SndSampler™ Version 2.4
By A. Glenn and M. Q. Edison
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SndSampler™ version 2.4 is **shareware**. If you like it and want to keep it, please register by sending $12 in U.S. funds (cash OK) and a self-addressed, stamped envelope (SASE) to: Alan Glenn, 4516 Cruz Drive, Midland, MI 48642, U.S.A. Please support the shareware concept by registering. Comments and bug reports are also welcome. If you report a reproducible bug that we haven't found yet, you'll get **free registration**! When reporting bugs, try to be as specific as possible, i.e. what were you doing exactly, where were the start and end pointers, was the sound compressed, what was the sample size and number of channels, what kind of Mac do you have, what system version, etc. Include your e-mail address (if you have one) on your correspondence and we may be able to write you back over the 'net.

Note: you are allowed to freely distribute UNREGISTERED copies of SndSampler™. As a matter of fact, we strongly encourage this. However, you must include all accompanying files and the original folder. And it probably goes without saying that you may not alter any of the materials which accompany SndSampler™, or the application itself.

How To Register

1. Fill out the handy form at the end of this document
2. Send $12 in U.S. funds to the above address
3. Include a self-addressed, stamped envelope to get your registration code and other stuff
4. That's all you need to do to get registered and get your free sounds. But...
5. Include a blank, virus-free disk and a postage-paid disk mailer and you'll get some extra goodies!

Network Notes

As of this version, SndSampler™ should not be launched over a network, i.e. the actual application should reside on the hard drive of the computer from which it is launched. At any rate, your registration is for you and you alone and does not permit multiple simultaneous users. Each new user must register his or her own copy.

Quick Reference: Changes From Earlier Versions

•Anyone registered for any version 2.x is automatically registered all subsequent versions 2.x.
•Anyone registered for version 1.x can register for 2.x for the special rate of $4.
•As always, miscellaneous bugs have been swatted, sprayed, squashed, and stomped on.
•Now supports AIFF files! Hurrah!
•The display window can now be resized.
•Preferences are stored in the file "SndSampler™ Prefs" in the Preferences folder in your

system folder.

•Now saves the input device parameters.

•New functions: Resource Editor, Hex Editor, Select All, Delete.

•Enhanced functions: Chorus, Reverb, Play Sound.

•Clicking on the Sound Length number will change it momentarily to the playing time.

•Can fix corrupted sounds.

•Allows extraction of 'snd ' resources from any file or application.

•Allows you to save 'snd ' resources in the resource fork of any file or application.
•Now saves undo information to separate temporary file rather than to the application's resource fork.
•No memory fragmentation—guaranteed!

Introduction

SndSampler™ is the ultimate tool for recording and editing Macintosh 'snd ' resources. SndSampler™ is simple enough for the novice but contains powerful features which will appeal to the sound-editing expert. SndSampler™ works with 8- or 16-bit, mono or stereo Macintosh sound files. SndSampler™ should work on any Mac running System 7.0 or later. It is helpful, but not necessary, if your Mac has a sound input device. Of course you won't be able to record sounds without a sound input device, but you can still edit existing sounds.

Please note: if your Mac doesn't have 16-bit audio hardware, you must have Sound Manager 3.0 or later installed in order to play 16-bit sounds. Otherwise your Mac will emit horrible screeching noises. System 7.5 and later have Sound Manager 3.0 built-in. Also, some Macs don't offer stereo playback. Many models will only play the left channel of a stereo sound. Check to see what your Mac hardware offers if you are having problems with stereo sounds. If you don't have stereo output capability, Sound Manager 3.0 will mix the left and right channels during playback. If you haven't already, you really ought to get yourself a copy of Sound Manager 3.0. Or you can get System 7.5 (although we think it's too bloated—but that's another story).

Sample rates of up to 65,535 Hz are supported by SndSampler™ and the Mac OS. All recording is done in RAM, so be generous. If you are having problems with memory, or you only seem to be able to record small sounds, use the Finder's Get Info command to give SndSampler™ a larger allotment of RAM. Also, try to keep your sounds reasonably sized. SndSampler™ may not always work correctly for sounds greater than 2000 megabytes or so (we haven't been able to test this yet). According to Apple, 'snd ' resources are not supposed to be larger than 16 megabytes, anyhow. AIFF files can be any size. Well, the limit would actually be around 2000 megabytes or so.

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Please note that if you are registered for version 1.2 or earlier, you can register for

version 2.x for a mere $4. (So, in other words, those two nice people who saw fit to register their copy of version 1.1 can just send me four bucks to register for this version.)

Registering for version 2.x will also get you some nifty **FREE SOUNDS** to use with SndSampler™!

Navigating The Registration Dialog

When you register you will receive a unique code which you can enter in this dialog. If you enter the correct code here, the dialog will no longer appear when you launch. If you launch SndSampler™ from a locked disk, however, the registration information will not be recorded and the dialog will continue to appear. IMPORTANT: after you get your code correctly entered, make a backup copy of the registered software. That way you won't have to enter it again if your Mac goes whacko and eats up SndSampler™.

** WARNING **: do not attempt to defeat this dialog by deleting certain resources from the application's resource fork. These resources are essential for the proper operation of SndSampler™. Without them, the program may unexpectedly quit at any time.

There will also be an annoying little dialog which pops up every time you make a significant menu choice. This is intended to encourage registration, since after you register the annoying little dialog doesn't pop up any more. Again, do not attempt to get around this by deleting the dialog resource, because without it the application may unexpectedly quit at any time.

General Info

SndSampler™ is an application program which allows you to record and edit Macintosh sound resources. Note that starting with version 2.2, SndSampler™ now supports Apple's AIFF sound file format. SndSampler™ will allow you to extract sound resources from any kind of file, including applications. You can also save your sound resources into any kind of file, including applications.

The Windows

SndSampler™ has two main display windows: the sample window and the stat window. The first thing you see in the sample window is a big rectangle, which is for viewing a graphical representation of your sound plotted as amplitude versus time, something like you might see on an oscilloscope. When displaying a stereo sound, SndSampler™ will alternate between drawing the left and right channels, so what you see will be kind of an average of the stereo signals. You can resize this window however you like. Sometimes when you change the size of the window the sound will show a different-looking waveform, especially when you make the window smaller. This works best on musical instrument samples.

Below the sample window is the stat window, which displays the sound's numerical descriptions. First, the stat window shows you how many frames are in the entire sound. For 8-bit mono sounds the sample frame size is 1 byte. For 8-bit stereo the frame size is 2 bytes (the first byte for the left channel, the second byte for the right channel). For 16-bit mono the frame size is 2 bytes (two bytes for one sample). For 16-bit stereo the frame size is 4 bytes (you get the idea). The sound length value will not change until you do something which changes the size of the entire sound, either by saving it or by doing some other operation like echo or reverb. If you click on this number, it will momentarily change to display the sound's playing time, either in milliseconds (millisecond = ms = 1/1000th of a second), or, if it is long enough, in seconds.

Next, going down, the start and end positions of the sample are given in sample frames. The portion of the sound which falls between the start and end positions is called the "selected portion" of the sound. When you save, the selected portion of the sound will

become the new sound. In other words, you will only be saving the selected portion of the sound.

Next comes the sample rate. This is how many digital samples were taken of the analog sound signal per second. kHz = kilohertz = thousand samples per second. Lowering this value makes the sound become slower and deeper and makes the playing time longer, while raising it makes it chipmunk-like and makes the playing time shorter. The sampling rate can be no higher than 65 kHz. Changing the value in this box simply changes the rate at which the sound will be played back. It does not affect the sound data in any way. Also, note that when you enter any of the values 5, 7, 11, 22, or 44, SndSampler™ will set the sample rate to Apple's pre-defined values of 5563.6363, 7418.1818, 11,127.27273, 22,254.54545, and 44,100 Hz, respectively. For more information on how to change the sample rate, see the Header, Downsample, and Upsample sections below.

Next comes the resource size. This is the actual disk space, in bytes, which would be taken up by your sound if it were to be saved immediately as a sound resource file. The AIFF file size will be similar. Notice how it changes when you choose to compress.

Now going up and to the right the stat window shows what format sound resource you are dealing with. This can either be format 1 (Normal), or format 2 (HyperCard). Apple considers format 2 sounds to be obsolete.

(We have found that the Sound Managers 3.0 and later will sometimes not play a HyperCard sound correctly, especially if it is 16-bit stereo.)

Next we have the compression option. We recommend that you do not compress your recordings, because when compressed they sound just plain awful. Apple's 3:1 and 6:1 compression algorithms are destructive, or "lossy," i.e. they discard sound data, which makes the sample sound lousy. It's not like compressing a sound with StuffIt™ or something. It's actually a little like trying to hammer a square peg into a round hole. Only 8-bit mono sounds can be compressed by SndSampler™. When a compressed sound is opened, it must be expanded before it can be edited. Even if it cannot be expanded, however, you can still Save As and Save In.

The window's title bars are also informative. The sample window's title bar shows the name of the 'snd ' resource (usually the same as the name of the System Sound File from which it came, or, in the case of an AIFF, the file name), and the bit resolution and whether the sound is mono or stereo. The stat window shows the name of the resource only.

Special Note: On the Importance of Free Disk Space
It is important that you launch SndSampler™ from a disk with plenty of free space. There are two reasons for this. First, SndSampler™'s Undo function works by saving the sound to disk before altering it, thereby allowing you to restore the unaltered sound by reading it back from disk. If there isn't enough free space on the disk to save the sound, the Undo function will not work. The second reason is that in order to make the most effective use of its allotment of RAM, SndSampler™ must sometimes write the sound out to disk, rearrange the application RAM, and then read the sound back in. So if there isn't very much room left on the disk, SndSampler™ won't be able to make the best use of its RAM. A good rule of thumb is that you should launch from a disk with at least three times as much free space as the size of the sounds you are going to work with. So, if you're going to work with a 100K sound, you should have at least 300K free on the disk. You might be able to get away with less free space, but we recommend this amount to be safe.

Menus

File

New
This function allows you to record a new sound. First, you will see the input device dialog, which offers you a number of options which depend on the chosen input device. If

the input device dialog does not seem to adequately display or understand the features offered by the chosen input device, click Bypass. When this button is pressed, SndSampler™ will not attempt to alter the input device parameters and the input device will remain in its default state.

Next you will see the sound recording dialog, with three buttons marked in tape recorder fashion. The far left button with the red circle is the record button. Press the record button to begin recording. The middle button is the pause button. Press the pause button once to pause recording, and press it once again to resume recording. The far right button is the stop button. Press this when you are finished recording.

Note: if you are using a Power Mac, turn off speech recognition before attempting to record a sound.

<u>Open</u>
Allows you to load a 'snd ' resource from any file's resource fork, or to open an AIFF file. (Note that if the AIFF file contains sound resources in its resource fork, these will be opened instead of the sound in the data fork. We recommend that you **don't** store sound resources in AIFF files.) If there is more than one resource available, you will be presented with a dialog box which allows you to choose one resource to load. The resources are listed in the order in which they appear in the resource file, not in order of ID. (So if you open a sound, alter it, and then save it, it will move to the end of the list the next time you open the file.) The dialog box features a Play button, which allows you to listen to a sound before loading it. To play the sound,

SndSampler™ calls the Mac OS routine SndStartFilePlay. Unfortunately, this routine is a little buggy, and will not always play a 'snd ' resource from disk. If the sound is corrupted, it may even crash the system. What's worse is the fact that Apple has mentioned this routine's bugginess in <u>Inside Macintosh</u>, and, as such, probably has no plans to fix it. Also, if your Mac doesn't support play from disk, the Play button will be disabled. Your Mac must have the Apple Sound Chip to support play from disk. Another reason the button might be disabled is if there isn't enough free memory to play the sound from disk. Also, as a convenience (i.e. so you don't have to go to ResEdit), you are allowed to delete sounds from the file's resource fork. Be careful when deleting a sound, however, as the action cannot be undone, and the sound will be gone forever. It is recommended that you do not delete anything from the system file's resource fork.

Incidentally, the key shortcuts work a little differently here than elsewhere in the program. Pressing the space bar is the same as clicking the Play button. Then, if you press the space bar while a sound is playing, the sound will stop (not restart from the beginning). If you press the escape key, the results will be the same as if you had clicked the Cancel button. The same goes for cmd-period: it's as if you clicked the Cancel button. Any sounds which are playing will of course stop when you leave this dialog.

Beginning with version 2.1, SndSampler™ is able to fix corrupted sound resources. It can't always fix every problem, but it can fix a lot of the common problems we have encountered. If SndSampler™ finds a problem with the sound, it will ask you if you want to fix it. If you choose to fix, it will do its best to correct whatever problems may exist. If the sound doesn't seem right after it has been fixed, DON'T SAVE! This means that SndSampler™ wasn't really able to fix the sound, but only thought that it was able to. If you know your way around 'snd ' resources, you may be able to use the Hex Editor (see below) to fix a corrupted sound.

<u>Save</u>
This function will save the selected portion of the sound in the current file. The current file is the file you last opened the sound from or saved the sound as. If the file was opened from an AIFF, it will be saved as an AIFF. The Save function does not ask you to specify a filename or a folder. It just goes ahead and saves your sound. There will be a warning alert, however, if the current file is not a System Sound File (type 'sfil'), i.e. one of those files which have a speaker icon on the desktop, or if it is not an AIFF. This is so you don't accidentally overwrite a critical sound which you have extracted from a game or other application. Applications have a curious way of crashing if you're not careful when you change their resource forks.

Note: because saving the sound may change it, you are allowed to Undo the Save. When you Undo the Save, though, the contents of the file you saved in are not changed. The

home file, i.e. the currently active sound file, will still hold whatever sound data you saved into it. If you Undo a Save, only the sound itself will be restored to its state immediately previous to the Save. Also, when you Redo the Save, the file contents are not altered. Only the sound resource itself is changed back to the way it was immediately after the Save.

Unknown sounds cannot be saved as AIFFs.

Save As

Saves the selected portion of the sound as either a System 7 Sound File or an AIFF file. The specified file becomes the current file. You may Undo a Save As. Note that the previous home file becomes the new home file. So if you open file X, change it, and Save As file Y, when you choose Undo Save, the home file will revert to X. File Y will still exist, and will still hold the data you saved into it.

Save In

This function allows you to save the selected portion of the sound in another file's resource fork. When this function is selected, you will have the option of giving the 'snd ' resource a new name, changing the resource ID, and also of specifying whether or not the new resource should replace an existing 'snd ' resource with the same ID. If you don't want SndSampler™ to replace a resource with the same ID, then if there is already a sound there with the same ID it will choose a new ID at random which is not used by any other 'snd ' resource in the chosen file. Note that Save In does not alter the current sound. The resource which has been saved will be altered, but not the original sound. Neither does Save In change the home file. Thus if you open

a sound from a System Sound File, alter it, and then choose Save In and specify a game application, the home file will remain as the System Sound File. So when you next choose Save, you will be saving to the System Sound File, not to the game.

Revert To Saved
Restores the sound to its state immediately following the last Save or Save as. Note that if you have never saved the sound, e.g. you pasted in a whole new sound from the clipboard, you won't be able to Revert because the sound has never been saved.

Quit
Quits the application. When quitting, SndSampler™ will attempt to delete the undo file (unless it knows that there was an Undo error). It will also attempt to copy the application's clipboard sound to the Finder's clipboard. If the clipboard sound is dangerously large, you will get a warning alert which allows you to tell SndSampler™ not to copy the sound to the Finder's clipboard (unless you turn off the warning with the Clipboard option). Note that unless you allow the warning dialog, the clipboard sound will be copied to the Finder's clipboard when you quit, even if you choose not to have the clipboard copied on an application switch. The only way to stop it from being copied is to allow the warning dialog, which then lets you choose not to copy to the Finder's clipboard when you quit.

Edit

Undo
The Undo function allows you to restore the sound to its state just prior to the last Undo-able operation (most operations are Undo-able). The method behind this function involves saving the entire sound as a resource in a special invisible undo file (imaginatively titled "Undo") whenever an Undo-able operation is performed. Then, when Undo is chosen, the sound will revert to its state just before the last Undo-able operation was performed. When you Undo, the main window control buttons will be set so as to reflect the state of the sound data as it appears in the file in which it was last saved. As an example, suppose you open a sound which has been saved at 3:1 compression, click on No Compression, then do something which is Undo-able, such as change the amplitude. If you then decide to Undo Amplitude, the compression buttons will indicate 3:1 compression, rather than No Compression as you selected just prior to the Undo-able operation. This is because 3:1 is how the sound was originally saved. The control buttons (both compression and format) don't really do anything to the sound until you save. In addition, the start and end pointers will be restored to where they were just prior to the Undo function.

After you Undo an operation, you have the ability to Redo it. The text of the Undo menu

choice will change from "Undo xxx" to "Redo xxx."

Note that since the Undo sound data is saved as a resource, in the event of a catastrophic error you may still be able to recover your original data. One way to do this would be to simply open the undo file's resource fork (even though it's invisible, SndSampler™ will let you open it). The Undo sound (if there is one) will be automatically loaded.

Another way to recover the Undo sound would be by making a copy of the undo file (cmd-D in the Finder) before you quit and then opening the duplicate's resource fork with ResEdit and copying the sound resource found there. You will want to attempt this recovery before quitting the application, because SndSampler™ tries to delete the undo file when it quits (unless it knows for sure that there has been an Undo error). To do this, you must make a copy of the undo file to use with ResEdit, since ResEdit will not work with an already open resource file. Then open the copy with ResEdit, and copy the sound resource found within. The sound will then be in the clipboard, and you can do what you want with it. Note that the Undo file is normally invisible, so you must use ResEdit (or some other application which can do this) to make the file visible again. To do this with ResEdit, launch ResEdit and open the undo file, which is called "Undo". ResEdit will show the file, since it can open invisible files. Then use ResEdit's Get Info for <filename> menu choice and unmark the "Invisible" box. Of course you will want to save the changes when ResEdit asks you.

If SndSampler™ says it can't delete the existing undo file when it starts up, you'll have to get rid of it yourself. Just use ResEdit to make the file visible again and then drag the visible undo file to the trash. If you don't have ResEdit, you'll have to remove all important files from the SndSampler™ folder and then drag the whole folder to the trash (unless you can think of some other way to do it).

Note that the Undo sound as saved in the undo file is always uncompressed. This is because SndSampler™ must always de-compress a compressed sound in order for you to edit it. To save time and trouble, the application does not re-compress the sound when saving it for Undo purposes.

Note also that the Undo function will be inoperable if SndSampler™ is launched from a locked disk. In addition, the Undo function will be inoperable if there isn't room on the disk to store the Undo data. It is not a good idea to launch SndSampler™ from a disk with not very much room on it.

If you don't like the way the Undo operation works, you can turn it off. Look at the Options menu for more details. Why would you want to turn it off? Well, we don't really know.

If you don't have a copy of ResEdit, we recommend that you get one right away. **No Mac should be without ResEdit**. ResEdit is available from Apple, and it's FREE! Most online services have the latest copy available for you to download.

Cut, Copy
These two functions copy the selected portion of the sound to the application's clipboard. This sound data can then later be inserted or mixed at a different point in the same sound, or in another sound altogether. The clipboard sound data can also be transferred to other applications which deal with sound resources, such as ResEdit.

Please note the following: using your clipboard sound in another application will require that the sound be copied to the Finder's clipboard. This will occur when you switch applications, and also when you quit SndSampler™ (unless you specify otherwise—see the Options menu below). The Finder's clipboard is not intended to hold a large amount of data, however, and the Mac's system software is not prepared to deal with a large clipboard.

In particular, **if you copy a large sound (or large anything) to the Finder's clipboard, low-memory applications may crash after launch**. For example, if you copy a 500K sound to the Finder's clipboard, and then try to launch an application whose memory

allocation is set to around 500K, the application may crash, or even crash the system. SndSampler™ will warn you when you are copying a dangerously large sound (>200K) to the Finder's clipboard. You can use the clipboard options to select if and when you want to copy the application's clipboard to the Finder's clipboard. Note that you can clear the Finder's clipboard with the appropriate choice from the Options menu. (Programmer's note: the Clear Finder Clipboard function simply calls ZeroScrap.)

Paste

This function should actually be called Replace, but in the interest of compatibility with other applications it has been named Paste. The selected portion of the sound is replaced with the clipboard sound. If there is no existing sound, this function will take the clipboard sound and make it the existing sound.

Select All

Will select the entire sound.

Delete

Will delete the selected portion of the sound. It's the same as pressing the delete key.

Insert Start, Insert End

These functions will insert the clipboard sound at either the start or end points of the existing sound, respectively.

Mix Start, Mix End

These functions will mix the clipboard sound with the existing sound at either the start or end points of the existing sound, respectively. The resulting sound will be lengthened if necessary.

Play Clipboard Sound

Lets you listen to the clipboard sound, in case you've forgotten what it is. You can't do anything else while the clipboard sound is playing. Press the escape key or cmd-period to stop the clipboard sound from playing. Clicking the mouse will also stop playback.

Clear Clipboard

Clears the application's clipboard. This will make more memory available for other operations, because any sound in the application's clipboard is stored in RAM. If you are getting inexplicable "out of memory" problems, try clearing the clipboard. Sometimes there can be something in there you didn't expect, since SndSampler™ will load any sound in the Finder's clipboard when it starts up.

Sound

Play Sound

Plays the selected portion of the existing sound. You have to wait until the sound is finished until you can do anything else. You can stop the sound at any time by pressing the escape key, hitting cmd-period, or clicking the mouse. You can also play the sound by pressing the space bar. If you press the space bar while the sound is playing, the sound will start over again from the beginning. A thin moving line will show you the progress of your sound when it is playing.

Sound Header

Allows you to edit certain information in the 'snd ' resource header. In particular, it allows you to enter a more exacting sample rate than in the sample rate box on the main window. You may enter a number which includes one decimal point. Note that this will only change the rate at which the sound is played back. The sound data is not altered in any way. Also note that there is possibly an important parameter left out: the AIFF sample rate available in compressed and extended sound headers as an extended floating-point value. Not to worry, however. SndSampler™ fills in this parameter based on what you have entered in the sample rate box.

Amplitude

Allows you to multiply or divide the amplitude of the selected portion of the sound by an amount that you type in. Use whole numbers with no decimal points for the least distortion. You can use decimal points if you want, however. The amplitude function allows you to save three of your favorite parameters. The first two choices in the submenu are predefined to "times 2" (cmd-2) and "divide by 2" (cmd-1, think "1/2"). The next three are yours to define. You can change the names of these user-definable functions to make it easy to pick the one you want from the submenu. The first user-definable function has a command key (cmd-G, think "Gain") associated with it.

Normalize
This function will multiply your sound's amplitude by the largest integer it can without causing clipping. The multiplication factor will be shown before the sound is redrawn. If the sound's amplitude could not be increased, you will hear a system beep and the sound will not be altered. Note that this function only works on the selected portion of the sound.

Fade In
Ramps the sound's relative amplitude from 0 to 1 over the selected portion. So, if you want to fade in the first 200 samples of the sound, set the start pointer at 0, the end pointer at 200, and choose Fade In. Then you can

restore the end pointer to its previous position. Note that you should **select only the portion that you want to fade**. If you leave the entire sound selected, then the entire sound will be faded.

Fade Out
Ramps the sound's relative amplitude from 1 to 0 over the selected portion. Otherwise, works identically to Fade In.

Zero Endpoints
This function reduces to zero volume the first and last sample of the selected portion of the sound in order to help eliminate clicks and pops. Then, to help even more, it takes the next respective sample and adjusts it so the sound's first (or last) three samples form a linear ramp to zero. This function won't get rid of the click the Mac sometimes makes when turning on or off the sound circuitry. A good way to see if there is a click at the beginning or end of your sound is to play it several times in quick succession (pressing the space bar while the sound is playing will start it over from the beginning). If the click isn't always there, then you know it is not due to your sound. Another good way to get rid of clicks is to do a very small fade in at the beginning and a very small fade out at the end.

Note that Sound Manager 3.0 makes fewer clicks than earlier versions. Again, we encourage you to upgrade.

Extend
Allows you to add zero-amplitude samples to the end or the beginning of the sound. Note that the extra samples will be added at the *very* beginning or *very* end, *not* where you have set the start and/or end pointers.

Resource
This function allows you to alter the sound resource ID, the sound resource attributes, and also to modify the sound channel initialization option and the sound command. For more information on initialization options and sound commands, see Inside Macintosh: Sound. Most users will only want to change the ID and won't need to adjust the other parameters. We recommend that you always set the initialization option to zero (Clear) and the sound command to a bufferCmd. The resource ID should probably be somewhere from 128 to 32767.

Hex Editor
The hex editor allows you to alter any byte in the sound resource. (You can't edit AIFF file data with SndSampler™.) **BE CAREFUL!** You can easily muck things up very badly if you don't know what you're doing. You can edit any sound with the hex editor, even if

SndSampler™ can't decode it. (This of course allows you to fix it if you know your way around sound resources.) Use the delete key to delete a data byte, and use the tab key to insert a new data byte immediately prior to the selected byte. The first actual sound sample will be shown in bold. If you are editing a stereo sound, this will be the left half of the stereo frame. Note that for a 16-bit sound, each sample is two bytes, so the first and second bytes will be shown in bold.

FX

Echo
This function gives your sound depth by adding a fading echo effect through an FIR (Finite Impulse Response) filter. This function operates only on the selected portion of the sound. Also, the Echo effect allows you to customize parameters. You can choose values for both the decay constant k and the echo delay (in milliseconds or sample frames). The decay constant k is taken from e^{-kn}, which is the amplitude factor of echo number n. The total number of echoes N is chosen by the application such that echo number N will have an amplitude factor which will reduce the sound amplitude to nearly zero. Increasing k will cause your echoes to die away faster. Decreasing k will have the opposite effect. The delay indicates how far apart each echo will be. If the Auto Extend box is checked, then SndSampler™ will increase the length of your sound so that you don't lose any of the echoes. SndSampler™ will generally make your sound REALLY big when doing echoes, and this will require more free RAM than otherwise. 16-bit echoes may sound odd towards the end when played on 8-bit machines. They should sound fine on 16-bit machines.

Note that the best way to figure out exactly what the user-adjustable parameters can do is to play around with them. When you do find some effects that you like, you can save them. SndSampler™ gives you five slots to fill with your own favorite effect parameters. You can change the names of these user-definable effects to make them easier to select from the submenu. Note that you can do the same thing with Reverb, Chorus, and Flange. The first user-definable function has a command key (cmd-E, for "Echo") associated with it. You can put your most-used effect here, so that you can invoke it with a quick keypress.

Reverb

The Reverb function imposes an orchestra hall type of echo on the selected portion of your sound. You can choose to use the allpass filter, which directly implements an allpass reverberation IIR (Infinite Impulse Response) filter of the equation

$$y(n) = -g * x(n) + [1 - g^2] * [x(n - D) + y(n - D)]$$

where y = output, x = input, g = gain factor (< 1), n = current sample number, and D = delay in samples. Or, you can choose the comb filter, which has the equation

$$y(n) = x(n - D) + g * y(n - D).$$

You can specify both g and D (D can be in samples or milliseconds). The gain factor g controls the ratio of direct sound to reverberated sound. Larger g = more direct sound, less reverberation. Note that you will probably want to make g smaller for a comb filter effect, since it can be quite loud and harsh. Note also that g can be negative. If you check Auto Extend, SndSampler™ will make your sound longer if necessary in order to not lose any reverb, and will increase the length of the selected portion of the sound to include the delayed samples. Note that this function operates only on the selected portion of the sound. Also note that the larger the selected portion of the sound, the more free memory required to make the reverb effect. More complicated reverbs can be created by using different parameters and then mixing together the results. For example, many commercial reverb generators will do three of four comb filters in parallel, mix this result together, and then do an allpass reverb on the mixed data.

Special note: SndSampler™ will *always* extend your reverb sound by at least the length of the delay, regardless of whether or not you have selected Auto Extend. However, sharp-eyed users may notice that if you choose a comb filter and don't check Auto Extend, the sound does not appear to increase in length. The reasons for this are complicated, and if you are really interested in why this happens, write to us at the above address. Rest assured, however, that SndSampler™ is not making a mistake when this happens. It is *not* a bug!

The command key for the first Reverb effect is cmd-R (for "Reverb").

Chorus

Chorus adds a delayed version of the selected portion of the current sound to the current sound to make it sound like there is more than one voice making the sound. You can choose the number of voices (delayed versions) to add to the original sound. Note that as you add more sounds, the resulting sound will tend to get louder. (The process will also become really s-l-o-w as you add more voices.) The delay value is a starting point for how much the other voices will be delayed. The speed factor determines how fast the variable delay will vary. You can type any number here, including numbers as high as 100,000 and as small as 0.0001 (although those numbers give lousy results). Feel free to experiment with the settings, although we have set the default values to what we consider to be the best-sounding effect. The Auto Extend function works as above. Note also that a lot of the Chorus parameters as determined by SndSampler™ are random. So if you don't like what happens to your sound with Chorus, try it again. The result will be different each time.

The command key for the first Chorus effect is cmd-K (think "Khorus").

Flange

This function is very similar to Chorus, and in fact uses almost the same program code as Chorus. Flange perpetrates a kind of phasey, in-and-out effect on the selected portion your sound. The gain factor represents the relative amplitudes of the original and delayed sounds which are adjusted so that they add up to 1. In other words, if you type 0.6 here, the delayed sound will be multiplied by 0.6, and the original sound will be multiplied by 0.4. Yes, you can enter numbers bigger than one, but we don't recommend it. (You'll want to try it for yourself, of course.) The speed factor and the delay parameters have the same function as in Chorus. The speed factor is particularly important in the Flange operation, because the default parameters of Flange (and Chorus) are adjusted so that the effect will perform one "cycle" over the length of the selected portion of the sound. So if you have a really long sound, the effect will be rather slow. The speed factor, however, enables you to speed things up a bit by typing in 150 % or 1000% or whatever. And we're all familiar with the Auto Extend option by now, right?

The command key for the first Flange effect is cmd-F (for "Flange").

Backwards
Reverses the selected portion of the sound so that it plays backwards. This function can produce interesting effects when combined with reverb or echo.

Invert
Makes sample[i] = -sample[i], providing a 180˚ phase shift. Operates only on the selected portion of the sound. This function doesn't really do much by itself, i.e. the inverted samples sound exactly like the non-inverted ones. However, you might want to try mixing the inverted sound with the non-inverted sound, with an offset of a few samples.

Downsample
This function allows you to decrease the sample rate of a sound while not changing the way it sounds when played back. The Downsample function uses linear interpolation to calculate new values for each individual sample so that when the whole sound is played back, it still sounds like it did before. The new sound will take up less disk space. Note that linear interpolation is not very accurate but is extremely fast. Downsampling affects the entire sound, regardless of the locations of the start and/or end pointers. Downsampling removes data which cannot be recovered by upsampling. The Upsample operation creates new samples by linearly interpolating between the samples on either side of the new sample. This will probably not return the sound to its un-downsampled state. If moving the slider doesn't give you the sample rate you want, you can type it in the text box. Remember, though, that the farther away you get from the original sample rate, the more distortion there will be in the resulting sound.

A note about sample rates on the Macintosh...
Apple specifies sample rates in sound resources as fixed-point binary numbers. A fixed-point number on the Macintosh only has 32 bits of resolution. Sample rates such as 22,254.54545 Hz (Apple's standard 22 kHz rate) can only be approximated with a fixed-point number. For most applications, this won't cause a problem. However, if you are upsampling by a factor of 2 from Apple's rate11kHz (which is actually 11,127.27272 Hz, as represented by the fixed-point value $2B77.45D1) you will not come up with Apple's rate22kHz. Multiplying rate11kHz by 2 results in a rate which is 1/65,536 shy of rate22kHz (which is actually 22,254.54546 Hz, as represented by the fixed-point value $56EE.8BA3). SndSampler™ recognizes this, and when upsampling from rate11kHz by a factor of two it will force the resulting sample rate to be rate22kHz. Conversely, when downsampling by a factor of 2 from rate22kHz, SndSampler™ will force the new sample rate to be rate11kHz. SndSampler™ doesn't do anything special with rate5kHz or rate7kHz because these are not used very much. By far the most popular sampling rates are 11 and 22 kHz.

Remember that typing 11 or 22 (etc.) in the Sample Rate box in the main window will force the playback rate to be rate11kHz and rate22kHz, respectively. This will not change the sound data, but will only change the rate at which the Sound Manager plays back the sound.

Downsize

Halves the sound's bit resolution, i.e. 16-bit --> 8-bit.

Upsample
Increases the sound's sampling rate in the same fashion that Downsample decreases it. Upsampling will make your sound larger. Note: this function will not make your awful-sounding 11 kHz recordings into wonderful CD-quality 44 kHz samples.

Upsize
Doubles the sound's bit resolution. The low-order 8 bits are cleared to zero. Note: this function will not make your awful-sounding 8-bit recordings into wonderful CD-quality 16-bit samples. They will still sound like 8-bit samples.

Stereo To Mono
Makes a mono sound out of a stereo sound. Operates on the entire sound.

Mono To Stereo
Changes a mono sound to a stereo sound. You can pan by moving the slider left and right. This function splits the sound into two parts, so there will probably be a noticeable decrease in volume. Operates on the entire sound.

Dynamic Pan
Changes a mono sound to a stereo sound, but with a dynamic effect which causes the sound to move from one speaker to the other, depending on how you specify the starting and ending pan values. Operates on the entire sound.

Options

Sound Color
Allows you to choose a new color for the sound waveform display.

Sound Click
Allows you to choose either a double-click or an option-(or ctrl or cmd)-click to select the end pointer. If you choose either of these options, you will select the position of the start pointer with a single click. You may also choose the nearest click option, where a single click will move the pointer which is closest to where you clicked.

Undo
Allows you to turn the Undo feature on or off.

Clipboard
Allows you to tell SndSampler™ when to copy its own clipboard to the Finder's clipboard. Also, this option will allow you to turn off SndSampler™'s warnings when the sound you are copying to the Finder's clipboard is dangerously large (>100K).

Clear Finder Clipboard
Clears the Finder's clipboard (by calling ZeroScrap). A convenient way to get rid of a large sound you may have copied to the Finder's clipboard, before it causes a system crash.

Cool Things To Try

Simple Stereo Chorusing

1. Change a mono sound into a stereo sound with the slider all the way left

2. Copy the new sound
3. Undo mono to stereo
4. Change the mono sound to stereo with the slider all the way right
5. Move the start pointer to around 100 or so
6. Mix start
7. Move start pointer back to the beginning

Shifting Echo

1. Change a mono sound into a stereo sound with the slider all the way left
2. Echo the entire sound with a delay slightly longer than twice the sound's duration (use frames)
3. Move the start pointer to just before the first echo
4. Copy
5. Revert to saved
6. Change to a stereo sound with the slider all the way right
6. Repeat step 2
7. Move the start pointer to just after the original sound
8. Mix start
9. Move the start pointer back to the beginning

Reverse Echo Fade-In

1. Reverse the entire sound
2. Echo the entire sound
3. Reverse again
4. Listen to that cool effect!

Keyboard Shortcuts

Space bar: plays the existing sound.

Escape key: stops a sound from playing.

Cmd-period: stops a sound from playing.

Delete: deletes the selected portion of the sound if no active text boxes.

Left arrow, right arrow: move the start pointer.

Up arrow, down arrow: move the end pointer.

Mouse Shortcuts

Drag the triangles to move the start and end pointers.

Click once on the sound to move the start pointer.

Double-click (or option-click—see the Options menu) to move the end pointer.

Click on any unused portion of the window to deactivate (and hence enter the text therein) an active text box.

When a sound is playing, click once to stop it.

Legal Notice

This product is sold as is. The authors make no claims about it correctness for or suitability for a specific purpose. The authors accept no responsibility whatsoever for damages of any kind, be they direct, incidental or otherwise, incurred by the user while using, or not using, any version of SndSampler™. We think that covers everything pretty well, don't you?

REGISTRATION FORM: SndSampler™ v2.4

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Where did you get this software?

Comments

Please mail the completed form along with $12 in U.S. funds (checks drawn on a U.S. bank, please) and a self-addressed, stamped envelope to:

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Thanks for your support!