Preface

This Sound Effect Editor Users Guide documents how to use the Atari HCD Software Engineering Sound Effects Editor. This guide is designed as an interactive tool. The user displays the features of the Sound Effects Editor and participates in a sample sound-creating session. This author recommends that the user read Chapter 7 in De Re Atari for background information regarding sound generation on the Atari 400/800. This guide is based on Rev. 1 of the Sound Effects Editor.

THE SOUND EFFECTS EDITOR

INTRODUCTION

The Sound Effect Editor was created as a software development tool by the HCD Software Engineering Group. You use the Sound Effect Editor to create sounds by charting frequency, volume and distortion values in the Edit Windows and specifying appropriate values in the Text Windows. The sounds are saved as Table Driven files or Timer Driven files. Table Driven files are then run through SEFT, (Sound Editor File Translator) which produces sound tables .

The Sound Effect Editor and SEFT enable programmers, program designers and trained non-programmers to create sophisticated sound effects without having to program them. This users guide explains how to use the Sound Effect Editor. The text first describes the individual features of the Sound Effect Editor. A sample editing session, demonstrating these features, follows this description. For a detailed explanation of sound generation on the Atari 400/800 systems, see De Re Atari, Chapter 7.

Procedures

You are encouraged to load the Sound Effect Editor diskette and display the various features as you read this users guide. Looking at the screens as they are being described will familiarize you with the Sound Effect Editor for the sample sound-creating session.

- Make certain your system contains 48K RAM.
- Remove all cartridges from the Atari 400/800 system.
- Boot the Sound Effect Editor diskette.
  The DOS Menu is displayed on the screen.
- Type "L" and respond to the prompt with "SOUND".
  The Sound Effect Editor Main Menu appears on the screen.

The Main Menu options are; Load Sound Effect Data, Create/Edit Sound Effect, Save Sound Effect Data, Display Data Directory and Return to System Menu.

Within the Sound Effect Editor;

- Press the OPTION key to move the cursor up and down the screen.
- Press the SELECT key to the cursor move across the screen.
- Press the START key to proceed with a chosen function.
- Use the joystick or cursor control keys to move cursor within the Edit Window.
- Press RETURN or the joystick trigger to plot a data point.

Use the second option, Create/Edit Sound Effects, first.
NOTE: The SWEAT System menu has not been developed at this time, hence, the "Return to System Menu" option returns control to DOS.

CREATE / EDIT SOUND EFFECTS

Press OPTION to move the cursor to Create/Edit Sound Effects.
Press START to proceed. The Edit Screen will appear.
The following illustration describes the Edit Screen attributes.

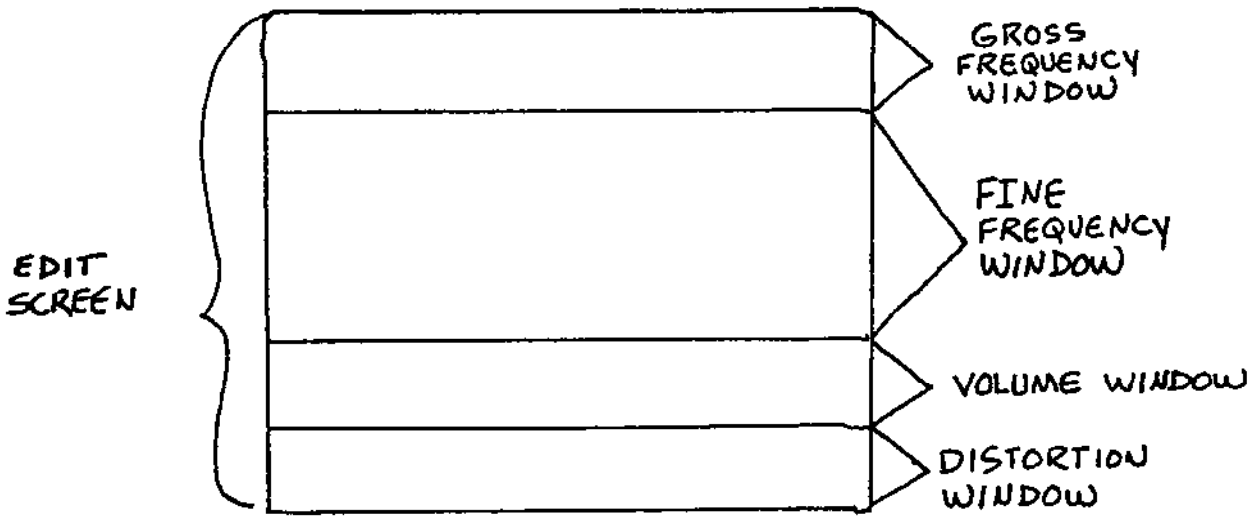

Figure 1. Illustration of Edit Screen

When the Edit Screen appears, the Sound Channel Window is accessible. The Sound Channel is a Text Window and is discussed in the section titled "Text Windows".

The Edit Screen

Conceptually, the Edit Screen is a plotting graph of frequency, volume and distortion values that combine to form sounds. The Edit Screen is incremented by jiffies. A jiffy is 1/60 of a second. Using the jiffy as the smallest increment, the jiffy count controls the duration of sound.

Jiffy

The jiffy number is displayed on the screen next to JIFFY. This number represents the location of the edit cursor on the jiffy. The width of the Edit Screen contains a total of sixty jiffies or the equivalent of one second of time. A total of 600 jiffies occur in the Sound Effect Editor. Display data points past 60 by plotting data points in the jiffies. Jiffies are used to match sound with animation.

The Edit Windows

There are four Edit Windows; The Gross Frequency Window, the Fine Frequency Window, the Volume Window and the Distortion Window. To create sound, you plot points that represent frequency, volume and distortion values in these respective windows. Press ESC to display the HELP Screen for the Edit Window commands.

The Frequency Windows

The top Edit Window is the Gross Frequency Window.
Due to the physical limitations of the screen, every value in the frequency range (0-255) cannot be displayed in a window at the same time.
The Gross Frequency Window displays frequency values in increments of eight. Therefore, you can see all the plotted frequency data points in the current jiffies.
Note: The highlighting band that appears in the Gross Frequency Window represents the current editing area of the Fine Frequency Window.

The Fine Frequency Window displays 64 frequency values at one time, but scrolling displays the entire range of frequency values. The Fine Frequency Window allows you to plot all the frequency values.

Example:

- Press F to access the Fine Frequency Window.
- Press Joystick one to the left, pushing the trigger.

A red line appears on the screen in the Fine Frequency Window. Notice that a red line also appears in the highlighting band in the Gross Frequency Window.
Also, note that the frequency value displays next to F on the screen when you press the trigger. This frequency value is the same as the number displayed under CURSOR while you are in one of the Frequency Windows. The CURSOR number allows you to determine the current frequency value without plotting a data point.

Note: The higher the frequency value, the lower the note. Table 1 suggests some musical equivalencies for your reference.

TABLE 1

TABLE OF PITCH VALUES FOR THE MUSICAL NOTES

MUSICAL NOTES	FREQUENCY
C	29
B	31
A# or Bb	33
A	35
G# or Ab	37
G	40
F# or Gb	42
F	45
E	48
D# or E	51
D	54
C# or Db	57
C	60
B	64
A# or B	68
A	72
G# or Ab	76
G	81
F# or Gb	85
F	91
E	96
D# or Eb	102
D	108
C# or Db	115
C	121
B	129
A# or Bb	136
A	144
G# or Ab	153
G	162
F# Gb	173
F	182
D	193
D# or Eb	205
D	217
C# or Db	230
C	243

The Volume Window

Press V to enter the Volume Window. To hear sound, you need volume. Volume values range from 0 (no sound) to 15 (maximum gain). Chart data points by moving Joystick and pressing the trigger. You will use the Volume Window during the sample sound-creating session. Plotted volume values appear next to "V" on the screen. While you are in the Volume Window, all current volume values appear under CURSOR in the upper right of the screen. The sum of the volume values for all four sound channels shoul not exceed 16 to avoid overmodulation of the audio output, which results in less volume and produces a buzzing quality.

The Distortion Window

Distortion values vary the tone quality of the frequency.
The distortion values available are 0-14, in increments of 2.
The default is 10 (no distortion). You plot a distortion value by moving the joystick and pressing the trigger.
The plotted distortion values are displayed next to "D" on the screen. While you are in the Distortion Window, the current distortion values are displayed under CURSOR.
You can see samples of frequency and distortion combinations used to create some familiar sounds in Table 2.

TABLE 2

SOUNDS PRODUCED BY DISTORTION COMBINATIONS AT SEVERAL FREQUENCIES

Distortion	Low Frequencies	Middle Frequencies	High Frequencies
0	geiger counter	raging fire	rushing air, steam
2 and 6	machine gun	auto at idle	electric motor
4	calm fire	laboring auto	auto with a miss
8	building crashing in	radio interference	waterfall
10 and 14	square waves		
12	airplane	lawnmower	electric razor

Text Windows

The four Text Windows allow you to manipulate the sound data that you have created in the Edit Windows. The Text windows are the Sound Channel Window, the Audio Control Window, the Copy Window and the Clear Window.

- Press W to move the cursor into these Text Windows.
- Press the Space Bar to toggle between the Sound Channel Window and the Audio Control Window.
- Press C to access the Copy Window. (You cannot be Text Window modify mode when you press C).
- Press CNTL and CLEAR to access the Clear Window. (You cannot be in the Text Window modify mode when you press CNTL).
- Press SELECT to cycle through the channels.
- Press OPTION to move the select arrows up and down.
- Press the CLR SET TAB key to choose a channel or selection.
- Press START to proceed with your chosen function.

Sound Channel Window

Four sound channels are available on the 400/800 system that you may edit, show and play.

Edit

Use the Edit function to select a sound channel.

- Press W to enter the Text Window modify mode.
- Press SELECT to cycle through the channels.
- Press the CLR SET TAB key to choose a channel.
- Press START to proceed.

Sound data from the current edit channel will appear on the screen in red.

Show

Use the Show function to display sound data on the Edit Screen.

- Press W to enter the Text Window modify mode.
- Press SELECT to cycle through the channels.
- Press the CLR SET TAB key to choose a channel (s).
- Press START to proceed.

Sound data from the current edit channel appears automatically on the screen in red. All channels, or combinations of channels, may appear on the screen at the same time. The sound data from any channels but the edit channel will be white.

Play

Use the Play function to choose a sound channel or a combination of channels to play.

- Press W to enter the Text Window modify mode.
- Press SELECT to cycle through the channels.
- Press the CLR SET TAB key to choose a channel.
- Press ESC twice for the appropriate HELP screen.
- Press START to proceed.

You are able to play two or more channels by selecting the channels on this line. Use the HELP Screen commands to play the channels. You will use this feature in the sample sound-creating session.
Channels may also be played by pressing the channel number on the keyboard, but you cannot be in the Text Window modify mode.

Length

This row gives you the current length in jiffies of each sound channel.

Audio Control Window

The Audio Control Window enables you to set the main clock cycle, the high-poly counter, a 16-Bit resolution, high-pass filters and the 1.79 MHZ clock. See De Re Atari, Chapter 7 for background information.

- Press Space Bar to access the Audio Control Window.
- Press W to enter the Text Window modify mode.
- Press SELECT to move across to the alternative selection.
- Press OPTION to move the cursor up and down.
- Press the CLR SET TAB key to choose a selection.
- Press START to proceed.

This section lists the defaults of the selections available in the Audio Control Window.

OPTION	DEFAULT
Main Clock Cycle	64 KHZ
High Poly Counter	17-BIT
16-BIT Resolution	8-BIT
High Pass Filter	NONE
1.79 MHZ Clock	64 KHZ

Copy Window

Use this feature to copy sound data from one channel to another.

- Press C to access the Copy Window.
  (You cannot be in the Text Window modify mode
  when you press C).
- Press SELECT to cycle through the channels.
- Press OPTION to move the cursor up and down.
- Press the CLR SET TAB key to choose a channel.
- Press START to proceed with the copy.
- Press BREAK to cancel the copy.

Clear Window

Use this feature to clear sound data from one or more channels.

- Press CNTL and CLEAR to access the Clear Window.
- Press SELECT to cycle through channels.
- Press the CLR SET TAB key to choose channel (s).
- Press START to proceed with the Clear.
- Press BREAK to cancel the Clear.

SAVE SOUND EFFECT DATA

Use this feature to save sound data created in the Create/Edit mode.

- o Display the Main Menu. (Press E if in the Create /Edit mode)
- o Press OPTION to move cursor to SAVE SOUND EFFECT DATA.
- o Press START.

The Save Sound Effect Data screen will be displayed.

- o Enter a filename and press RETURN.

Backspace over the "D2" and alter if you are not using Disk Drive 2. After you press RETURN, a second line will appear on the screen, displaying the channel numbers and "ALL".
Note: ".SND" is the default extension. Extensions must be specified in SEFT.

- o Press SELECT to cycle through the channels.
- o Press the CLR SET TAB key to choose a channel.
- o Press START to proceed.
- o Press ESC for the Method Selection HELP Screen.

A third line appears on the screen displaying the SAVE methods. Table Driven means that every frequency, volume and distortion combination, charted in the Edit Window will be saved as a value. Timer Driven means that each unique value for frequency, volume and distortion combinations will be saved. Therefore, in Timer Driven, if a specific sound continues for more than one jiffy, only one value combination and its jiffy count will be recorded. In Table Driven, the value combinations are recorded every jiffy (1/60 of a second). At completion, the Sound Effect Editor Main Menu will be displayed.
NOTE: Sounds created by the Sound Effect Editor and saved as Table Driven must be run through the SEFT Utility to produce sound tables. The Utility for the files saved as Timer Driven has not been developed yet.

DISPLAY DATA DIRECTORY

Use this feature to display the files on your diskette.

- o Display the Main Menu. (Press E if in the Create/Edit mode).
- o Press OPTION to move the cursor to Display Data Directory.
- o Press START to proceed.
- o Press ESC for the HELP Screen.
- o Press SELECT to choose the drive.
- o Press START to proceed.

This option displays the filenames and number of the sectors allocated. To get back to the Main Menu, press the BREAK key.

LOAD SOUND EFFECT DATA

Use this feature to load sound files that you have already created.

- o Display the Main Menu. (Press E if in the Create/Edit mode).
- o Press OPTION to move the cursor to Load Sound Effect Data.
- o Press START to display the Load Sound Effect Data screen.

The Load Sound Data screen is displayed on the screen.

- o Enter a filename and press RETURN.

Backspace over "D2" and alter if you are not using Disk Drive 2. The Sound Effect Editor loads the specified file and determines the file type. If the specified file is a single channel sound effect, select the sound channel to load on the next line.

- o Press SELECT to cycle through the channels.
- o Press the CLR SET TAB key to choose a channel.
- o Press START to proceed.

If there is data currently in that channel, the message, "WARNING: CURRENT DATA WILL BE LOST", will be displayed. Here you may press BREAK to abort the load or START to continue. If the specified file contains data for all four channels, the screen will flash "Four Channels", load the file, and return to the Main Menu. If data exists for any of those channels, the message, "WARNING: CURRENT DATA WILL BE LOST", appears. Press BREAK to abort the load or START to proceed.

NOTE: Sound files saved as Table Driven files must be run through SEFT to produce sound tables.

Sound Effects Editor Sample Session

This sample sound-creating session enables you to create a simple sound on two separate sound channels, Show the sound data from both channels on the Edit Screen and Play the sounds.

This session is a step-by-step, user-participating procedure.

Procedures

1. Boot the Sound Effects Editor Diskette.
   The DOS Menu will appear on the screen.

2. Type L.

3. Respond to the prompt with "SOUND".
   The Sound Effects Editor Main Menu will appear on the screen.

4. Press OPTION to move the cursor to CREATE/EDIT SOUND EFFECT.

5. Press START to choose CREATE/EDIT SOUND EFFECT.
   The Edit Screen appears.

6. Press W to select a channel in the Edit line.
   Initially, the arrows point to channel 1 on the Edit line.

7. Press SELECT to move the arrows to channel 3.

8. Press the CLR SET TAB key to choose the channel.

9. Press START to proceed.

10. Press F to enter the Fine Frequency Window.
    The cursor is in the top left corner of the Fine Frequency Window.

11. Using Joystick 1, move the cursor down the left border of the Fine Frequency Window until you see "100" appear under CURSOR in the upper right of the screen.
    NOTE: DO NOT PRESS THE TRIGGER WHEN YOU DO THIS.
    When you reach 100, you should be in the bottom left corner of the Fine Frequency Window.

12. Press the Joystick 1 trigger and move the cursor along the bottom border of the Fine Frequency Window to the right bottom corner.
    You have drawn a red line in the Fine Frequency Window.
    A red line also appears in the Gross Frequency Window in the highlighting band.
    You now have sound data in the Frequency Windows.

13. Press V to enter the Volume Window.

14. Using Joystick 1, move the cursor back to the left border, WITHOUT PRESSING THE TRIGGER.

15. Using Joystick 1, move the cursor until "10" appears under CURSOR, near the Volume Window.

16. Using Joystick 1, press the trigger and move the cursor to the right border of the Volume Window.

17. Press 3 on the keyboard. Listen to the sound you have created.

18. Press D to enter the Distortion Window.

19. Move the cursor back to the left border without pressing the trigger.

20. Using Joystick 1, move the cursor until 10 appears under CURSOR, near the Distortion Window.

21. Pressing the trigger of Joystick 1, move the cursor across the Distortion Window, to the right border.

22. Press 3 to hear the sound. SHIFT 3 plays the sound continuously.

The Audio Control Window

1. Press SPACE BAR to access the Audio Control Window.

2. Press W to get into the Text Window modify mode.

3. Press SHIFT 3 to play the sound continuously.
   Now you are going to hear how these audio control choices affect the sound you have created.
   - o Press W to access the Audio Control Window.
   - o Press OPTION to move the arrows up and down.
   - o Press SELECT to move the arrows across.
   - o Press the CLR SET TAB key to choose an audio control option.
   - o Press START to hear the difference in the sound.

   Note: Once you press START, you must press W to access the Audio Control Window again.

Go through the Audio control choices for awhile and pick different combinations. Listen to the variety of sounds they help to create.

Show a Sound Channel

1. Press Space Bar to get back to the Sound Channel Window.

2. Use Steps 6-9 above, to select Channel 4 on the Edit line.

3. Alter the values in steps 10-23 to create a new sound for Channel 4.

4. Press W to access the Text Window modify mode.

5. Press OPTION and SELECT to move the arrows to Channel 3 in the Show line. Press the CLR SET TAB key and START. Notice that the data from Channel 3 appears on the Edit Screen in white.

Play a Sound Channel

1. Press W to enter the Text Window modify mode.

2. Use the OPTION and SELECT keys to move the arrows to Channel 3. Press the CLR SET TAB key, move the arrows to Channel 4, and press the CLR SET TAB key again.

3. Press START.

4. Press P on the keyboard to hear the sounds in Channels 3 and 4 played together. Press SHIFT P to hear them play continuously together.

SOUND "EFFECTS" EDITOR
FILE FORMATS

description	byte #s	length	data
SWEAT identification	1 - 5	5	S W E A T
period	6	1	.
default extension	7 - 9	3	S N D
SWEAT editor #	10	1	6
audio control data	11	1	
file type	12	1	0 = TABLE; 1 = TIMER
channel number	13	1	0 = all four channels 1 - 4 = channel number
channel # data length	14 - 15	2	low byte high byte

if channel number = 0 (all four channels) then

channel #2 data length	16 - 17	2	low byte high byte
channel #3 data length	18 - 19	2	low byte high byte
channel #4 data length	20 - 21	2	low byte high byte

the data that follows is file type dependent

if file type = 0 (TABLE) then

description	byte #s	length	data
channel # freq. data		1	0 - 255
channel # vol/dist data		1	

repeat: channel # data length times

if channel number = 0 (all four channels) then

channel #2 freq. data		1	0 - 255
channel #2 vol/dist data		1	

repeat: channel #2 data length times

channel #3 freq. data		1	0 - 255
channel #3 vol/dist data		1	

repeat: channel #3 data length times

channel #4 freq. data		1	0 - 255
channel #4 vol/dist data		1	

repeat: channel #4 data length times

if file type = 1 (TIMER) then

description	byte #s	length	data
channel # freq. data		1	0 - 255
channel # vol/dist data		1	
channel # # of jiffies		1	1 - 255

repeat: channel # data length times

if channel number = 0 (all four channels) then

channel #2 freq. data		1	0 - 255
channel #2 vol/dist data		1	
channel #2 # of jiffies		1	1 - 255

repeat: channel #2 data length times

channel #3 freq. data		1	0 - 255
channel #3 vol/dist data		1	
channel #3 # of jiffies		1	1 - 255

repeat: channel #3 data length times

channel #4 freq. data		1	0 - 255
channel #4 vol/dist data		1	
channel #4 # of jiffies		1	1 - 255

repeat: channel #4 data length times