how much the file compresses for each change. If you click the Test button, not only will

Flash perform the compression you specified, but the sound starts playing and you can hear how it sounds (similar to the Test button for bitmaps, although with bitmaps you judge the visual effect). This gives you all the information you need to decide what settings to use. You can listen to the sound while assessing the effect on file size.

The Sound Properties dialog box has a couple other items you should note. The Default option will use whatever settings you specify in the Publish Settings. Also, you have the same ability to replace sounds as you do for replacing bitmaps. For instance, if you've edited a sound in a sound editor and you want to import the replacement sound, just click the Update button (if the file has moved, you'll be asked to point to the new location). Additionally, if you want to replace a sound (without taking the trouble of reassigning every keyframe where you've already used the sound), just click Import and select the new file when prompted.

## Tricks for Efficiency

Obviously the best way to reduce file size (in respect to audio) is to avoid using audio. Although this may sound facetious, it's worth consideration. You should force yourself to consider each sound you use, and if it's not adding something to your file, it's most certainly distracting because it's adding to the file size (and that's a distraction during download). Gratuitous sound effects are worse than gratuitous visual effects because sounds add significantly to the file size. Just be extra critical when asking yourself whether a particular sound is really necessary.

After you've decided that a sound is, indeed, necessary, you still have ways to reduce the sound's impact on the file size. The best way is to trim any "silence" at the beginning or end of the audio. Silence still adds to the file size. Ideally, you should do this before importing the audio into Flash, but you can also do it for each instance through the Edit Envelope dialog box shown earlier. Another great way to reduce file size is to use a short looping sound instead of a long linear sound. Of course, there's a possibility of selecting a loop that can become monotonous, but you might be surprised how much "mileage" you can get from one simple loop. Sprinkle a few incidental Event sounds independent of the loop, and it can often sound very interesting.

Probably the most subjective question is "Which level of compression is appropriate?" First of all, it makes the most sense to always start with the best quality sound possible and then selectively reduce the file size and quality as appropriate. (The only exception is an MP3 file that you believe already has the best possible compression—in which case you wouldn't want to recompress it.) If you start with a bad sound, it's never going to get any better. You always want to start with top-quality sounds.

Determining which level of compression is appropriate is really a subjective decision, but that doesn't mean I can't make a few suggestions. First of all, there's a common misconception that audio containing voice can withstand the most compression, whereas music can't. This is just plain false! A better generalization would be to say that sounds of natural items (acoustic instruments and voices, for example) are best kept at a high quality, whereas sounds of synthetic items (such as a distorted electric guitar and synthesized keyboards) will likely be perfectly acceptable at a lower quality. This is true because any sound on the computer is fake—you're trying to make the user believe the sound is one thing or another when, in fact, it's just electronic data. When you attempt to simulate something natural, such as a voice or acoustic instrument, your audience has a good recollection of what that sound is supposed to sound like, and they'll notice if it doesn't sound right. On the other hand, sounds from an electric guitar, for example, can be distorted and still sound perfect. Ultimately, you'll still need to test each compression setting to hear how it sounds, but just remember it's easier to notice that something's wrong when a natural sound gets distorted.

One other fact: If everything else is kept equal, a mono sound will appear “cleaner” than a stereo sound. This doesn't mean that you shouldn't use stereo. Instead, simply realize that in order to maintain quality in a stereo sound, you usually can't compress as much (and add to this the fact that stereo sounds are twice as big as mono sounds). Therefore, just be absolutely sure you *need* stereo sound (and remember you can still pan the left and right channels without a stereo sound).

## Summary

Flash supports audio elegantly. Including audio in your movie is a simple process of importing the sound and then deciding in which keyframe you want the audio to play. Many options are available on *how* the audio plays—for example, whether it plays and finishes naturally (Event) or whether you want it to lock itself to the timeline so images remain synchronized no matter what (Stream). You're also given sophisticated envelope controls for each instance of a sound used.

Because the effect on file size is the biggest “cost” of using audio, Flash provides a variety of compression technologies and settings to individually or globally specify the kind of compression you want to use. I'm sure you'll find MP3 or Speech to be the best quality, when considering file size, for almost any sound you want to use, but other alternatives do exist. If nothing else, I hope this hour has made you more deliberate and restrained when adding audio to your movies. Don't get me wrong—the power of audio is great. Just try not to abuse this power when you're given it. (Your slow-connection users will thank you.)

## Q&A

**Q I placed a long-running sound in the first frame of my movie. However, when I test the movie, it only plays for the first few seconds and then stops. Why?**

**A** Probably you've set the sync for the keyframe (on the Properties panel) to Stream and haven't extended the Timeline long enough. If your sound is 10 seconds long and you're playing at 12fps with Stream selected, you're going to want to make sure 120 frames are available in the layer of the Timeline in which you placed the sound. An Event sound doesn't have this restriction (although it also won't have the same synchronization behavior).

**Q I put a sound in the first frame of my movie, but when I click Play, I don't hear anything. I verified that my speakers were plugged in and that my computer sound level was cranked. What else could it be?**

**A** I wish I could say that you must use Test Movie because otherwise the sound won't work. Of course, Test Movie is a better option for visualizing exactly what your users will see. However, even Play should let you preview the sound. You might check two things: First, Control, Mute Sounds should be unchecked, and the envelope settings for the sound instance should not be two horizontal lines at the lowest sound level. Second, you might check the original sound that you imported to make sure it's not just silence.

**Q I imported an MP3 sound and want to make sure I don't recompress it because I know that tends to make for bad quality. How do I do that?**

**A** Very simple. It's similar to how a JPG image (already compressed by definition) can be set to "not compress." When you access the Sound Properties dialog box (by double-clicking the sound item in the Library), you will see the "Use imported MP3 quality" check box. This selection is made by default and it's only available for MP3s. Translated, this option means "don't recompress."

**Q I imported an MP3 file that was only 61KB, but when I export the movie, it becomes 900KB. I'm sure my graphics aren't that big because when I remove the sound, the file goes down to 5KB. What could possibly be wrong?**

**A** Most likely you're resampling the sound (as Raw) and Flash is converting the sound into the size it would have been as an uncompressed sound. Check the Publish settings for Flash and confirm that you don't have Override Sound Settings selected. Then inspect the Sound Properties dialog box for the Library item of your imported sound and confirm that the MP3 settings match the original attributes of your file (shown near where the date and file location are displayed).

## Workshop

The Workshop consists of quiz questions and answers to help you solidify your understanding of the material covered. Try to answer the questions before checking the answers.

### Quiz

1. Which is a better quality audio format to use for your original files—AIF or WAV?
  - A. AIF, because it was developed for the Macintosh.
  - B. WAV, because it was developed more recently.
  - C. Neither, because they both can be the same quality.
2. Where do you place sounds in order to hear them in the final movie?
  - A. In the Library, in symbols, or in keyframes.
  - B. In keyframes (no matter where they are).
  - C. In the sound layer.
3. How do you make a sound loop forever?
  - A. You can't, but you can type a really high number in the Loop field of the Properties panel, and that's close enough.
  - B. Type **infinity** into the Loop field.
  - C. Make sure the sound file has "loop" in the filename.

### Quiz Answers

1. C. There's nothing inherently better about AIF or WAV—either can be high quality or low quality.
2. B. Sounds are placed into keyframes, either via the Properties panel (when a keyframe is selected) or by dragging the sound right onto the stage from the Library.
3. A. Although all these options seem equally goofy, the first option is the one that works. By the way, you can only type integers into the loop field, so something such as "1.5" won't work either.

