

Chapter 12

Editing Sound Files

Unless you are much better at recording than I am, you probably need to clean up your recordings after you make them. Perhaps you need to trim the beginning and the end. You may want to add a little echo or other sound effects. You may also want to mix two sounds together. This chapter shows you how to do these and other basic editing tasks using the editors introduced in Chapter 12: Sound Recorder and Cool Edit for Windows and SndSampler for Macintosh.

What you'll learn:

- How to edit sounds using Windows Sound Recorder
- How to edit sounds using Cool Edit for Windows
- How to edit sounds using SndSampler for Macintosh

Don't forget that you are free to edit your own original work as much as possible, but other people's works are copyrighted and you are not supposed to copy or edit them. (End of lecture for this chapter. Refer to Chapter 11 for a brief discussion of copyright laws.)



Tip

Whenever you edit a sound, make a copy first and then edit the copy. That way, you can always get back to the original sound if need be.

Using Windows Sound Recorder

Windows Sound Recorder provides a few simple editing facilities for WAV files:

- Change the properties of the WAV
- Copy all or part of a WAV
- Delete all or part of a WAV
- Add to the WAV
- Insert or mix in another file
- Increase and decrease the volume and speed
- Add echo to all or part of the WAV
- Reverse all or part of the WAV

You can edit only uncompressed (PCM) sound files. If you don't see a green waveform when you open the file, it is compressed and can't be modified as is. You can uncompress it by changing its format to PCM, as explained in the next section.

Converting audio properties

You can change the audio properties of a WAV in the Sound Selection dialog box, shown in Figure 12-1. Open the desired WAV in Sound Recorder and then choose File ⇨ Properties to see its current properties. Then choose the Convert Now button to open the Sound Selection dialog box. You can select new properties in the Format and Attributes drop-down list or select one of the named setups from the Name list. (The Name list is explained under the "Setting the recording properties" section in Chapter 11.)

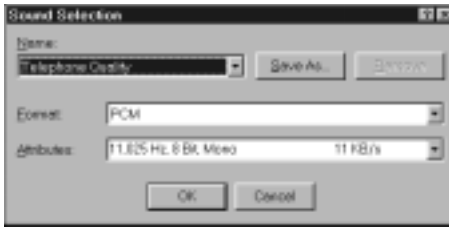


Figure 12-1 *Sound Recorder's Sound Selection dialog box lets you change a sound's properties.*

You may not like what you hear after changing a sound's properties. If you try to increase its quality — from mono to stereo, from 8-bit to 16-bit, or from 11 kHz to 22 kHz, for example — Sound Recorder must generate new sound samples based on the current ones. This is definitely not the same as recording the needed samples to start with. The result can sound pretty bad. Reducing the sound quality works better, as Sound Recorder merely needs to remove existing sound samples.

Selecting and replacing all or part of a sound

You can apply some editing functions to the entire sound or just part of it. For example, you can replace the middle part or mix in another file starting at a specific point. Sound Recorder gives you limited ability to select part of a sound for editing. All you can do is place the position slider where you want to start editing. In Figure 12-2, I placed the slider at .13 second.



Figure 12-2 *To edit part of a sound, you position Sound Recorder's slider where you want to edit your sound.*

**Tip**

Positioning the slider at just the right point is often a matter of trial and error. Drag the slider and listen to the result. Then drag the slider again. Use the Position time and the waveform display as guides.

To record over any part of a sound, simply position the slider where you want the replacement to begin and start recording. If the replacement is longer than the original file, Sound Recorder extends the file up to a point. As I explain in Chapter 11, Sound Recorder limits the length of a new recording, and you have to press the Record button again each time you reach the limit.

Inserting and mixing files

You can add other sounds to your current sound by inserting or mixing. Figure 12-3 shows the difference between these two techniques. In the figure, Sound A represents the currently open file—the sound being edited. The gray dotted line marks the current position in this file, right after the first of four loud bangs. Sound B is another sound—perhaps another file or something on the Windows clipboard.

Inserting a sound is much like inserting text in a document. As you can see in Figure 12-3, Sound B is inserted after the first bang, and the rest of Sound A is moved over to make room for it. The result is a longer file. If you played the file, you would hear Sound A up through the first bang, then Sound B, and then the three remaining bangs and the rest of Sound A.

Mixing two sounds adds them together, starting at the current position. If you examine the mixed sound carefully in Figure 12-3, you can see how the softer sounds from Sound B were blended right in with the four bangs. The file might or might not be longer, depending on the length of Sound B. In the example, Sound B is considerably shorter than Sound A, so it did not extend the file's length.

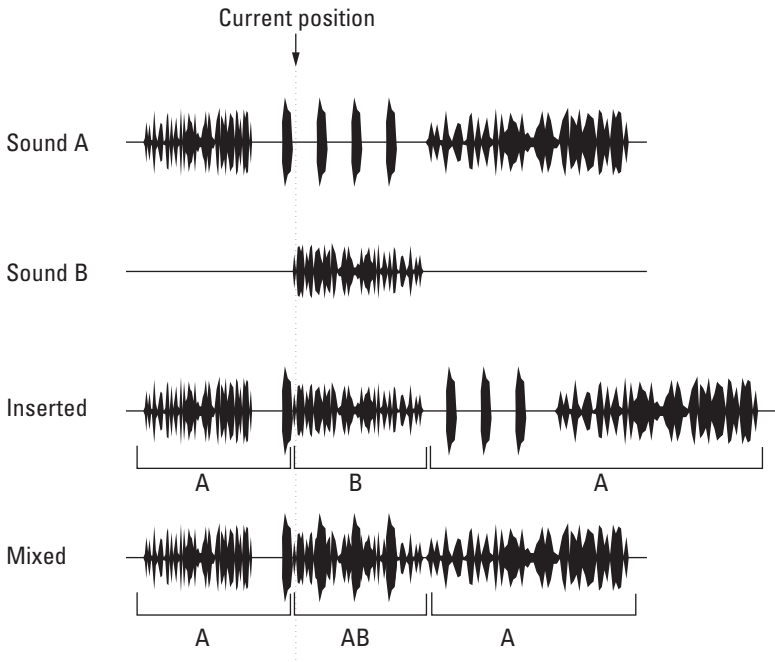


Figure 12-3 You can insert or mix a second sound into the current sound.

How to insert or mix another file into the current file:

1. Open the sound to be edited.
2. Position the slider.
3. Choose Edit ⇨ Insert File or Edit ⇨ Mix with File to open a common browse box.
4. Select the file to be inserted or mixed and choose Open.

Deleting the beginning or end of a sound

Sometimes when you make a new recording, you accidentally record a second or two of silence at the beginning, perhaps followed by the

sound of you picking up the microphone and clearing your throat. You don't have to rerecord the sound to get rid of the rubble at the beginning. You just delete the part you don't want. Sound Recorder gives you the option of deleting the beginning or the end of a sound. Unfortunately, you can't delete a middle part.

How to delete the beginning of a recording:

1. Position the slider where you want the edited sound to start.
2. Choose Edit ⇨ Delete Before Current Position. A message box asks you to confirm the deletion.
3. Choose OK in the message box to confirm the deletion.

How to delete the end of a recording:

1. Position the slider where you want the edited sound to end.
2. Choose Edit ⇨ Delete After Current Position. A message box asks you to confirm the deletion.
3. Choose OK in the message box to confirm the deletion.

Adding sound effects

Sound Recorder's Effects menu offers a limited number of effects:

- Increase and decrease volume
- Increase and decrease speed
- Echo
- Reverse

They all affect the complete sound. You can't add an effect to just a portion of the file in Sound Recorder. To use one of these effects, just select it from the Effects menu and then listen to the result. If you find you don't like it, the next section shows you how to get rid of it.

Discarding and saving changes

Sound Recorder does not have an Undo feature. If you decide to discard the changes you have made, choose File ⇨ Revert to get rid of them. This command returns to the last saved version of the file so you can continue editing.

When you're satisfied with your changes, choose File ⇨ Save to replace the former version with the new one. Or choose File ⇨ Save As to create a new file out of the edited version.

Using Cool Edit for Windows

As you can see in the last section, Sound Recorder is pretty limited. Cool Edit, on the other hand, has more features than I can hope to cover here. It's great for casually playing around with sounds, as it offers lots of special effects. But it's also an excellent tool for heavy-duty editing, such as filtering out the background noise from an on-the-street interview and equalizing the volume to eliminate sudden lows and highs. This chapter concentrates on the more casual and fun editing functions such as the special effects.

Until you register Cool Edit, the dialog box shown in Figure 12-4 appears each time you start it. You may select only two groups of functions to work with. Always select the first group because it includes the Save function. Otherwise, you won't be able to save your editing. The other group is up to you. In the example in Figure 12-4, I chose a group of effects that I was planning to use in that session.

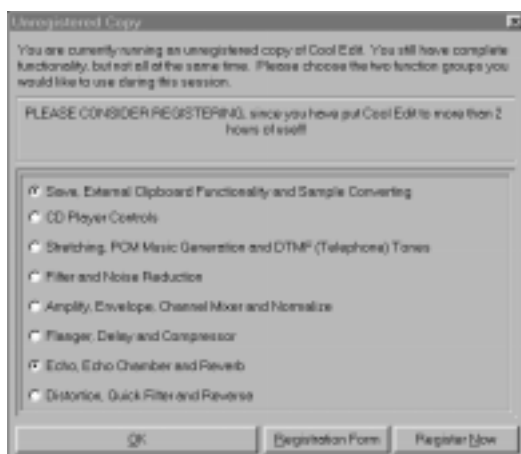


Figure 12-4 *Cool Edit encourages you to register by permitting only two function groups at a time in the unregistered version.*

Converting sound files

Cool Edit makes converting a sound file to another format simple. Just open the file and choose File ⇨ Save As to open the Save Waveform As box shown in Figure 12-5. You can select a different file type and give the file a new name and location in this box. For example, you might open a WAV file, choose File ⇨ Save As, and then select Apple AIFF from the “Save as type” drop-down list. Now you have both the WAV and the AIFF versions.

Suppose you want to change an uncompressed WAV into a compressed WAV using μ -law compression. Open the WAV, choose File ⇨ Save As to open the Save As box, and choose A/ μ -law Wave. The Options button in the Save As box becomes available when you select this file type. Choose it to pop up a dialog box where you can select between a-law and mu-law.

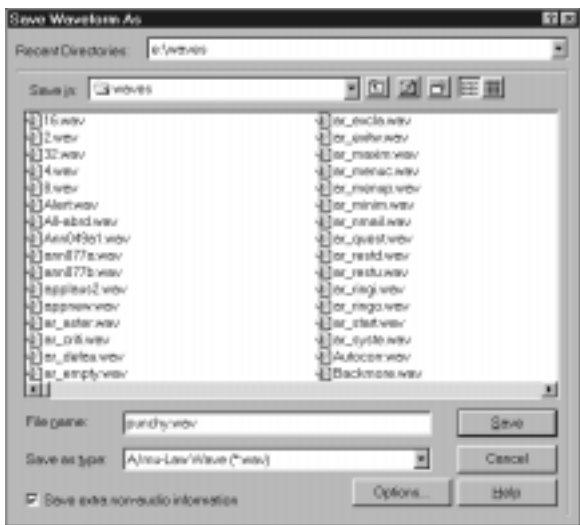


Figure 12-5 *Cool Edit's Save As box lets you convert files from one type to another.*

Suppose instead that you want to change the sound's properties. Choose **Edit** ⇨ **Convert Sample Type** to open the dialog box shown in Figure 12-6. As you can see, you can change the sampling rate, sample size, and number of channels.

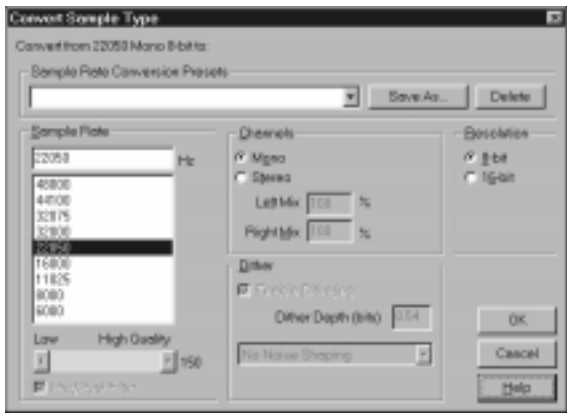


Figure 12-6 *You use Cool Edit's Convert Sample Type dialog box to change a sound's properties.*

If you change the number of channels, you indicate the volume mix in the Left Mix and Right Mix boxes. When you go from mono to stereo, use the Left Mix and Right Mix boxes to indicate the relative volume of the channels. You can also assign -100% to one channel for an “inverse mono” effect, where each channel is the inverse of the other. When going from stereo to mono, the Left Mix and Right Mix boxes determine how the two channels are mixed into one.

The Quality setting determines the overall quality of the converted sound. The higher the setting, the longer the conversion takes. When you are *upsampling*—that is, increasing the sampling rate or sample size—there’s not much difference between the low and high settings, so try a setting around 100. When you are *downsampling*—decreasing the sampling rate or sample size—higher quality settings produce a better result. Try a setting around 400 to start with. If the result sounds muffled, undo the conversion and try it again with a higher quality setting.

Working with a selection

You can select any portion of a sound for editing. Just drag your mouse pointer across the desired area in the waveform display. In Figure 12-7, I have selected the samples from 80,000 to 130,000. The selected portion is shaded by default in light blue. Yellow markers above and below the waveform display also indicate the selected area.

When an area is selected, many of Cool Edit’s commands apply only to the selection. If you choose the Play button, for example, only the selection is played. Transformations such as stretching and echo apply only to the selection by default.



Figure 12-7 Shading indicates the selected portion of the sound wave.

The Zoom button lets you examine the current selection close up by expanding it to fill the waveform window. Choose the In button to get even closer—you can click it several times to keep expanding the wave. The Out button reverses the effect of the In button. Or you can use Zoom to return the entire selection to the window. The Full button restores the original view of the complete waveform.



Tip

An easy way to select the portion of the wave that appears in the window is to double-click it.

If instead you just want to position the pointer at a specific spot, click that spot on the waveform. A dotted line appears in the waveform to mark the spot, and the yellow markers appear above and below it. Any editing applies from that point to the end of the sound. The zooming commands try to keep the selected spot centered in the window.

When working with a stereo sound, you can edit one or both channels. To select both channels, drag or double-click somewhere near the middle of the waveform window. To select a single channel, drag or double-click somewhere near its outside edge. To select part of the left channel, for example, you would drag near the top of the waveform window. To select the entire visible portion of the bottom

channel, you would double-click near the bottom of the waveform window. The letter *L* or *R* attaches to your mouse pointer when you're in the proper position to select just the left or right channel.

Pasting and mixing a selection

When you cut or copy a selection, you can paste it somewhere else in the same file or another file. All the commands you need are on the Edit menu: Cut, Copy, Paste, and Mix Paste. The effect of the Paste command depends on whether something is selected. With no selection, the sound is inserted at the current position. With a selection, the sound replaces the selection.

When you choose Mix Paste, the dialog box shown in Figure 12-8 opens so you can choose how you want the sound to be inserted or mixed. If you choose Insert, the effect is much the same as the Paste command. The Overlap function mixes the two sounds. Modulating is similar to Overlap—the samples are multiplied by each other instead of added. You might try both methods to see which produces the result you want.



Figure 12-8 *The Mix Paste dialog box gives you control over how a clipboard sound is pasted into the current sound.*

When you Overlap or Modulate, the Volume sliders adjust the volume of the sound from the clipboard. Use Lock Left/Right to keep the two sliders together. If you want different volumes for the left and right tracks, disable Lock Left/Right.

**Tip**

Notice that the Mix Paste function also gives you the ability to select a file to mix into your current file. Just enable “From File” and then click the Select File button.

Undo, reverting, and saving

Cool Edit keeps track of your edits and lets you undo them by choosing Edit ⇨ Undo *edit*, where *edit* is the action to be undone, as in Undo Delete or Undo Record. You must undo edits in reverse order. Suppose you change the format, then delete a section, then record a section. To undo the changed format, you must first undo the recording, then undo the deletion, then undo the format change. The number of actions that Cool Edit can undo is dictated by the amount of space available in your Windows temporary folder. By default, Cool Edit will warn you if it cannot keep track of at least five actions. Usually, there is plenty of room for at least five edits.

If you want to undo all the changes you have made so far, the File ⇨ Revert to Saved command is the easiest way. This restores the file to its last saved condition. You can’t undo any editing that has been saved, of course.

You save your editing just as you do with most Windows programs, with File ⇨ Save to replace the current file or File ⇨ Save As to create a new file. You can also save the current selection as a separate file with File ⇨ Save Selection. Don’t forget that saving is one function that must be enabled when you start up the unregistered version of Cool Edit. If you don’t enable it during startup, you won’t be able to save your work.

Basic editing operations

Many of Cool Edit’s basic editing operations are the same as in word processing. After selecting part of a sound, you cut, copy, delete, or replace it. But there are a couple of functions unique to sound files, such as trim and silence. The following list reviews the basic editing functions:

- To delete the selection, press the Delete key. If the selection involves only one track of a stereo recording, Cool Edit replaces it with silence, rather than deleting it, to keep the two tracks in sync.
- To replace the selection with silence, choose Transform ⇨ Silence.
- You record over the selection simply by choosing the Record button and recording something else. Recording automatically stops when you reach the end of the selection.
- To copy the selection, choose Edit ⇨ Copy.
- To cut the selection, choose Edit ⇨ Cut. As with deleting, if the selection is limited to one track of a stereo recording, Cool Edit replaces it with silence rather than deleting it.
- To trim the selection, choose Edit ⇨ Trim. Trimming deletes everything *but* the selection — the opposite of deleting.



Note

In the unregistered version of Cool Edit, unavailable functions appear dimmed on the menus and in the toolbar. You may need to restart Cool Edit with a different set of functions to access the one you want.

Adding sound effects with Cool Edit's Transform menu

Cool Edit's Transform menu offers many ways to manipulate (or *transform*) a sound, from reversing it to stretching it. Some are fairly easy to learn and to use, while others are much too complex to cover here. This section shows you some basic transforms: inverting, reversing, and delays (which include echoes and reverb).

Inverting

Inverting a selection essentially turns the waveform upside down. The peaks become valleys and the valleys become peaks. Interestingly, if you invert a mono wave or both tracks of a stereo wave, you probably won't be able to hear a difference. The difference becomes noticeable when you invert just one channel of a stereo recording. Choose Transform ⇨ Invert to invert the selection.

Reversing

Reversing a selection turns it backwards. If you want to check out a rumor that a certain song includes hidden messages, try reversing it by choosing Transform ⇨ Reverse. You may also need to speed it up or slow it down using the Stretch transform (explained in the "Stretch" section below).

Stretch

Stretching a selection changes its tempo and/or pitch. It comes in especially handy when editing a song you want to sing along with. When you choose Transform ⇨ Time/Pitch ⇨ Stretch, you can set sliders to slow the selection down, speed it up, lower its pitch, or raise its pitch. You can even use the Gliding Stretch feature to have it gradually become slower or faster, lower or higher, rather than change the entire selection at once. (Try singing along with that!)

Delay

The Delay option lets you insert so many milliseconds of silence at the beginning of the selection. Transform ⇨ Delay Effects ⇨ Delay opens the dialog box shown in Figure 12-9, where you set up the delay. The Delay slider and text box indicate how much delay you want. The maximum slider value is 500 ms, but you can type a larger value in the text box.

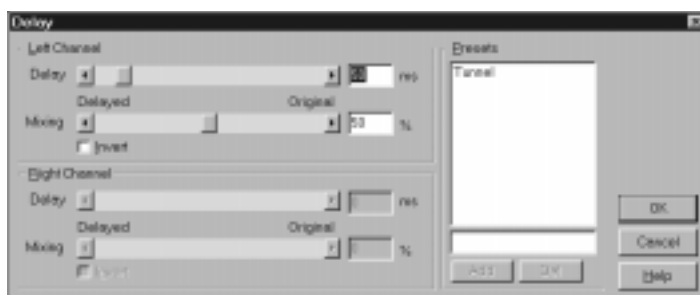


Figure 12-9 *The Delay dialog lets you specify the details of a delay effect.*

You can replace the selection with the delayed sound, or mix the delayed sound into the original sound for an echo effect. If you don't want to mix the delayed sound into the original sound, set the Mixing slider and text box to zero percent. A value above zero indicates how much of the original sound to include in the mix. A value of 50 percent mixes the two sounds equally. Seventy-five percent gives prominence to the original sound, with the delayed version sounding like a distant echo. When working on a stereo sound, you can delay and mix the two channels separately.

Presets are a handy feature of Cool Edit. When you create an effect you like, you can give it a name so you can recall it later without having to remember all the settings. Cool Edit starts you off with a few presets in many of the Transform dialog boxes. For example, it provides the Delay preset called Tunnel, which sets the delay to 26 ms and the mix to 60 percent. To use a preset, double-click its name in the Presets list. To create your own preset, set up the desired values in the dialog box, choose Add, and give it a name. To remove a preset, select it and then click the Del button.

Echo

The Echo effect creates a more sophisticated echo than a simple delay. It provides continuous echoing, with each echo fading away at the rate you specify. Figure 12-10 shows the dialog box that opens

when you choose Transform ⇨ Delay Effects ⇨ Echo with a stereo selection. (When only one track is selected, the Echo Characteristics section shows sliders and text boxes for only one track.)

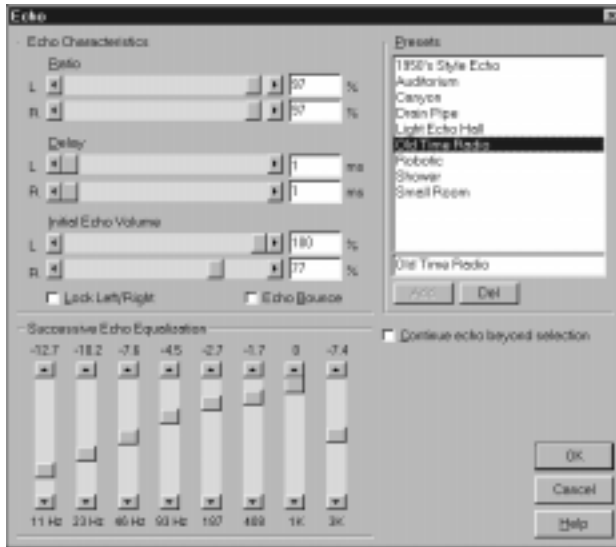


Figure 12-10 You use Cool Edit's Echo dialog box to set up the properties of an echo.

The three main settings are Ratio, Delay, and Initial Echo Volume. Ratio determines how the echoes fade out. If you set it to 50 percent, each echo will be 50 percent softer than the preceding one until they fade out entirely. At 100 percent the echoes never fade, whereas at 0 percent they never appear. Delay determines how quickly the echoes follow each other, in milliseconds. Initial Echo Volume specifies the first echo's volume as a percentage of the original sound's volume.

Echo Chamber

The Echo Chamber function also creates a complex echo. But instead of calculating factors such as Ratio, Delay, and Initial Echo Volume yourself, you specify the characteristics of a room and the location of the microphones, and it calculates the echo for you. Figure 12-11 shows the dialog box that open when you choose Transform ⇨ Delay Effects ⇨ Echo Chamber. Notice that Cool Edit gives you a number of presets that you might find handy as an alternative to setting these options yourself.



Figure 12-11 *The Echo Chamber dialog box lets you add an echo effect to the selection by specifying the characteristics of the “room.”*

If you want to try your hand at your own settings, try to imagine a place that gives the effect you want to create. Suppose, for example, you want the effect of a cavern. The dimensions are set in feet, so you might decide that your cavern is 200 feet long, 100 feet wide, and 100 feet high.

Damping factors indicate the sound absorption of the various surfaces of the room, from 0 (total absorption—imagine heavy velvet drapes) to 1 (no absorption). Your cavern, with its slimy wet walls, ceiling, and floor, has no absorption, so you might set all the damping factors to 1.

Intensity determines the volume of the echoes as a percentage of the original sound. Because each echo adds to the overall volume of the sound, you can end up with too much volume, which results in clipping, if you set the intensity too high. I find that a number between 80 and 99 works best.

Echoes specifies the number of echoes that you want to produce. Cool Edit suggests using at least 300 echoes for good reverb. A cavern would probably produce some distinct echoes rather than a general reverb, so you might try around 30 echoes to start with. You can use numbers as high as 25,000 or so if you have enough RAM for Cool Edit to do the calculations.

You'll find the greatest differences in effect result from the source and microphone placement. The source placement determines where the sound is coming from. You specify it in feet from the left wall, the back wall, and the floor. To place the sound source in the exact middle of the cavern, you would put it 100 feet from the left wall, 50 feet from the back wall, and 50 feet above the floor. The microphone placement indicates where the microphone is located, in feet. The further it is from the sound source, the more echoing you'll get. In your cavern, you could try placing the microphone 50 feet from the left wall, 70 feet from the back wall, and 4 feet above the floor for a start. Then move it around until you get the effect you want.

When you have completed the settings, choose OK to close the dialog box. Cool Edit calculates the new wave. The more echoes you specified, the longer the calculations take, but it's only a matter of seconds with a reasonably fast Pentium. Then choose Play to hear the transformed sound. If you decide to try again, choose Edit ⇨ Undo Echo Chamber to return to the previous version. Then choose Transform ⇨ Delay Effects ⇨ Echo Chamber to reopen the Echo Chamber dialog box. Cool Edit remembers your previous settings, so it's easy to make a few adjustments and try again.

When you find the settings you like, you might want to turn them into a preset for future use. Simply type a name such as Cavern at the bottom of the preset box and choose Add.

The Flanger effect is difficult to describe. It sounds like someone

The Initial Mix Delay slider indicates how many milliseconds to

The Stereo Phasing setting is available only when you're editing a stereo selection. It determines the delay settings for the two channels in relationship to each other. If you set it to 0, both channels use exactly the same delay settings. But if you set it to 180, one channel starts off with the initial delay setting and moves to the final delay setting, while the other channel does just the opposite. This is a fun setting to play around with for some interesting effects.

The Rate settings determine how fast the flanged signal moves from the initial delay setting to the final delay setting and back again—which is considered one complete cycle. You can set it in terms of cycles per second, or the number of seconds to complete a cycle, or the number of cycles to complete during the entire time of the selected sound. Whichever one you set, Cool Edit automatically sets the other two.

The Invert option inverts the flanged signal, which causes the waves to cancel each other out periodically, resulting in brief periods of silence.

The Special EFX option mixes both normal and inverted flanging, with a few other transformations as well. All I can say is, try it and see if it works for you.

The Sinusoidal option affects the rate of change from the initial delay to the final delay. When this option is disabled, the rate of change is constant. In other words, the delay increases and decreases steadily. But when this option is enabled, the rate of change follows a sine curve, sometimes increasing or decreasing faster than at other times. Flanging is more noticeable and more psychedelic when you enable the Sinusoidal option.

As with other transformations, you probably have to experiment to find the effect you want. Be sure to use Edit ⇄ Undo Flanger in between trials. When you find an effect you like, you can save it as a named preset by typing a name at the bottom of the Presets box and choosing Add.

Reverb

Reverb differs from echo because it does not produce specific echo waves at regular intervals. Instead, it makes the audio sound bigger and more natural—more like you’re in the same room with the original source. You can create the sound of a specific type of room or hall by using Echo Chamber first and then using Reverb to “smooth out” the echo. Figure 12-13 shows the dialog box that opens when you choose Transform ⇨ Delay Effects ⇨ Reverb. Cool Edit supplies several preset Reverb effects, shown in the figure, to get you started.



Figure 12-13 *The Reverb dialog box lets you select or set reverb effects for your sound selection.*



Tip

Reverb helps to create a more natural stereo effect when you convert a mono recording to stereo. After converting the sound, add in some reverb to get a larger effect.

The Total Reverb Length specifies how long the reverb lasts, in milliseconds. The signal trails off after the specified amount of time. The reverb length creates the effect of being in a specific size of room. The shorter the length, the smaller the room. The following numbers are estimates to give you a starting point in creating the effect you want:

Less than 400	Small room
400 to 800	Medium room
800 to 1600	Large room
1600 to 3000	Huge room (concert hall)
Over 3000	Amphitheater

Attack Time specifies how long it takes for the Reverb effect to go from zero to full strength. The shorter the time, the sharper the attack. Try an attack time that is approximately 10 percent of the reverb length to start with. Make it longer for a softer effect or shorter for a more pronounced effect.

The High Frequency Absorption Time determines how soon the high frequencies disappear. In most rooms, high frequencies are the first to be absorbed by the objects in the room, and the low frequencies reverberate a little longer. The more furnishings and people are in the room, the faster the high frequencies are absorbed. By adjusting this setting, you can create the effect of a crowded concert hall (a low setting) or a sparsely furnished basement (a high setting). As with most of these settings, you have to experiment to create the effect you want.

The Perception slider adjusts the prominence of echoing. The more you move it to the left, the mellower the reverb. Move it to the right to create more noticeable waves of echoes, as in a larger concert hall.

The reverb signal, based on all your other settings, is mixed into the original signal. The Original Signal (dry) slider determines what percentage of your original signal should be used in the mix. You can go up to 200 percent, but watch out for clipping. The Reverb Signal (wet) determines the volume of the reverb signal in the mix. Generally, it should be lower than the Original Signal, but you might want to create the effect of great distance by giving it more prominence than the Original Signal. If you end up with a clipping problem, reduce both signals.

For stereo recordings, the Combine Source Left and Right option helps to save computation time by combining the left and right tracks before the reverb is calculated. If your left and right tracks are the same anyway, you might as well enable this option. But if your left and right tracks are different, and if you have a fast enough processor, disable the option to calculate the reverb for each track separately. The reverb is mixed into both tracks to produce an enhanced stereo effect.

A final word on Cool Edit

I have shown you the Cool Edit features that most people want to use at first. But it has a lot more features that you'll probably want to try out eventually, such as the brainwave generator or the noise reduction options. Cool Edit's Help library can help get you started with a new feature, although it's often couched in unfamiliar audio jargon that is less than helpful to people who are not audio engineers. In my opinion, the best way to learn what a feature does is experiment, undo, experiment, undo, experiment, undo ... until you have found the effect you want. Have fun!

Using SndSampler for Macintosh

In Chapter 11, you learned how to record sounds using SndSampler 3.5.2. Now let's look at how you use SndSampler as an editor. I can only cover some of the basic SndSampler editing functions in this chapter, but here's a brief overview of what it can do:

- Convert a sound from stereo to mono and vice versa, change the sampling rate (resample), and convert it from 8-bit to 16-bit samples and vice versa
- Cut, copy, paste, and mix to create the sound you want
- Add the following effects: echo, reverb, chorus, flange, tremolo, and backwards (reverse)

- Adjust amplitude (including fade-ins and fade-outs) and the pitch
- Generate tones from scratch
- Edit movie soundtracks and convert a sound to movie sound-track format (requires QuickTime 1.6 or later)
- Edit a file that is larger than your RAM by breaking it into segments
- Convert batches of files

Plus, SndSampler provides some miscellaneous functions such as editing snd resource headers extract snd resources from files.

Working with files in SndSampler

SndSampler works only on System 7 or AIFF sound files, but you can import files from these formats: WAV, Sun, NeXT AU, raw audio, QuickTime movies, and CD audio tracks. You can also extract a snd resource from another file to work on. After editing, you can export to these formats: WAV, Sun, NeXT, and raw audio. You can work on several files at once, and copy sounds from one to another.

Opening files

To open one or more files, drag and drop them on the SndSampler icon. Or start SndSampler first and use File ⇨ Open to select them from the file list. Use File ⇨ Import to import another type of sound file, such as a WAV or AU file. You can access snd resources with the File ⇨ Extract command. This opens a dialog box where you select the file from which to extract the snd resources—usually a program file. Then you see a list of snd resources for that file, and you choose the ones you want to open.

Working with the selection

With SndSampler, almost all editing takes place on the current selection, not the whole file. The selection is marked in SndSampler's sample window both by color and by two markers below the waveform. You can see them in Figure 12-14. The status window also shows the frame numbers for the start and end of the selection. In Figure 12-14, the selection starts at frame 9205 and ends at frame 14339.

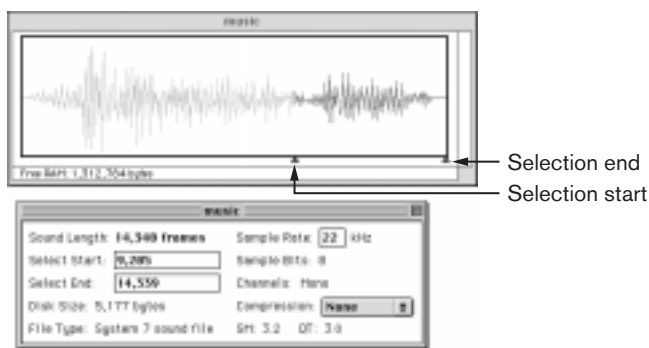


Figure 12-14 *The selection is clearly marked in the sample window and identified in the status window.*

There are several ways to make a selection:

- Drag the markers.
- Click the waveform where you want the selection to start; double-click where you want it to end.
- Type the start and end frame numbers in the Select Start and Select End boxes in the status window.

To make sure your selection is just right, choose Sound ⇄ Play to listen to the selection. You might also try Sound ⇄ Play Unselected to listen to everything else.

**Tip**

Play Unselected comes in particularly handy when you are planning to delete the selection. You can hear what the remainder will sound like after the deletion.

Many of the commands on the Edit menu work with the selection. Copy copies it to the clipboard. Cut also copies it to the clipboard, but then deletes it. Delete simply deletes it. Make Selection New creates a new file out of it. The new file becomes the current file, which is untitled until you save it.

Working with the clipboard

Once a selection is on the clipboard, you can paste it into the current sound using these commands from the Edit menu:

Paste	Replaces the current selection with whatever is on the clipboard
Paste New	Creates a new, untitled sound file from the clipboard
Insert Start	Inserts the sound from the clipboard at the start of the current sound
Insert End	Inserts the sound from the clipboard at the end of the current sound
Mix Start	Mixes the sound from the clipboard with the current sound, matching their start points
Mix End	Mixes the sound from the clipboard with the current sound, matching their end points

SndSampler uses its own clipboard, which can hold much more data than Finder's clipboard. If you forget what's on the clipboard, choose Edit ⇨ Play Clipboard Sound to hear it. You can clear the clipboard by choosing Edit ⇨ Clear Clipboard.

Changing the audio properties

Several commands on the FX menu really have nothing to do with effects. Instead, they let you change the audio properties, the number of channels, the sampling rate, and the sample size.

Changing the number of channels

The Stereo to Mono option combines two tracks into one. When you choose FX ⇨ Stereo to Mono, the dialog box shown in Figure 12-15 opens. You can choose to equally mix the left and right tracks to create the new single track, or to simply use the left or right track. If you enable “Make into new sound,” the mono recording becomes a new file in memory that won’t have a filename until you save it. (The previous file still exists on disk and will not be replaced by the new file.) If you disable this option, the mono recording replaces the previous stereo in memory, and when you choose Save, it replaces the previous file on disk.

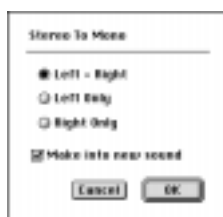


Figure 12-15 *The Stereo to Mono dialog box lets you choose how to reduce two tracks to one.*

The Mono to Stereo option is doesn’t offer as many choices. A slider appears so that you can set the volume mix between the left and right channels. Other than volume, the two channels will be the same. As usual, “Make into new sound” means that the original file will not be replaced when you save the new recording.

Changing the sampling rate

Two options let you change the sampling rate of the selection. Both work on the entire sound, not the selection. (You can't have different sampling rates in different parts of a sound file.)

Selecting Downsample cuts the sampling rate in half, which not only reduces the quality of the sound but also cuts the file size in half. It offers no options, and the downsampled sound replaces the original sound. The Resample option provides a more flexible way to change the sampling rate. It opens the dialog box shown in Figure 12-16 so you can set the new sampling rate. You can use the pop-up menu to select one of the standard sampling rates, or use the slider to set the rate as a percentage of the current rate.

Each time you resample a sound, whether you increase the sampling rate or decrease it, the quality of the sound deteriorates to a certain extent. Try to avoid resampling a sound more than once. Instead, choose Edit ⇨ Undo Resample to restore the original resampling rate before using the Resample option a second time.



Figure 12-16 The Resample option opens this dialog box so you can select a new sampling rate.

Changing the sample size

The 16 ⇨ 8-bit option reduces the sample size from 16 bits to 8 bits. Likewise, the 8 ⇨ 16-bit increases the sample size from 8 bits to 16 bits.

Adjusting amplitude

Use the commands on the Sound ⇨ Amplitude submenu to adjust the volume of the selection. Choose X 2 to double the amplitude or ÷ 2 to cut it in half. If you don't want to multiply or divide it by two, use one of the other options on the menu.

The three other options on the menu are initially labeled User Amplitude 1, User Amplitude 2, and User Amplitude 3. You can set these three options to any values you'd like, and they become menu items that you can use in the future. For example, you could create a menu item that says X 3 or Very Soft.

How to set a user amplitude:

1. Choose Sound ⇨ Amplitude ⇨ User Amplitude 1, 2, or 3 to open the window shown in Figure 12-17.
2. Type your name for this amplitude in the Amplitude box.
3. Select Multiply or Divide.
4. Type an amount in the By box. SndSampler automatically fills in the Percent amount.
5. Choose OK to close the window and place your new option on the Amplitude submenu. (The selection is not changed until you select the new option from the submenu.)

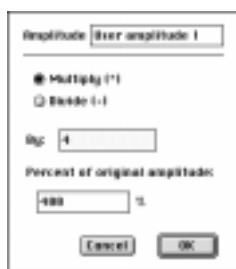


Figure 12-17 You create your own User Amplitude setting in this dialog box..

**Tip**

Replace User Amplitude 1 with the user amplitude setting you'll use more often, because that option has a shortcut key combo assigned to it, **⌘+G**.

When you're increasing amplitude, especially when you're multiplying it by a factor of 2 or greater, it's easy to get extremes that are so loud that clipping occurs. You can spot possible clipping problems in the waveform window when the graph touches the top and bottom of the window. One way to avoid clipping is to *normalize* the selection. Normalizing amplifies the sound just below the point where it would get clipped. Choose Sound ⇨ Normalize ⇨ Integer if you want SndSampler to multiply the amplitude by an integer only. This eliminates distortion but might not produce the loudest sound. Choose Sound ⇨ Normalize ⇨ Fraction to permit SndSampler to select a fractional multiplier for the loudest possible sound, with some possible distortion.

If you want to make your sound fade in, select the beginning portion of the file and choose Sound ⇨ Fade In. SndSampler adjusts the amplitude of the selection so it increases from zero to its original volume. You control the speed of the fade by the size of the portion you select. Similarly, to fade out at the end, select an ending portion and then choose Fade Out.

Adding sound effects

At last we come to the fun part — adding in sound effects. They are all located in the top section of the FX menu. Five of the effects — Echo, Reverb, Chorus, Flange, and Tremolo — open submenus with five User Effect options. The first option on each submenu has a shortcut key combo. The last effect, Backwards, simply reverses the selection and needs no options.

**Caution**

While SndSampler is performing a complex effect on a large sound selection, you can cancel it by pressing Escape. But if you cancel it, you could corrupt the original sound. Always choose Undo after canceling any effect in midstream, just to make sure the original sound was not corrupted.

Echo

The Echo command cascades a submenu with five commands: My Echo and User Effect 2 through 5. Any of the five submenu commands opens the Echo dialog box shown in Figure 12-18, where you can set the parameters for the echo. Enter a name in the Echo FX box to replace the name on the Echo submenu. The Decay Factor indicates how fast the echoes die away. The higher the number, the faster they die. The Delay value determines the time between echoes. Enable Auto Extend to increase the length of the file to enable the last echo to die away.



Figure 12-18 You specify the parameters for an echo effect in the Echo dialog box.

Reverb

Reverb provides a smoother, more random echo effect, much like being in a large hall. Figure 12-19 shows the dialog box that opens when you choose any one of the five User Effect options for the first time.



Figure 12-19 You set the options for a reverb effect in this dialog box.

The Gain Factor determines the mix of the original sound to the reverb sound. Raise the gain factor to hear more of the original sound and less of the reverb sound. Or lower it to give more emphasis to the reverb sound. When you use a low factor, it sounds as if you are far away from the sound source in a large hall or amphitheater.

The Delay indicates how much delay is built into the reverb effect, in milliseconds. The longer the delay, the more extreme the reverb effect will be. This is easier to understand if you consider a single echo effect. Suppose you holler “hello” down a well and the echo returns to you in about one second. You know it’s not a deep well. But if the echo doesn’t return to you for 20 seconds or longer, you get the feeling of a deep well. You can create similar feelings of size with your reverb by adjusting the length of the delay before the echoing starts.

Auto Extend is directly related to Delay. Each echo that makes up the reverb dies away at the end. If you want to hear the last ones die, enable Auto Extend so that SndSampler can extend the length of the selection to make room for the dying echoes. If you don’t use Auto Extend, the echoes cut off when the selection ends, which might not sound natural. Even if you don’t enable Auto Extend, SndSampler extends the length of the selection by the length of the delay.

The two filters, Allpass and Comb, affect the way in which the reverb is calculated. It's a matter of experimentation to decide which provides the effect you're looking for. By the way, you can use the reverb function many times on a selection to compound the echoing effects and combine the Allpass effect with the Comb effect.

Chorus

Chorus makes the selection sound like it comes from multiple voices. You can choose the number of voices (up to 20). To create the multiple voice effect, a slight delay is used between voices. You can set the size of the delay for the first voice, such as 10 milliseconds. But to make things realistic, that value will be varied somewhat for additional voices. You can also set the speed that the delay is varied, with 100 percent being the default speed.

Flange

Flange provides a somewhat psychedelic effect, with the sound speeding up, slowing down, and speeding up again. The flanged signal is mixed with the original signal to produce the final result. To me, it sounds like the file is slightly damaged, but sometimes you want that effect. As with Chorus, you specify both Delay and Speed. Delay specifies in milliseconds how far behind the original track the flanged track begins. Speed determines the rate at which the flanged track varies in speed. You also specify Gain Factor to control the mix between the original sound and the flanged sound. Auto Extend extends the selection to permit the delayed flanged track to join up smoothly with the next section (or the end of the recording).

Tremolo

Tremolo mixes a tremolo or vibrato effect into the selection by rapidly varying the amplitude of the original wave. You can choose the frequency of the variation; the higher the frequency, the more the tremolo effect. You can also set the minimum amplitude of the

variations; the amplitude varies from 100 percent down to your minimum. The Smooth Junction option returns the amplitude to 100 percent at the end of the selection to phase smoothly into the next part of the sound.

Undoing, redoing, and reverting

Happily, SndSampler includes an Undo option to remove the previous editing action. Choose Edit ⇨ Undo *action*, where *action* is your most recent edit, such as Undo Delete or Undo Echo. You'll find Undo handy when you're experimenting with a sound effect to see what its various settings do. Finding the exact right combination of settings can often take a lot of trial and error.

If you change your mind again after undoing an edit, you can redo it by choosing Edit ⇨ Redo *action*. Undo and Redo keep track of the most recent action only. If you want to undo a whole series of edits, you may need to choose File ⇨ Revert to Saved to get back to the last saved version of the file. This removes all editing that you haven't saved.

Saving files

Eventually, you'll want to save your edited sound. Use File ⇨ Save to save the selection (only) in the current file. Use File ⇨ Save As to save the selection (only) as a new file, which becomes the current file. Use File ⇨ Save In to save the current selection in another file's resource fork, the opposite of the Extract command. Use File ⇨ Export to export the current selection to another format, such as WAV or AU.

By the way, unlike most programs, SndSampler lets you undo a save command. Saving a sound saves only the selected portion. If you want to recover the part that wasn't saved, undo the save. This restores the former sound in memory only. The version on disk still reflects the last save. But now you can change the selection and save it again.

**Caution**

Be especially careful with the File⇨Save command, as SndSampler saves or exports only the current selection. Since only the selection is saved, you might replace the whole sound with just part of it. Fortunately, you can undo saves to recover sounds you accidentally damage this way.

A final word on SndSampler

This chapter has explained the SndSampler features that you most likely want to use at the beginning. But eventually, you'll probably want to try out some other features, such as the tone generator or the Pitch Bend feature. SndSampler comes with a User's Guide that can help get you started with a new feature. Unfortunately, it often breaks into jargon that only an audio engineer could love or understand. But it never hurts to experiment. Just keep trying out options and undoing them until you have created the effect you want. It's a fun program, and I hope you'll have fun with it.

What's Next?

Nothing's next — you have finished the book. Congratulations! I hope you are already having more fun with your computer and the Internet sound. Please write to me at judinorth@aol.com with any comments, questions, or criticisms. I really do read and answer my e-mail!