SuperSonic Digitizer™

and the

Digitizer Sound Editor

from MDIdeas, Inc.

SuperSonic Digitizer Installation Instructions

1. Be sure the power is off on your Apple IIGS™ Computer and remove the computer cover.

2. Remove the cable connected between the SuperSonic™ stereo card and the computer motherboard connector J25. Carefully remove the SuperSonic stereo card.

3. Place the SuperSonic card on a table with the components on top as shown in Figure 1. The gold connector fingers should be located on the bottom and the left side of the card. Since the card is sensitive to static electricity, try to handle the card only by the board edges.

4. Remove the SuperSonic Digitizer board from its protective bag and place it next to the SuperSonic card with the component side up (Figure 1). Carefully slide the SuperSonic Digitizer board onto the Expansion Connector located on the SuperSonic stereo card. Push the cards together until they are fully seated (Figure 2).

Your SuperSonic Digitizer board is now installed onto your SuperSonic stereo card. Refer to the SuperSonic Installation Instructions to re-install your SuperSonic into the computer.

Connecting up Audio

1. You will need an audio cable with RCA plugs to connect the SuperSonic Digitizer to an audio source. Feed the cable through a rear panel opening and connect it to the RCA jack located on the digitizer board.

2. The small adjustment knob located on the digitizer board adjusts the audio input level. Refer to the particular software you wish to run on how to adjust this for optimum results.

Important

The SuperSonic Digitizer is slot dependent. In other words, you must install the card in the slot your software accesses. Please refer to your software manual for further information.

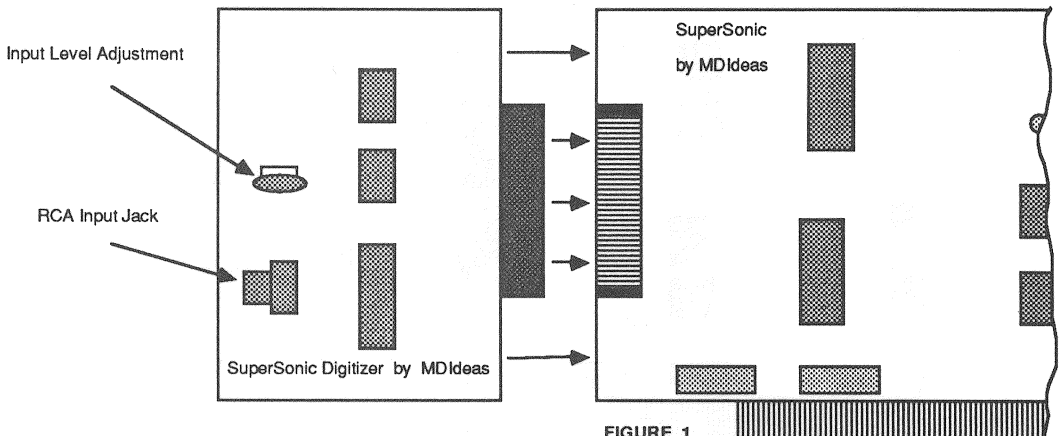
Input Level Adjustment
RCA Input Jack
SuperSonic Digitizer by MDIdeas
SuperSonic
by MDIdeas

FIGURE 1

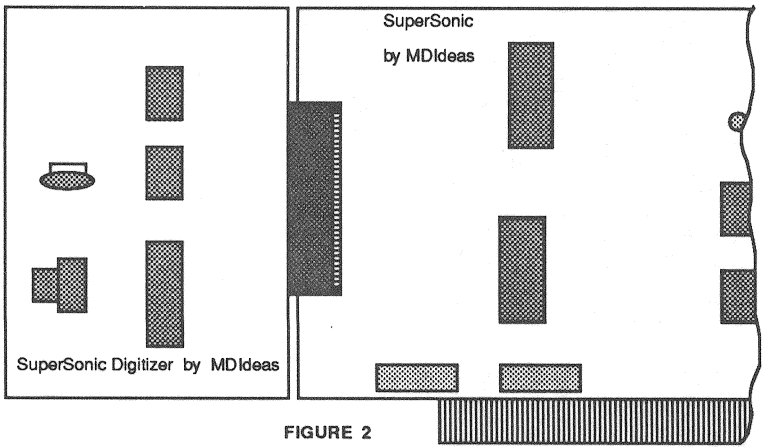

FIGURE 2

Program Overview

The SuperSonic Digitizer Sound Editor allows audio to be entered, modified, played back, and stored onto disks. The SuperSonic Digitizer inputs audio signals into the Apple IIGS computer where the built-in Ensoniq™ sound chip samples the audio and assigns 8-bit numbers corresponding to the audio level at predetermined times. Once the audio passes through the Ensoniq sound chip, it is stored in the computer's auxillary memory (up to 8 Megabytes) for editing, or for permanent disk storage.

For high quality audio analysis, the number of 8-bit numbers (bytes) taken per second (sample rate) should be rather high. The sample rate of the editor is variable from 10Kbytes per second up to 27Kbytes per second. For example, if you have 1 Meg of auxillary RAM, at 27Kbytes per second that would allow for 38 seconds of audio (1Meg/27Kbytes),

Because the Ensoniq sound chip can only digitize one channel at a time, stereo recordings are handled by digitizing one channel at a time and playing back two channels simultaneously. The starting points for each channel can be set for perfect synchronization during stereo playback.

Getting Started

Equipment needed:

Apple IIGS Computer
256K RAM Expansion card *MINIMUM*
3.5" Disk Drive
SuperSonic™ stereo card with a
SuperSonic Digitizer
Pair of stereo speakers (Bose Roommates™) or an
external stereo amplifier with speakers
Program disk
Sound source to digitize (a CD player works best)

Hooking it all up:

Please refer to your installation instructions on how to install your digitizer. Attach the line out of your audio source into the SuperSonic Digitizer. You will probably use an RCA plug to RCA plug patch cable. Feed the cable through a back panel opening on the computer and attach it to the RCA jack on the digitizer board. If you are planning to do a stereo recording, connect up the left channel first. Be sure your SuperSonic stereo card is connected to a set of Bose Roommates or to an external stereo amplifer. See your SuperSonic installation instructions for further information.

Make sure everything is connected correctly. Leave the cover of your computer off and insert your program disk into the disk drive. Turn on the computer and allow it to boot up. You should come to a work space with a menu bar across the top of the screen.

The Sound Editor

Here is a listing of the various menu commands available with a description for each:

File

Load Mono Waveform - Loads in a single waveform from a disk into memory for playback or editing.

Load Stereo Waveform - Loads in two waveforms from a disk into memory for playback or editing.

Append a file - Loads in a single waveform into memory and appends it onto the current waveform in memory. Used to piece two sounds together into one file.

Save Selection - Saves the selected portion of the waveform to a disk either as a normal binary file or as a packed file. The packed file takes up less room on the disk, but takes longer to save. Also the amount of compaction is small, usually around ten percent.

Remove waveform file - Deletes a file off of a disk.

Adjust card volume - Runs the volume adjustment program on the disk. This gives a visual representation of the incoming audio and allows easy volume adjustments for optimum results.

Show wave size - Displays the size, in bytes, of the waveforms in memory.

Quit - Exits the program.

Edit

Digitize Mono - Digitizes the incoming audio into memory as one waveform. The digitization will stop if a key is depressed or the program runs out of free memory.

Digitize Stereo - Digitizes the incoming audio into memory as two waveforms. The left channel is digitized first with the right channel next. Digitization will stop if a key is depressed or the program runs out of free memory.

Playback Mono - Plays back the selected portion of the waveform in memory through both channels with Reverb (echo) acting on the right channel.

Playback Stereo - Plays back the selected portion of both waveforms in memory through their respected channels with no Reverb.

Stop the Music - Stops playing the music. If an Edit window is open, it will display the section of the waveform where it stopped playing.

Edit Mono recording - Opens up a window to allow the user to view and edit the current waveform in memory.

Edit Stereo recording - Opens up two windows (Left and Right) to allow the user to view and edit the current waveforms in memory.

View Left Channel - Brings up the Left channel window to allow editing.

View Right Channel - Brings up the Right channel window to allow editing.

Clear Selection - Clears the selected portion of the waveform to mid-scale (no sound).

Reverse Selection - Takes the selected portion of the waveform and reverses the data for backwards playback.

Options

Preferences - Brings up a dialog box which diplays the current recording and playback parameters. These values may be changed:

The *Playback Rate* varies the pitch of the sounds being played back. The lower the number the lower the pitch.

The *Digitizing Rate* adjusts the sample rate when digitizing sounds. The lower the number the faster or higher the sample rate. Zero corresponds to approx. 27Kbytes of memory per second of sound.

The *Playback Volume* adjusts the output level of the audio through the SuperSonic stereo card.

The *Reverb Value* is essentially a delay applied to the right channel when playing back a mono waveform. This gives a feeling of depth and produces great pseudo stereo sound when playing back mono sounds.

Clicking on the Auto Repeat box will make the audio playback continuous. The selected sound data will play and re-play until 'Kill the Music' is selected.

Also included is the option to select the slot of the digitizer. Choose the appropriate button corresponding to the slot in which the SuperSonic Digitizer is plugged into.

Adjusting the volume

After you have connected an audio source to the SuperSonic Digitizer, you need to adjust the volume for the sounds you wish to digitize. Choose 'Adjust Card Volume' from the 'File' menu.

The program Adjust.Vol will be executed and on the screen you should see a flat horizontal line. Turn the volume knob on you SuperSonic Digitizer card to minimum (Counter Clockwise). Turn on your sound source. With the sounds playing, slowly turn the knob Clockwise until you see the line bounce up and down to the music. You should adjust the volume until the loudest passages make the line hit the top and bottom of the screen. This will give the best results.

If you cannot get the line to move, you probably will have to tell the program where your SuperSonic Digitizer card is located. Hit the number keys 1-4 and the program will look for the digitizer in that slot location.

To quit the program, hit the 'ESC' key. You will be back in the sound editor.

Editing

Once you have digitized a sound into memory you may view it by choosing 'Edit Waveform' from the 'Edit' menu. A window will be displayed which will give a visual representation of the sound data in memory. You may scroll through the data with the scroll bar located on the bottom.

To select a portion of the waveform, you designate start and end points on the waveform. If you point the mouse on a portion of the wave and click, a new starting point will be set. This is indicated by a graying out of the deselected portion of the wave. To set the ending point, hold the Ó key and click the mouse.

Once you have selected the portion you wish to analyze, you have several options:

Clicking on the Zoom box in the top window border will zoom up the waveform for a more precise look at the data. Clicking on the Zoom box again will return the window to its original size.

Choosing 'Playback' will play the selected data through the SuperSonic stereo card. The monitor border will cycle through various colors indicating that the program is indeed playing back sound data.

Choosing 'Clear Selection' will erase or zero out all sound data between the selected starting and ending points.

Choosing 'Reverse Selection' will recopy the selected sound data backwards into memory.

You may also move the selected data to another part of the waveform. Scroll to where you would like to place the selected data. Hold the 'OPTION' key down, point the mouse where you want the data to start at, and click the mouse button. This will re-write the selected data starting where the mouse was pointing at. Remember this operation will write over the existing data.

Choosing 'Save Selection' will save the selected data onto a disk in either a packed or normal binary file.

Samples

Object - Take two digitized words from two sound sources and place them together in sequence in one sound waveform.

Procedure:

1. Digitize the first sound passage.
2. Set starting and ending points around the first word in the waveform.
3. Save the selection to a disk.
4. Repeat steps 1-3 for the second sound passage.
5. Load in the first sound file from the disk.
6. Append the second file from the disk.
7. Save the entire waveform (both words) to disk.
8. Re-load in waveform with both words together.

Object - Find out what is being said during backward masking in part of a song.

Procedure:

1. Digitize song where backward masking appears.
2. Set starting and ending points around section that appears to be backwards masked.
3. Choose 'Reverse Selection'.
4. Playback section which should now be backwards in memory.
5. Save selection to disk if desired.

Object - Digitize stereo recording off of a compact disk player and playback the data together in stereo.

Procedure:

1. Connect up left channel to the SuperSonic Digitizer
2. Set CD player to start of music and pause.
3. Choose 'Digitize Stereo'. Start left channel digitizing and start CD player.
4. Stop digitizing by hitting a key on the keyboard.
5. Set CD player to start of music again and pause.
6. Connect up right channel to the SuperSonic Digitizer
7. Start right channel digitizing and start CD player.
8. Stop digitizing by hitting a key on the keyboard.
9. Playback stereo data and note which channel is starting late.
10. Choose Edit Stereo Recording which will bring up two windows. Get to the window of the channel which is starting late.
11. Set starting point in until both channels are synchronized on playback.
12. Save selections to disk if desired.

Troubleshooting

A) I cannot get the volume adjustment program to indicate any audio signal is present.

1. Make sure the digitizer volume knob is turned up.
2. Be sure the digitizer is in slot 1-4 and press the number key 1-4 of the slot it is located in.
3. Make sure the audio signal is at line-level. This is the output of a tape deck or CD player. The output of a microphone will not give adequate results.

B) The reverb gets longer and longer when playing back a sound sample.

1. The Auto-Repeat function is active. With a reverb and auto re-peat enabled, the reverb value will be additive with each pass of the waveform.

C) I can only get one recording in memory at a time.

1. There probably isn't enough free memory left to do the other channel. Re-do the recording, but cut down the time for the first recording.
2. Be sure to choose 'Digitize Stereo' from the 'Edit' menu.

D) The recordings I make all sound noisy or scratchy.

1. The signal source is noisy. Try using a cleaner source.
2. The recording level is too low. Try increasing the volume of the recording.
3. The material being recorded is too quiet in passages and the background noise is coming through. Try a louder passage. Remember that this is only an 8-bit digitization and quiet passages, similar to those found in classical music, will be lost in the recording and will appear as noise.

E) I get a beep when I try to reposition the starting and ending points on the waveform.

1. You are trying to position the starting point after the ending point or the ending point before the starting point.

2. You are trying to select too small a section. The smallest section in the first edit window is around 4500 bytes. Once you zoom in with the zoom box you can select a section down to around 80 bytes is length.

TIPS and HINTS for the Experimenter

If you lower the digitizing rate too much, the recordings will sound noisy and distorted. This is digital aliasing noise. Either increase the sample rate or install variable low-pass filters before digitizing and after playback. The built-in filter cutoff frequency of the SuperSonic Digitizer and the SuperSonic stereo card is approx. 10 KHz.

Because of the 8-bit resolution of the Ensoniq chip, quiet music will not sound very good. You can try an audio limiter on the input and increase the volume. This gives good results.

Audio compandors will work with a good deal of success. In fact you can get a signal to noise ratio of over 75db! The only disadvantage is that the expandor is required on the output stage. This is OK if you are doing your own work and don't expect the sound samples to be released to others without compandors.

'Preferences' for equal pitch recordings

Digitizing Rate / Playback Frequency / Sample Rate (bytes/sec)

0	114	27.5K
1	114	27.5K
2	109	26.5K
3	102	25.0K
4	97	23.5K
5	93	22.5K
6	89	21.5K
7	86	21.0K
8	82	20.0K
9	79	19.5K*
10	76	18.5K*

* Sample rates below 20Kbytes per second will sound scratchy unless an external filter is used before digitizing and after playback.

Other Problems?

If you have any questions or comments about the SuperSonic Digitizer or the SuperSonic stereo card, or would like information on how to program using either product, please contact us at:

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Manual by Mark Bain
'Adjust.Vol' program by Roland Gusstafson
Sound Editor program by Roger Uzun

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If you discover a defect, MDI will, at its option, repair, replace or refund the purchase price of the product at no charge to you, provided you return it during the warranty period, transportation costs prepaid, to the authorized MDI dealer from whom you purchased it or directly to MDI. All direct returns to MDI must be accompanied with a Return Merchandise Authorization (RMA) number. Please attach your name, address, telephone number, a description of the problem, the RMA#, and a copy of the bill of sale bearing the appropriate MDI serial numbers as proof of date of original retail purchase, to each product returned to warranty service. You can obtain additional information from MDI directly at 1163 Trition Drive, Foster City, CA 94404.

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