

# CHAPTER 1 OVERVIEW

## **1** Features

The PlayStation sound artist board (DTL-H700, hereinafter referred to as the PlayStation sound board) and the PlayStation sound artist tool (DTL-S710, hereinafter referred to as the PlayStation sound tool) are applications executed on Apple Macintosh. They are tools for creating sound data for the PlayStation unit. Using the tools along with existing sound tools enables music creation for the PlayStation unit.

The following are other features of the PlayStation sound tool:

#### Sound chip SPU for the PlayStation unit is mounted.

The PlayStation sound board is equipped with the same sound chip (SPU) as for the PlayStation unit and with a sound source memory of 4 M-bits (= 512 k-bytes). Hence, sound data equivalent to data for the PlayStation unit can be reproduced on Macintosh. SPU is provided with DSP for reverb effect implementation.

#### · Optical digital output is covered.

The PlayStation sound board is equipped with a square optical digital output terminal (TOSLINK). The terminal allows data creation under high-quality music reproduction environment.

#### MIDI is supported.

A sound board driver included in the PlayStation sound tool is applicable to the Apple MIDI manager (version 2.0 or later). The sound tool can be operated directly from sequencer software and the MIDI keyboard.

#### A standard MIDI file (SMF) and an audio interchange file format (AIFF) are covered.

The sound tool supports SMF and AIFF as source data, being highly compatible other general sound tools.

#### File format

The PlayStation sound tool supports the following sound data formats.

- SMF: Standard MIDI file (Format 1)
- AIFF: 16-bit audio interchange file format (AIFF)
- · SDII: SoundDesignerII file format

The PlayStation sound tool supports the following sound formats for the PlayStation unit.

- SEQ: PlayStation sound sequence format
- VAG: PlayStation waveform format
- VAB: PlayStation wave bank format
- DA: PlayStation CD-DA format
- XA: PlayStation CD-ROM XA audio channel format

The PlayStation sound tool also supports the following sound formats for the PlayStation unit.

- SEP: PlayStation sound sequence chuck format
- VH: PlayStation wave bank header format
- VB: PlayStation wave bank body format

The XA format supported by RAW2XA is based on the following specifications.

#### • CD-ROM XA

SYSTEM DESCRIPTION CD-ROM XA Copyright May 1991

For details of the formats, see Chapter 4, References.

## 2 System Configuration and Music Creation

The use of the PlayStation sound tool involves the following devices and software.

#### • Apple Macintosh II/Quadra series and Power Macintosh series

- NuBus slot x 1 or more
- Memory area of 8 M-bytes or more
- Hard disk (of 100 or more MB) for saving sound source data

#### · Peripheral devices

- Display of 13 or more inches
- D/A converter (such as DAT) with square optical (TOSLINK) input
- · Reproducing devices including an amplifier, speaker and headphone

#### Software

• KEIS Talk 7 Rel 7.1 or later

For the comfortable use of the PlayStation sound tool, it is recommended that the following environment be set up.

#### Apple Macintosh II/Quadra series and Power Macintosh series

- MC68040 processor rated at 33 MHz or PowerPC 601 rated at 66 MHz, or more powerful device
- NuBus slot x 3 or more
- Memory area of 16 M-bytes or more
- Hard disk (500 MB or more) for saving sound source data

#### · Peripheral device

• High-resolution display of 17 inches or more

#### Environment for music creation

Actual music creation by the PlayStation tool involves the following system in addition to the items given in the preceding paragraph for operating environment.

	@ @ &Function @ @ @ @	@ @ @ @ @ @ @ <b>D</b> evice
Sampler	Records data from DAT, CT and other devices to HD.	Audiomedia II (Digidesign) Pro Tools (Digidesign) S-100 (AKAI)
Waveform editing software	Edits stored waveforms.	Sound Desinger II (Digidesign) Alchemy /Passport Desingn) INFINITY /Jupier)
MIDI keyboard	Enters score data from the keyboard.	
Sequence software	Enters, edits and reproduces score data.	Perfomer (Mark of Unicom) Vision (Opcode System)
MIDI interface	Connects a MIDI device to the Macintosh serial port.	MIDI Interface (Apple Computer) MIDI Translator (Opcode Systems) MIDI Timepiece (Mark of Unicom)
MIDI Manager	Patches software and devices for MIDI.	Apple MIDI Manger (Apple Computer) Free MIDI (Mark of Unicom) OMS (Opcode System)

Table 1 Equipment Needed for Creation Environment

#### Example of music creation environment

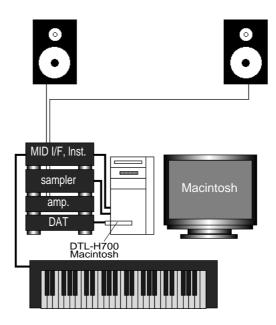


Figure 1-1 Example of Music Creation Environment

#### Process of music creation

The following gives the process of music creation for the PlayStation unit.

#### On Macintosh

- HD recording and waveform editing
- Waveform data conversion
- Sound source set development and editing
- Sequence development and editing
- Sequence data conversion



Figure 1-2

#### • PC/AT-compatible machine

- · Programming and linking
- Final sequence and SE checking
- Inspection of real time effects
- Data conversion and interleave (MovConv \*)
- CD-ROM fixing (CD-ROM generator \*)
- Completion



Figure 1--3

- \* MovConv (MOVCONV.EXE) belongs to the PlayStation Runtime library (DTL-S590 / DTL-S2100).
- \* The CD-ROM generator is a CD-ROM generation tool (DTL-S2030).

# CHAPTER 2 INSTALLATION

## 1

### **Setting up DTL-H700**

Setting up the PlayStation sound board (DTL-H700) requires the following operation.

- PlayStation sound board installation
- · Connection of board output to the D/A converter

#### Installing PlayStation sound board

In accordance with the manual for Macintosh, draw out the power cable and remove the cover of the computer used (1).

Install DTL-H700 in an empty NuBus slot (2) and set the cover (3).

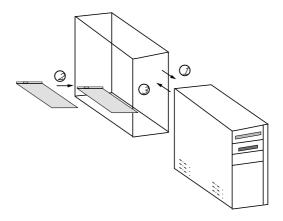


Figure 2-1 Installing Board

#### Connecting board output and D/A converter

The rear panel of DTL-H700 is provided with a set of square TOSLINK optical digital output terminals. Apply board output to the D/A converter (DAT) using a square optical cable as an option.

## 2 Installing DTL-S710

Installation involves a sound artist tool disk for Macintosh.

- (1) Start up Macintosh.
- (2) Insert the sound artist tool into the floppy disk drive.
- (3) Drag the disk icon to the place where DTL-S710 is to be installed.



Figure 2-2 Installing Software

Now, DTL-S710 has been installed.

Should the application icon not be displayed correctly (default icon) after the installation, reconstruct the desktop computer. The desktop computer can be reconstructed by starting up Macintosh with the option key and the command key (with the Apple mark) pressed. For details, refer to the user's guide for Macintosh.

## 3 Testing System

Immediately after having installed the PlayStation sound board (DTL-H700) and the PlayStation sound tool (DTL-S710), carry out the following tests to check that the system is installed correctly.

#### Connection test

Check that the PlayStation sound board is installed correctly in the NuBus slot and that the square optical cable is connected validly.

#### Reproduction test

Use sample data for the PlayStation sound tool to check actual sound reproduction.

Should an error be detected during the test, make sure that the system is connected validly and the software is installed correctly. Should the cause not be isolated, please contact our business department whose address and phone number are written on the back cover of this manual.

(1) Open the "sample" folder in the installed sound artist tool folder.

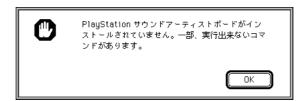


Figure 2-3 Error Message Panel

(2) Open the VAB folder, double click the file with a name of "sample.vab", and start up sound tool SoundDelicatessen. If the following dialogue box is displayed, this indicates that the board is not correctly installed. Immediately terminate the system to check board setup.

If double clicking the file does not lead to the startup of SoundDelicatessen, double click and initiate SoundDelicatessen in the "Bank Editor" folder in the installed sound artist tool folder. Then, open the "sample.vab" file in the applications.

(3) After SoundDelicatessen has been started up, select the "Mac -> SPU" menu in the "SoundBoard" menu to transfer sound data to the SPU sound source memory.

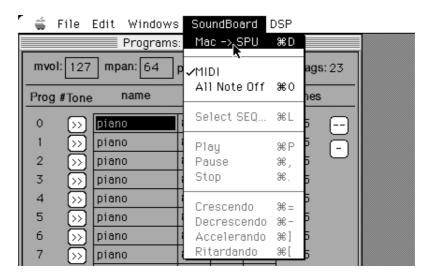


Figure 2-4 "SoundBoard" Menu

Upon the end of the data transfer, the Keyboard window is displayed.

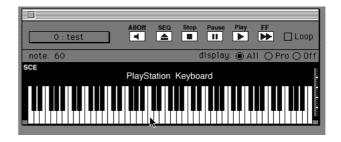


Figure 2-5 "Keyboard" Window

- (4) Clicking the displayed Keyboard window by the mouse causes piano sound to be reproduced. Should no piano sound be reproduced, check the connection of the D/A converter and amplifier, and the potentiometer.
- (5) Select "Quit" in the "File" menu to terminate SoundDelicatessen.

# CHAPTER 3 TUTORIALS

1

### **Creating Sound Data for PlayStation Unit**

The following are the sound data formats that can be handled by the PlayStation unit:

#### • SEQ

PlayStation sound sequence data format

#### • SEP

PlayStation sound multi-track sequence data format

#### VAB

PlayStation sound bank data format

#### VH

PlayStation sound bank data format (Attribute part)

#### • VB

PlayStation sound bank data format (Waveform part)

#### • DA

PlayStation CD-DA format

#### XA

PlayStation CD-ROM XA voice channel format

In addition, the PlayStation sound tool handles the following data format as the intermediate format.

#### VAG

PlayStation waveform data format

The PlayStation sound tool supports the following five applications to create and edit data.

#### • SMF2SEQ

Sequence data converter



Figure 3-1 SMF2SEQ Icon

#### • AIFF2VAG

Waveform data converter



Figure 3-2 AIFF2VAG Icon

#### VAG Player

Waveform data player



Figure 3-3 VAG Player Icon

#### • SoundDelicatessen

Sound source bank editor (including the sound board driver)



Figure 3-4 SoundDelicatessen Icon

#### • RAW2DA

Endian converter for CD-DA data



Figure 3-5 RAW2DA Icon

#### • RAW2XA

Data encoder for CD-ROM XA voice channel



#### Figure 3-6 RAW2XA Icon

The PlayStation programmer tool supports the following two applications for DOS/V to simplify data and memory management.

#### • VABSPLIT.EXE

VAB data separation tool

#### • SEQ2SEP.EXE

SEP creation tool

For these DOS/V applications, refer to the manual for the programmer tool.

## 2 SMF2SEQ - Creates Sequence Data

SMF2SEQ converts a format 1 standard MIDI file (SMF) created by such existing sequence software (score editing software) as Performer (Mark of the Unicorn) and Vision (Opcode) into the sequence data format SEQ file for the PlayStation unit.

Appropriate format	@ @ @ @ SMF _iFormat 1 _j		
Sampling frequency	Optional		
Appropriate message	Note On/Off Program Change Pitch Bend Control Change @		

**Table 3-1 Appropriate Format (SMF)** 

Resolution in SEQ is optional. But the highest resolution depends on the actual reproduction mode (1/60 sec., 1/120 sec., 1/240 sec., etc.).

#### Setting up SMF file

Before using SMF2SEQ, save the sequence to be converted by your sequence software in the SMF format (format 1).

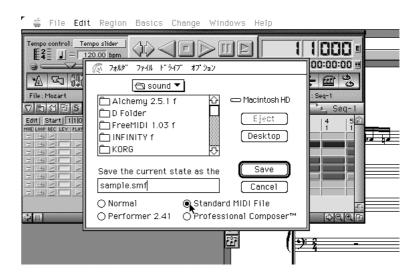


Figure 3-7 SMF Output in Performer

#### Using SMF2SEQ



- (1) Double click the SMF2SEQ icon to start up the application.
- (2) Select "Convert" in the "File" menu, and specify the file to be converted.
- (3) In response to the prompt message of the name of a file to be output, enter a file name to be assigned after the conversion.
- (4) Select the "Quit" menu in the "File" menu to terminate the application.

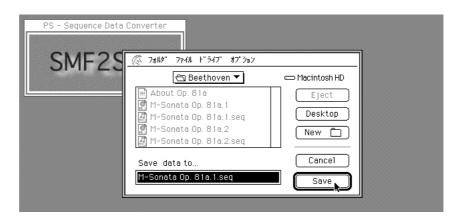


Figure 3-8 SMF2SEQ

An SMF file can also be converted by dragging it to the SMF2SEQ icon. (Two or more SMF files can be selected.)

## 3

### **AIFF2VAG - Creates Waveform Data**

AIFF2VAG converts an Apple AIFF (Audio Interchange File Format) file created by such existing waveform editing software as SoundDesigner II (Digidesign) and Alchemy (Passport Designs) into the waveform data format VAG file for the PlayStation unit.

For VAG, a multiple of 28 of samples are handled as one block because of hardware characteristics. Thus, handling a sound source with a loop requires that the loop length be a multiple of 28.

Appropriate format	AIFF
Sampling frequency	Transparent
Channel	1 (Monophonic)
Resolution	16 bits
Block length	28 samples

Table 3-2 Appropriate Format (AIFF)

#### Setting up AIFF file

Before using AIFF2VAG, save waveform data to be converted by your waveform editing software in the AIFF format (16 bits, monophonic and not compressed).

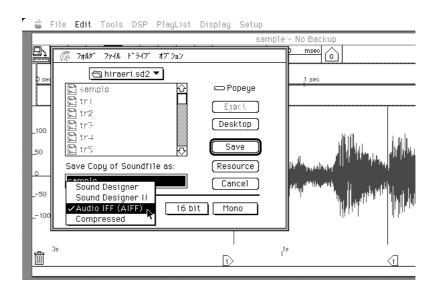


Figure 3-9 AIFF Output in SoundDesingerII

#### Using AIFF2VAG



- (1) Double click the AIFF2VAG icon to start up the application.
- (2) In response to the request of an AIFF file to be converted as a result of selecting "Convert ..." in the "File" menu, specify a file.

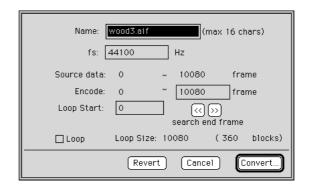


Figure 3-10 AIFF2VAG Conversion File

- (3) Specify the number of samples to be converted and the loop start point.
- (4) In response to the prompt message of an output file name, enter a file name to be assigned after the conversion.
- (5) Select the "Quit" menu in the "File" menu to terminate the application.

An AIFF file can also be converted by dragging it to the AIFF2VAG icon. (Two or more AIFF files can be selected.)

## 4 VAG Player - Reproduces Waveform Data

VAG Player is a tool for using the PlayStation sound board to reproduce a waveform data format VAG file for the PlayStation unit converted by AIFF2VAG.

This reproduction is based on the AIFF sampling frequency during the conversion, and changes the reproduction pitch.

#### Using VAG Player



- (1) Double click the VAG Player icon to start up the application.
- (2) Select "Open" in the "File" menu, and select a VAG file to be reproduced.
- (3) Upon file selection, VAG data is transferred to the PlayStation sound board, which in turn reproduces sound.
- (4) In response to the request of a VAG file to be reproduced next, select a file. Pressing "Cancel" sets up the initial state.
- (5) Select "Quit" in the "File" menu to terminate the application.

A VAG file can also be reproduced by dragging it to the VAG Player icon. (Two or more VAG files can be selected.)

The file name and size of the selected VAG file, and the sampling frequency are displayed. Pressing the "Play" button reproduces VAG. (If two or more files have been selected, press the "Play" button for each BAG file.) When reproducing no VAG file, press "Skip". When canceling the reproduction of all VAG files, select "Skip All".



Figure 3-11 Dialogue Box for Dragging and Dropping VAG Player Icon

## **5** SoundDelicatessen - Implements Sound Source Data

This section describes the structure of VAB data of created by SoundDelicatessen and how to use SoundDelicatessen, and briefly explains the components of the window.

For the screen configuration and component sections, and for the dialogue messages, see chapter 4.

#### VAB data structure

This paragraph first explains the structure of VAB data briefly.

VAB data is composed of tone attributes (including program attributes) comprising two hierarchies, and of a list of waveforms (VAG list).

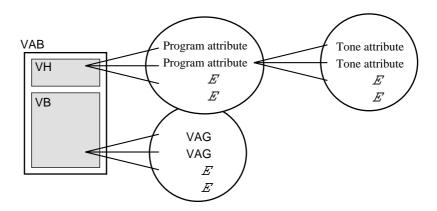


Figure 3-12 VAB Structure

Up to 128 program attributes can be cataloged in one unit of VAB. A program corresponds to a sound source number in MIDI, being equivalent to music instrument levels of "piano", "guitar", "drum", etc. Changing sequence data is accomplished by updating the program.

The tone attributes are program components. Up to 16 tone attributes can be cataloged in one program. Up to 2,048 tone attributes can be cataloged in VAB.

A VAG list can contain up to 254 VAG files converted by AIFF2VAG. Restrictions of the SPU sound source memory requires that the total of VAG data be 520,160 bytes or less.

Piano Kick VAB1 Drum Cymbals Guitar Sneer Effect sound Tambourine Low piano tone High piano tone,' <sup>'</sup>Guitar Kick Bass Cymbals Click sound Sneer Explosive sound Tam-BG noise bourine

The following gives an example of VAB.

Figure 3-13 Example of VAB

In a program (instrument) level, VAB in the above example is composed of "piano", "drum", "guitar" and "effect sound".

The "drum" comprises four tones of "kick", "cymbals", "sneer" and "tambourine". The tones are based on an independent VAG list.

#### Developing needed data

SoundDelicatessen involves a VAG file created by above AIFF2VAG as waveform data. Sample data includes VAG file "Tom.vag".

The test of a VAB sound source by the sequencer uses VAG files of "sample.vab", "sample.vab.s" and "sample.mid" included in sample data.

#### Startup



Starting up SoundDelicatessen requires that the SoundDelicatessen icon be clicked.



Figure 3-14 Error Message Panel during Startup

If the PlayStation sound board is not correctly installed, the following message is displayed.

If the message is displayed, immediately terminate the system and check system setup in accordance with chapter 2, Installation.

If SoundDelicatessen has been started up correctly, the following message is displayed for several seconds.



Figure 3-15 Message Displayed during Startup

#### Termination

To terminate SoundDelicatessen, select "Quit" in the "File" menu, or enter Command-Q.

#### Creating new VAB

- (1) Double click the SoundDelicatessen icon to start up the application.
- (2) Select "New" in the "File" menu to open new VAB.
- (3) The gray window is displayed.

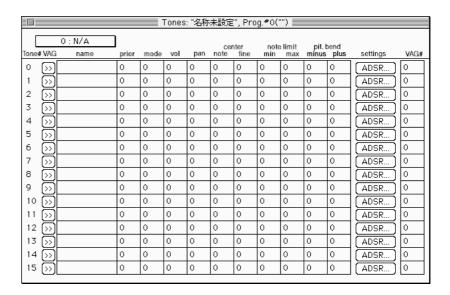


Figure 3-16 Program List Window

This is the program list window. In the program list window, tone names and volume balance can be set for panning.

First, enter "drum" in the program name column for program number (Prog#) 0 and, then, press the tab key. Enter "127" for volume (vol) and press the tab key again. Then, enter "64" for panning. Now, the program (instrument) can be developed which provides for the highest volume and center panning, and has a name of the drum.

(4) Press the tone list display button (">>") on the top (Prog#0) in the program list window to have the cream window displayed.

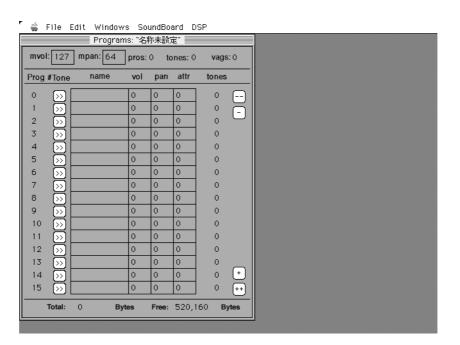


Figure 3-17 Tone List Window

This is the tone list window. In the tone list window, catalog the actual waveforms constituting tones in the above program window.

Also, selecting "Show Tones" in the "Windows" menu allows the tone list window to be displayed.

(5) With the tone list window left as it is, press the VAG link button (">>") on its top (Tone#) to have the orange window displayed.

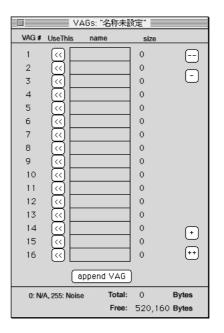


Figure 3-18 VAG List Window

This is the VAG list window. In the VAG list window, catalog the waveform data VAG file created by AIFF2VAG.

Also, selecting "Show VAGs" in the "Window" menu allows the VAG list window to be displayed.

(6) The next step is to actually catalog VAG. First, click the "append VAG" button on the window. In response to the prompt message of a VAG file to be cataloged, select "Tom.vag" in sample data.



Figure 3-19 Cataloging to VAG List

If there are other types of VAG created, catalog them.

(7) Use cataloged VAG in the tone list window. Click the top "Use This" button ("<<"). Then, the tone list window is displayed, with the default tone attribute value entered automatically.

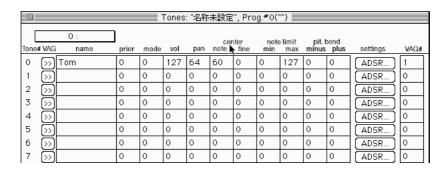


Figure 3-20 Setting Tone Attribute

The tone attributes are: tone number (Tone#); VAG link button (VAG); tone name (name); priority (prior); waveform mode (mode); volume (vol); pan pot (pan); center pitch (center note); fine center pitch (center fine); effective interval (note limit min/max); vertical pitch bend (pit. bend minus/plus); ADSR settings (settings); and VAG reference number (VAG#).

The above tone attributes are arranged from the left in that order.

For the tone attributes, see chapter 4.

(8) Now, the simple sound source has been implemented. Given below is a description of actual sound reproduction.

First, select "Mac -> SPU" in the SoundBoard menu, and transfer waveform data to the SPU sound source memory. Then, the violet keyboard window appears.

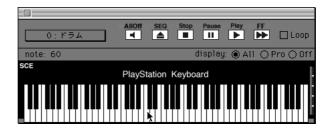


Figure 3-21 Keyboard Window

This is the keyboard which allows sound production inspection through clicking the mouse.

Clicking and dragging keys on the keyboard enable reproduction in various intervals.

Pressing the mouse button causes the note on message to be sent to the sound board. Releasing the button causes the note off message to be sent to the sound board. Clicking the button with the shift key pressed causes the note off message to be ignored. When carrying on loop sound reproduction, click the keyboard with the shift key pressed.

(9) Finally, save created sound source data VAB and terminate SoundDelicatessen.

Saving VAB data requires the selection of "Save ..." or "Save As ..." in the "File" menu. For the first saving or if "Save As ..." has been selected, enter the name of the file to be saved in response to request. Because data is handled by a PC, it is recommended that the file name be "???????.vab" (eight half-size alphabetic characters plus. vab).

To terminate SoundDelicatessen, select "Quit" in the "File" menu.

#### Editing VAB

(1) Double click the created VAB file and start up SoundDelicatessen. Double clicking the VAB file to start up SoundDelicatessen causes the VAB file to be opened automatically after the startup.

With SoundDelicatessen started up and the file opened, press the "Save" button when saving the edited VAB data, the "Don't Save" button when saving is not needed, and the "Cancel" button when carrying on editing, in response to the prompt message of saving.



Figure 3-22 Dialogue Box for Saving File

- (2) The VAB file is opened, with the program list window displayed.
- (3) Press the tone list display button (">>") for program number zero to have the tone list for program number zero displayed.

- (4) Select "Mac -> SPU" in the "SoundBoard" menu to transfer sound data to the SPU sound source memory.
- (5) Click the displayed keyboard window to check that sound is produced. Then, click the tone list again for display nearest you.
- (6) Change the "Pan" item from 64 (center) to 0 (left) or 127 (right). Click the keyboard to make sure that the reproduced sound is accompanied by pan pot effects.
- (7) Change the "note limit/max" item from 127 to 60. Then, drag the keys from the leftmost position to the most right position. With the note limit set at 60, make sure that, only for the intervals below set 60, sound is produced.
- (8) Press the "ADSR ..." button to have the ADSR setting screen displayed.

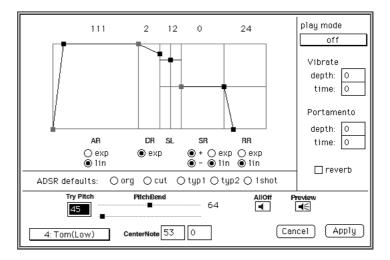


Figure 3-23 ADSR Setting Window

On the ADSR setting screen, the following can be carried out. 1) Set ADSR. 2) Set the waveform reproduction mode. 3) Test the pitch bend.

(a) For ADSR, the change rate or level can be set for any of the following items. The change rate can be set to provide for exponential or linear changes (only in AR, SR and RR). Further, for SR, the mode of increase or decrease can also be set.

AR: Attack rate: Change rate after key-on until the highest volume

DR: Decay rate: Change rate from the highest volume to the threshold level

SL: Sustain level: Continued sound level

SR: Sustain rate: Change rate after the threshold level has been

reached

RR: Release rate: Change rate of attenuation after key-off

(b) In the waveform reproduction mode, the following items can be set.

Vibrate, Portamento

depth: Sets the amplitude of vibration in the range from 0 to 127

in units of 1/4 of half tone.

time: Sets the time of one period of vibration in the range from  $\boldsymbol{0}$ 

to 254 in units of ticks (1/60 seconds).

reverb: Specifies the use of reverb effects during tone reproduction.

#### Using MIDI to check VAB

SoundDelicatessen serves Apple MIDI Manager. SoundDelicatessen allows VAB to be checked by the MIDI sequence software (Performer and Vision) on Macintosh and from the keyboard.

(1) Double click and open VAB file "sample.vab" included in sample data.

With VAB opened by SoundDelicatessen, the dialogue box pops up to inquire whether to save and close the file. (See the Figure below.) Click the "Save" button when saving the file, the "Don't Save" button when opening the VAB file without saving, and the "Cancel" button when stopping opening the VAB file and carrying on editing currently opened VAB.



Figure 3-24 Dialogue Box for Saving File

- (2) Select "Mac -> SPU" in the SoundBoard menu to transfer VAB to the SPU sound source memory.
- (3) Next, start up the sequence software to open SMF file "sample.mid" included in sample data.
- (4) Start up PatchBay belonging to Apple MIDI Manager. Connect the sequence software and the MIDI interface to SoundDelicatessen.

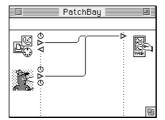


Figure 3-25 Example of PatchBay Using Apple MIDI Manager

The above example shows the state of PatchBay with input via the standard MIDI interface and output from Vision connected to SoundDelicatessen.

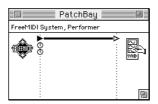


Figure 3-26 Example of PatchBay Using FreeMIDI

In the above example, FreeMIDI is installed.

(5) Use the sequence software to reproduce the opened SMF data, and make sure that sound is output from SoundBoard via DAT, etc.

If the MIDI message is sent correctly from the sequence software to SoundDelicatessen, the red point is blinked in the keyboard window, with the right indicator extended and contracted.

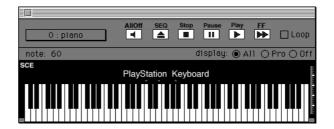


Figure 3-37 Keyboard Window

If no sound is reproduced and no changes are observed on the keyboard window, MIDI may not be connected validly. Check PatchBay connection and the MIDI output of the sequence software.

#### Checking reverb

The PlayStation unit can access nine kinds of reverb effects. This paragraph explains how to set the reverb.

- (1) Double click and open VAB file "sample.vab" included in sample data.
- (2) Select "Mac -> SPU" in the SoundBoard menu to transfer VAB to the SPU sound source memory.
- (3) Click the tone list display button (">>") to the left of "piano" on the top line in the program list to have the tone list for program number zero displayed.
- (4) Next, click the ADSR setting button ("ADSR ...") on top line "piano2" in the tone list to have the ADSR setting window displayed.

(5) Click the check box where "reverb" is written, and declare the use of the reverb in this tone. Then, press the "Apply" button to fix settings.

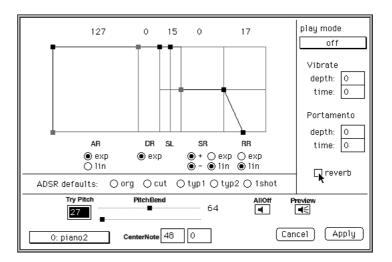


Figure 3-28 Setting Reverb

In the tone list, the item of "mode" for "piano2" is changed to "4". This sets the use of the reverb by this tone. Also, the reverb can be set by entering a number of "4" for this item. For "piano3", "piano4" and "piano5" as well, a number of 4 is so entered that the reverb may be operated.

Now, the reverb for VAB data can be applied.

(6) Next, in the "DSP" menu, select the "5: Hall" type.

Thus, SPU starts to operate the reverb.

(7) With the keyboard window displayed, click the keyboard to check effects of reverb sound.

The depth of the reverb can be set. In the "7:Echo" type, delay and feedback can be set. In the "8:Delay" type, delay can be set.

The use of the reverb involves a reverb operation work area of several k-bytes to several tens of k-bytes. The following gives the needed size. The DSP menu also covers the size.

Туре	Work size (bytes)	Effect
Room	9,920	Small room
Studio A	9,000	Studio (Small)
Studio B	18,496	Studio (Medium)
Studio C	28,640	Studio (Large)
Hall	44,512	Hall
Space	63,168	Universal space
Echo	98,368	Echo
Delay	98,368	Delay
Pipe	7,072	In a metal pipe

Table 3-3 Reverb Type

#### Printing VAB attribute table

SoundDelicatessen can print the set program, tone and VAG lists. A printed sheet providing effect tone sound layout in a program allows the efficient utilization of the effect sound. The program can use the output sheet along with data for smoother data exchange.

(1) With the VAB file opened, select "Preferences ..." in the "File" menu to have the print setting dialogue box displayed. Specify a printer font to be used for output, the number of printing lines per page, a program, tones, and whether the VAG list is to be printed.

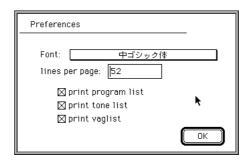


Figure 3-29 Printing Option Dialogue Box

(2) Next, select "Page Setup ..." in the "File" menu to have the printing setting dialogue box displayed. Check the form size and the printing direction, and press the "OK" button.

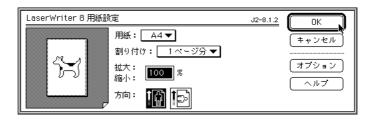


Figure 3-30 Printing Setting Dialogue Box

(3) Select "Print ..." in the "File" menu to have the printing dialogue box displayed. Check the number of prints and press the "Print" button.



Figure 3-31 Printing Dialogue Box

Note: In the above example, printer driver LaserWrite 8 is used to display the dialogue box for output to Apple LaserWrite II NTX-J. For other printers, the displayed screen may be different.

## 6

## **RAW2DA - Creates CD-DA Data**

RAW2DA converts the SoundDesigner II format (a sampling rate of 44.1 kHz, 16-bit straight PCM stereophonic ( $L\rightarrow R\rightarrow L\rightarrow R$ ) data, big Endian) created by such existing waveform editing software as SoundDesigner II (Digidesign) and Alchemy (Passport Designs) into the CD-DA file (little Endian) for PlayStation.

Appropriate format	Sound DesingerII format
Sampling frequency	Fixed at 44.1 kHz
Channel	2 (Stereophonic)
Resolution	16 bits
Block length	Any

Table 3-4 Appropriate Format (RAW2DA)

## Developing DA data

Before using RAW2DA, save sound data to be converted by your waveform editing (HD recording) software in the SoundDesigner II format (16 bits, stereophonic, 44.1 kHz). Make sure that the sampling rate is 44.1 kHz for stereophonic sound (two channels).

Note: The converter does not convert the sampling rate nor make monophonic sound stereophonic. Be sure to use stereophonic data of 16 bits.

## Using RAW2DA

- (1) Double click the RAW2DA icon to start up the application.
- (2) In response to the request of a SoundDesigner II file to be converted upon the selection of "Convert ..." in the "File" menu, specify a file.

(3) In response to the prompt message of an output file name, enter a file name to be assigned after the conversion.

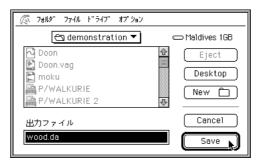


Figure 3-32 RAW2DA

(4) Select "Quit" in the "File" menu to terminate the application.

A SoundDesigner II format file can also be converted by dragging its icon to the RAW2DA icon. (Two or more icons can be selected at a time.) With "Auto" selected in the "OutputMode" menu after having started up the application, the selected files from the second onward are converted consecutively into the corresponding DA data. (An extension of ".da" is appended automatically.)

## **T** RAW2XA - Creates CD-ROM XA Voice Data

RAW2XA converts the SoundDesigner II format (a sampling rate

of 18.9 or 37.8 kHz, 16-bit straight PCM monophonic or stereophonic data, big Endian) created by such existing

waveform editing software (HD recording software) as SoundDesigner II (Digidesign) and Alchemy (Passport Designs) into the CD-ROM XA voice data file for PlayStation.

Unlike such typical straight PCM (not compressed) data, XA voice data is compressed by ADPCM and, thus, its data amount can be regulated. Depending on the mode, 4 to 16 channels of voice data can be interleaved during ordinary speed CD reproduction, and 8 to 32 channels of voice data can be interleaved during double speed reproduction. Interleaved desired XA multi-channel voice data on the CD can be selected and reproduced by specifying the channel.

Appropriate format	Sound Designer II format
Sampling frequency	18.9 or 37.8 kHz
Channel	1 or 2 (Monophonic or stereophonic)
Resolution	16 bits
Block length	Any

Table 3-5 Appropriate Format (RAW2XA)

## Developing XA data

Before using RAW2XA, save sound data to be converted by your waveform editing (HD recording) software in the SoundDesigner II format (16 bits, monophonic or stereophonic, 18.9 or 37.8 kHz).

The PlayStation unit supports the XA voice data formats for the following four modes.

- 37.8 kHz: Stereophonic 8 channels. Interleave supported.
- 37.8 kHz: Monophonic 16 channels. Interleave supported.
- 18.9 kHz: Stereophonic 16 channels. Interleave supported.
- 18.9 kHz: Monophonic 32 channels. Interleave supported.

Note: The converter does not convert sampling rates, and the monophonic mode into the stereophonic mode and vice versa. Be sure be develop data for the mode during reproduction.

## Using RAW2XA

(1) Double click the RAW2XA icon to start up the application.

- (2) Select "Convert ..." in the "File" menu, and specify a file in the SoundDesigner II format to be converted.
- (3) In response to the prompt message of an output file name, enter a file name to be assigned after the conversion.

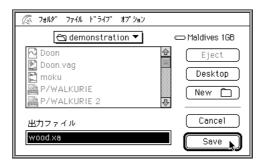


Figure 3-33 RAW2XA

(4) Select "Quit" in the "File" menu to terminate the application.

A SoundDesigner II format file can also be converted by dragging its icon to the RAW2DA icon. (Two or more icons can be selected at a time.) With "Auto" selected in the "OutputMode" menu after having started up the application,

the selected files from the second onward are converted consecutively into the corresponding DA data. (An extension of ".da" is appended automatically.)

If the data to be converted is not stereophonic at a frequency of 37.8 kHz, select the appropriate data format in the "Format" menu before the conversion.

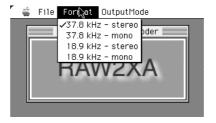


Figure 3-34 "Format" Menu

Interleaving the converted XA file with other data involves programmer movie tool MovPack (MOVPACK.EXE). For details, refer to the manual for the programmer tool.

## 8

## Reproduction by DTL-H2000

This section briefly explains a procedure for using sound data (SEQ and VAB) created by the PlayStation sound tool for reproduction by the programmer tool (DTL-H2000).

For details of the program and compiler, refer to the manual for the programmer tool.

## Developing sound data and program

This paragraph describes sound reproduction using sequence data (SEQ) and sound source data (VAB). The needed sample program is stored in the following directory for the programmer tool.

¥psx¥sample¥sound¥simple

The following are the files to be used:

## Using DTL-H2000 to reproduce sound data

(1) Compile the program.

Compiling the program involves movement to the \(\pm\)psx\(\pm\)sample\(\pm\)sound\(\pm\)simple and the entry of "make all". The following are the contents of makefile.mak:

```
makefile.mak

all:

ccpsx -g -Xo$80100000 -Xm main.c -omain.cpe.main.sym.main.map
load:

pqbload sample.vh 80015000

pqbload sample.vb 80020000

pqbload ..\forall basic\forall fuga.seq 80010000
```

clean:
del \*.?~
del \*.??~
del \*.cpe
del \*.sym
del \*.map

Entering "make all" causes the following command to be issued in accordance with the description of makefile.mak.

ccpsx -g -Xo\$80100000 -Xm main.c -omain.cpe.main.sym.main.map

Now, the program has been compiled.

### (2) Load data.

To load data, enter "make load". The following three commands are executed in accordance with the description of makefile.mak.

```
pqbload sample.vh 80015000
pqbload sample.vb 80020000
pqbload ..\(\pm\)basic\(\pm\)fuga.seq 80010000
```

Each of the commands transfers sound data of sample.vh, sample.vb and fuga.seq to the specified address.

## (3) Use the debugger to execute the program.

Executing the program requires that "dbugpax main/r50 /2" be entered. The debugger is started up, with the main program loaded to the debugger. Pressing "F-9" causes the program to be started up. Operate the control pad to reproduce sound.

The current tempo, volume and status are displayed.



Figure 3-35 Monitor Output of Sample Program

The following are the keys on the control pad:

"START" button: Play (Starts playing.)
"SELECT" button: Stop (Stops playing.)

"X" button: Replay
"button: Pause

"R1" button: Gradually increases the tempo.
"L1" button: Gradually decreases the tempo.

"↑" button: Increases the volume.
"↓" button: Decreases the volume.

"←" button: Gradually decreases the volume to zero."→" button: Gradually increases the volume to 127.

"SELECT" button plus "START" button: Close

## Program flow

This paragraph briefly explains the program flow used for the sample. The items not related to sound are omitted.

```
* sample..simple
#include <sys/types.h>
#include <libgte.h>
#include <libgpu.h>
                         ~ Declares the header file of the library to be used.
#include <libetc.h>
#include <libsnd.h>
                         ~ Declares the variable where the VAB ID is to be stored.
short vab;
                         ~ Declares the variable where the SEQ ID is to be stored.
short seq;
char seq_table[SS_SEQ_TABSIZ * 1 * 1];
                         ~ Acquires the attribute table for SEQ to be used.
main()
      SsInit();
                                             ~ Initializes the sound library.
      SsSetTableSize (seq_table, 1, 1);
               ~ Passes the SEQ attribute table to the library.
      SsSetTickMode(SS_NOTICK);
                                             ~ Declares the sound interrupt mode.
      vab = SsVabOpenHead ((u_char *)VAB_HADDR, -1);
               ~ Passes the VAB attribute section to the library.
      if (vab == -1) {
        printf ("SsVabOpenHead : failed !!!\fmathbf{Y}n");
         return;
 if (SsVabTransBody ((unsigned char *)VAB_BADDR, vab) != vab) {
               ~ Starts transferring the VAB waveform section to the sound buffer.
         printf ("SsVabTransBody : failed !!!\fmathbf{Y}n");
         return;
 SsVabTransCompleted (SS_WAIT_COMPLETED);
               ~Waits for the completion of the transfer.
```

```
seq = SsSeqOpen((u\_long *)SEQ\_ADDR, vab); \sim Passes SEQ to the library.
     SsSetMVol(MVOL, MVOL);
                                           ~ Sets the main volume.
     SsSeqSetVol(seq, SVOL, SVOL);
                                           \sim Sets the SEQ volume.
     SsStart();
                                           ~ Starts sound interrupt (play).
     while (1) {
                                           ~ Main loop
                  ~ Main processing ~
         VSync(0);
                                           ~ Waits for the V blank.
         SsSeqCalledTbyT();
                                           ~ Sound processing function
 }
     SsSeqClose(seq);
                                           ~ Closes SEQ.
     SsVabClose(vab);
                                           ~ Closes VAB.
     SsEnd();
                                            ~ Stops sound library utilization.
     SsQuit();
                                           ~ Terminates sound library utilization.
     return;
}
```

## CHAPTER 4 REFERENCES

## Sound File Format

This section explains the following file formats.

¥ SEQ

¥ SEP

YVAG

¥ VAB

YVH

Y Y B

¥ DA

YXA

## SEQ

SEQ is the PlayStation sequence data format. The typical extension in DOS is ".SEQ".

# Byte count ID zVABp j 4 Version 4 Resolution of quarter note 2 Tempo 3 Rhythm 2 Any Score data End Of SEQ 3

Figure 4-1 SEQ Format

## SEP

SEP is the PlayStation multi-track sequence data format. The typical extension in DOS is ".SEP".

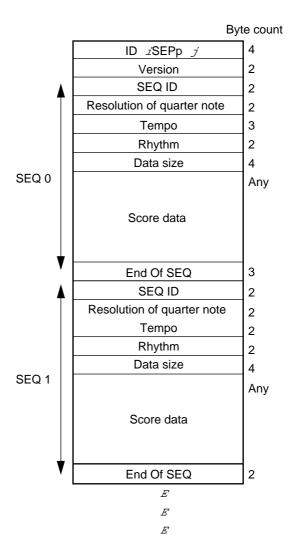


Figure 4-2 SEP Format

## VAG

VAG is the PlayStation single waveform data format. The typical extension in DOS is ".VAG".

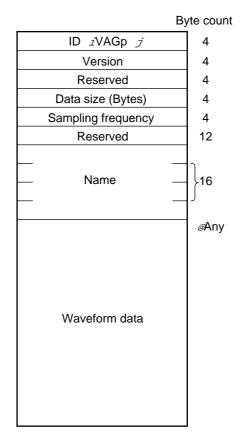


Figure 4-3 VAG Format

## VAB

VAB is the PlayStation sound source data format. The typical extension in DOS is ".VAB".

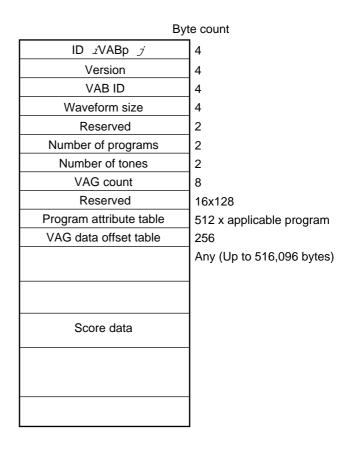


Figure 4-4 VAB Format

The program attribute table has the following structure.

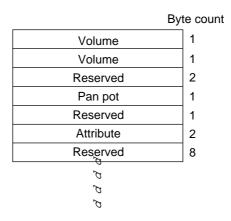


Figure 4-5 VAB Program Attribute Table

The tone attribute table has the following structure.

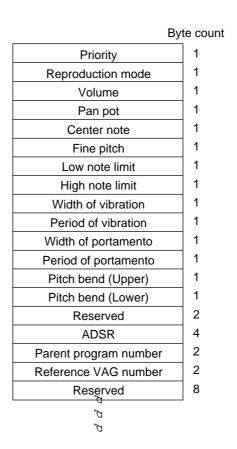


Figure 4-6 VAB Tone Attribute Table



VH is the VAB attribute table section. The typical extension in DOS is ".VH".

By	te count
ID ∡VABp j	4
Version	4
VAB ID	4
Waveform size	4
Reserved	2
Number of programs	2
Number of tones	2
VAG count	2
Reserved	8
Program attribute table	16 x 128
Tone attribute table	512 x applicable program
VAG data offset table	256

Figure 4-7 VH Format

VB

VB is the VAB waveform data section. The typical extension in DOS is ".VB".

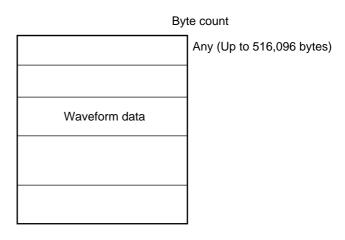


Figure 4-8 VB Format

DA

DA is the PlayStation CD-DA data format. The typical extension in DOS is ".DA".

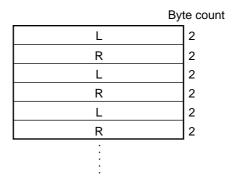


Figure 4-9 DA Format

XA

XA is the PlayStation CD-ROM XA voice data format. The typical extension in DOS is ".XA".

The XA format is based on the following specifications. The XA file output by RAW2XA has a sub-header.

## **■CD-ROM XA**

SYSTEM DESCRIPTION CD-ROM XA Copyright May 1991

## 2 Commands and Names of Window Components

## SMF2SEQ

Upon the startup of SMF2SEQ, the following dialogue box pops up.



Figure 4-10 SMF2SEQ Panel



Figure 4-11 SMF2SEQ: "File" Menu

[File] menu

[File] - [Convert ...]
Starts conversion from SMF into SEQ.

Upon the selection of the [Convert ...] command, the SMF file selection dialogue box pops up. Specify an SMF file to be converted.

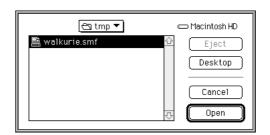


Figure 4-12 SMF2SEF File Selection Dialogue Box

When the [Open] button is pressed, the SEQ file name specification dialogue box pops up.

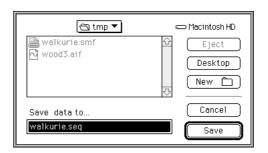


Figure 4-13 SMF2SEQ: SEQ File Specification Dialogue Box

Pressing the [Save] button starts conversion.

[File] - [Quit]
Terminates the SMF2SEQ application.

## AIFF2VAG

Upon the startup of AIFF2VAG, the following dialogue box pops up.



Figure 4-14 AIFF2VAG Panel



Figure 4-15 AIFF2VAG: "File" Menu

[File] menu

[File] - [Convert ...]
Starts conversion from AIFF into VAG.

Upon the selection of the [Convert ...] command, the AIFF file selection dialogue box pops up. Specify an AIFF file to be converted.

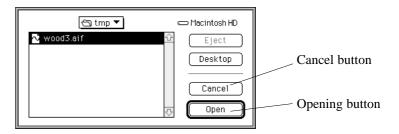


Figure 4-16 AIFF2VAG: AIFF File Selection Dialogue Box

When the [Open] button is pressed, the loop point specification dialogue box pops up.

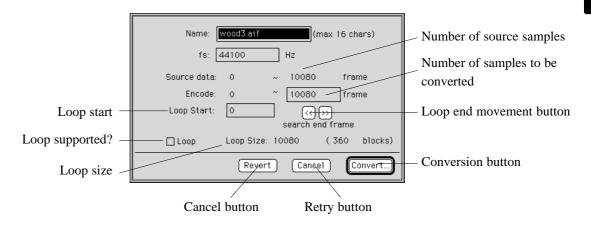


Figure 4-17 AIFF2VAG: Conversion Panel

When the [Convert] button is pressed, the VAG file name specification dialogue box pops up.



Figure 4-18 AIFF2VAG: VAG File Specification Dialogue Box

Pressing the [Save] button starts conversion.

## [File] - [Quit]

Terminates the AIFF2VAG application.



Figure 4-19 AIFF2VAG: "Compression" Menu

[Compression] menu:

Specifies the type of compression.

[Compress] - [Standard]:

Selects a typical compression type.

[Compress] - [High Band]:

Selects the compression type adapted to the waveform comprising more high-frequency components.

[Compress] - [Low Band]:

Selects the compression type adapted to the waveform comprising more low-frequency components.

[Compress] - [4-bit Straight]:

Selects the type for compressing 16-bit data simply to 4-bit data.

## VAG Player

Starting up VAG Player causes the following dialogue box to pop up.



Figure 4-20 VAG Player Panel

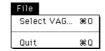


Figure 4-21 VAG Player: "File" Menu

[File] menu

[File] - [Select VAG ...]
Select VAG to be reproduced.

Upon the selection of the [Select VAG ...] command, the VAG file selection dialogue box pops up. Select VAG to be reproduced.

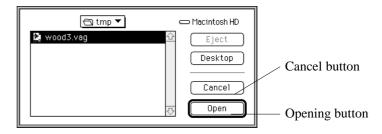
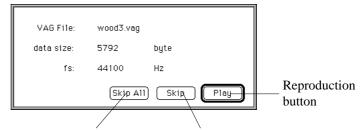


Figure 4-22 VAG Player: VAG File Selection Dialogue Box

[File] - [Quit]
Terminates the VAG Player application.

Dragging the VAG file to the VAG Player application icon causes the following dialogue box to pop up. Two or more VAG units can be dropped.



Total cancel button (Two or Reproduction cancel button more VAG units are selected.)

Figure 4-23 VAG Player: Dialogue box for dragging and dropping

## SoundDelicatessen

When SoundDelicatessen is started up, the following dialogue box is displayed until the completion of setup.



Figure 4-24 SoundDelicatessen Panel



Figure 4-25 SoundDelicatessen: "File" menu

[File] menu

[File] - [NEW]
Opens new VAB.

Upon the selection of the [NEW] command, the following program list window pops up.

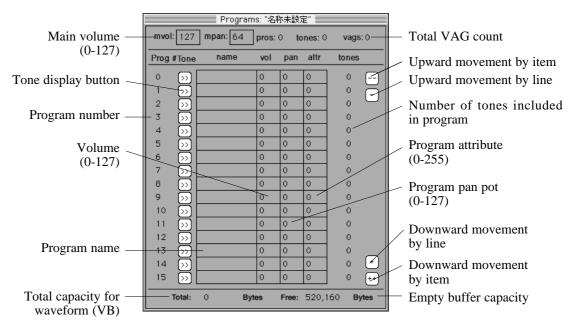


Figure 4-26 SoundDelicatessen: Program list window

Select the [IMport program...] command and, then, a program file to be loaded. In response to the prompt message of the order of the program in the selected file, enter a number of 0 to 127, and click the [Import] button.



Figure 4-27 SoundDelicatessen: Program Selection

```
[File] - [Export program...]
Writes a program unit.
```

When using the [Export program...] command to output a program, click the tone display button for the program to be output, and select the [Export program...] command with the tone list window displayed.

In response to the prompt message for the number of the program to be output, click the [Export] button if the program is correct.

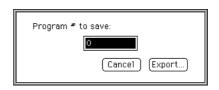


Figure 4-28 SoundDelicatessen: Program output

[File] - [Page Setup...]
Sets up the printer.

Set the paper size. The paper setting dialogue box displayed may vary with the printer used.



Figure 4-29 SoundDelicatessen: Print setting dialogue box

[File] - [Print]

Prints the attribute table (VH section).

Clicking the [print] button with the print count set starts printing. The printer dialogue box displayed may vary with the printer used.



Figure 4-30 SoundDelicatessen Printer Dialogue Box

[File] - [Preferences...]

Sets a printing option.

Specify the printer font to be used.

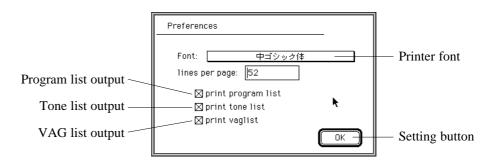


Figure 4-31 SoundDelicatessen: Print option dialogue box

## [File] - [Quit]

Terminates the SoundDelicatessen application.

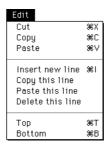


Figure 4-32 SoundDelicatessen: "Edit" menu

[Edit] menu

## [Edit] - [Cut]

Cuts the character pointed to by the inverted cursor.

## [Edit] - [Copy]

Copies the character pointed to be the inverted cursor.

## [Edit] - [Paste]

Pastes the previously cut or copied character to the current cursor position.

## [Edit] - [Insert new line]

Inserts a new program, tone or VAG into the line pointed to by the inverted cursor.

## [Edit] - [Copy this line]

Copies the program or tone pointed to by the inverted cursor. For a program, all tones contained in it are copied.

## [Edit] - [Paste this line]

Copies the previously copied program or tone to the line pointed to by the cursor. For a program, all tones contained in it are pasted.

## [Edit] - [Delete this line]

Deletes the program or tone pointed to by the inverted cursor. For a program, all tones contained in it are deleted.

## [Edit] - [Top]

Movement to the start program, tone or VAG

## [Edit] - [Top]

Movement to the end program, tone or VAG



Figure 4-33 SoundDelicatessen: "Windows" menu

[Windows] menu

[Windows] - [Show Programs]

Displays the program list window.

[Windows] - [Show Tones]

Displays the tone list window.

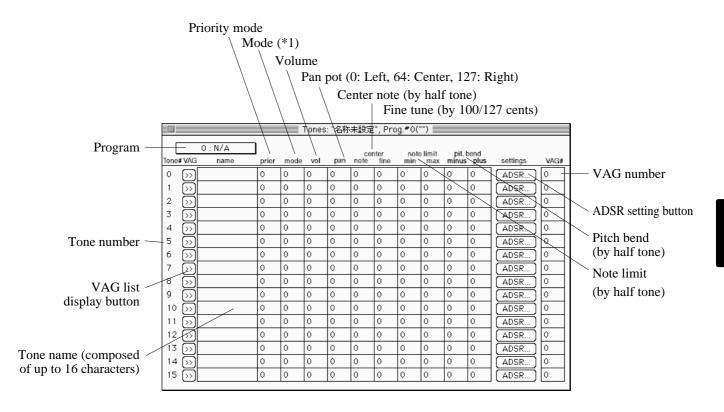


Figure 4-34 SoundDelicatessen: Tone list window

Clicking the "ADSR..." button for the tone list allows tone ADSR to be set.

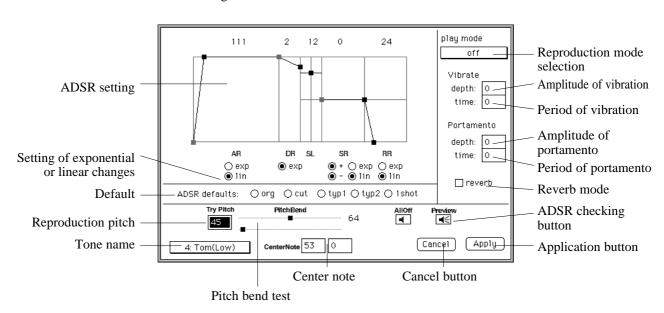


Figure 4-35 SoundDelicatessen: ADSR setting window

[Windows] - [Show VAGs]

Displays the VAG list window.

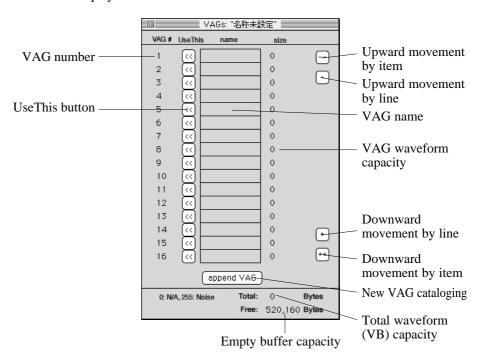


Figure 4-36 SoundDelicatessen: VAG list window

Clicking the [<<(UseThis)] button allows the VAG file to be used in the tone list. (A link is applied.)

Clicking the [append VAG] button allows new VAG to be cataloged to the end of the VAG list.

[Windows] - [Show Keyboard]

Displays the keyboard window.

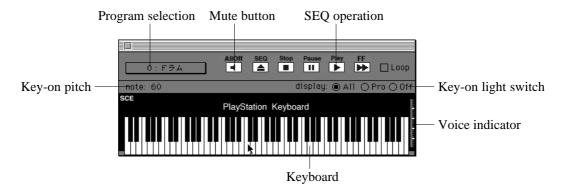


Figure 4-37 SoundDelicatessen: Keyboard window

[Windows] - [Regist new VAG...]

Catalogs new VAG in the VAG list window.

This command is equivalent to [append VAG] on the VAG list window.



Figure 4-38 SoundDelicatessen: "SoundBoard" menu

[SoundBoard] menu

[SoundBoard] - [MAC -> SPU]

Transfers the VB (waveform data) section of cataloged VAG to the sound board.

[SoundBoard] - [MIDI] Sets MIDI.

With Apple MIDI Manager and MIDI Driver installed correctly, MIDI is connected automatically and this item is checked. Use this function to temporarily disconnect MIDI.

[SoundBoard] - [All Note Off]

Forcibly stops sound production from the sound board.

When the sequence is suspended or if the low release rate (ADSR RR) for the loop sound source has been set, sound may be left. Use this function for muting.

[SoundBoard] - [Select SEQ...]

[SoundBoard] - [Play]

[SoundBoard] - [Pause]

[SoundBoard] - [Stop]

[SoundBoard] - [Crescendo]

[SoundBoard] - [Decrescendo]

[SoundBoard] - [Accelerando]

[SoundBoard] - [Ritardando]

The above commands are used to operate SEQ.

\* The PlayStation sound board is not equipped with the PlayStation CPU. Thus, SEQ is reproduced at different timing than the actual device. Use the MIDI sequence to check the sequence.

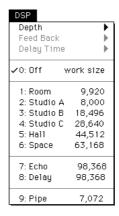


Figure 4-39 SoundDelicatessen: "DSP" menu

[DSP] menu

[DSP] - [Depth]

This is a sub-menu for setting reverb depth (reverb volume).

[DSP] - [Feed Back]

This is a sub-menu for setting the feedback amount of reverb.

\* The [Feed Back] command can be set, only when the "Echo" type reverb is used

## [DSP] - [Delay Time]

This is a sub-menu for setting reverb delay.

\* The [Feed Back] command can be set, only when the reverb of the "Echo" or "Delay" type is used.

The following are specifications of each reverb type:

Туре	Work size (bytes)	Effect
Room	9,920	Small room
Studio A	9,000	Studio (Small)
Studio B	18,496	Studio (Medium)
Studio C	28,640	Studio (Large)
Hall	44,512	Hall
Space	63,168	Universal space
Echo	98,368	Echo
Delay	98,368	Delay
Pipe	7,072	In a metal pipe

Table 4-1 Reverb Type

## RAW2DA

Upon the startup of RAW2DA, the following dialogue box pops up.

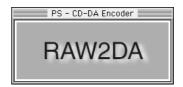


Figure 4.40 RAW2A Panel



Figure 4-41 RAW2DA: "File" menu

[File] menu

[File] - [Convert...]

Selects a RAW file to be selected and starts conversion.

Like the SoundDelicatessen II format (44.1 kHz, stereophonic), the RAW file contains 16-bit straight PCM data in the order of L, R, L and R.

[File] - [Quit]

Terminates the RAW2DA application.



Figure 4-42 RAW2DA: "OutputMode" menu

[OutputMode] menu

[OutputMode] - [Auto]

[OutputMode] - [Interactive]

Sets conversion in the automatic or interactive mode.

Upon the selection of more than one RAW file through dragging and dropping, the prompt message for an output file name is displayed for each file. Conversion with an extension of ".DA" appended can be selected automatically.

## RAW2XA

Upon the startup of RAW2XA, the following dialogue box pops up.

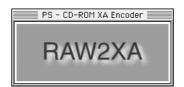


Figure 4-43 RAW2XA Panel



Figure 4-44 RAW2XA: "File" menu

[File] menu

[File] - [Convert...]

Selects a RAW file to be converted and starts conversion.

Like the SoundDesigner II format (44.1 kHz, stereophonic), the RAW file contains 16-bit straight PCM data in the order of L, R, L and R.

[File] - [Quit]
Terminates the RAW2XA application.

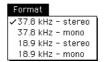


Figure 4-45 RAW2XA: "Format" menu

[Format] menu

[Format] - [37.8 kHz - stereo]

[Format] - [37.8 kHz - mono]

[Format] - [18.9 kHz - stereo]

[Format] - [18.9 kHz - mono]

Specify the mode for a file to be converted.

RAW2XA does not convert the sampling frequency, and stereophonic sound to monophonic sound and vice versa. Thus, develop RAW data adapted to the format in advance.



Figure 4-46 RAW2XA: "OutputMode" menu

[OutputMode] menu

[OutputMode] - [Auto]

[OutputMode] - [Interactive]

Sets conversion in the automatic or interactive mode.

Upon the selection of more than one RAW file through dragging and dropping, the prompt message for an output file name is displayed for each file. Conversion with an extension of ".DA" appended can be selected automatically.

# 3 Supporting MIDI in Sound Library

#### Setting VAB attribute data by Control Change

NRPN data is so defined that NRPN for MIDI standard Control Change can be used to set VAB attribute data.

#### **Operation**

Sequentially sending bnH 99 data1 (NRPN MSB), bnH 98 data2 (NRPN LSB), and bnH 06 data3 (Data Entry) when using the sequence to create an SMF file enables VAB attribute data to be set.

Given below is a description of data1, data2 and data3.

The tone number ranges from 0 to 15. When changing attributes for all tones, set a number of 16.

Because of hardware specifications, however, only one set of such factors as reverb depth can be set by SPIU. The reverb type, depth and the feedback amount cannot be set for each channel for tones and MIDI.

The reverb can be turned on and off only for each voice.

This setting requires that the reverb switch on the ADSR setting screen for SoundDelicatessen be checked. 'Mode' for NRPN can be used to change setting in real time from the MIDI sequence.

ATTRIBUTE	data1(CC99)	data2(CC98)	data3(CC06)
Priority	Tone Number	0	0 '15
Mode	V	1	0 '4 (*)
Limit low	V	2	0 '127
Limit high	V	3	V
ADSR (AR-L)	V	4	V
ADSR (AR-E)	V	5	V
ADSR (DR)	V	6	V
ADSR (SL)	V	7	V
ADSR(SR-L)	V	8	V
ADSR (SR-E)	V	9	V
ADSR (RR-L)	V	10	V
ADSR (RR-E)	V	11	V
ADCD (CD +)	1000 (00 ±)	40	0 '64 <i>F</i> +
ADSR (SR-†)	V	12	65 '127 <i>F</i> -
Vibrate time	V	13	0 '255
Portamento depth	V	14	0 '127
Reverb type	16	15	0 '9 (**)
Reverb depth	16	16	0 '127
Echo feed back	16	17	V
Echo delay time	16	18	V
Delay delay time	16	19	V
Vibrate depth	Tone Number	21	0 '127
Portamento time	V	22	0 '255

### (\*) Mode Type

Number	Mode
0	Off
1	Vibrate
2	Portamento
3	1 & 2
4	Reverb

(Portamento & Vibrate on)

#### (\*\*) Reverb Type

Number	Mode
0	Off
1	Room
2	StudioA
3	StudioB
4	StudioC
5	Hall
6	Space
7	Echo
8	Delay
9	Pipe

## Repeated setting in music by Control Change

A music part repetition function has been implemented by NRPN data. Repetition symbol "||:" serves for Loop1, while ":||" serves for Loop2. The function can be used in a music piece as many times as you desire. A nest of (Loop1...(Loop1'...Loop2') ...Loop2) for repetition cannot be used.

ATTRIBUTE	data1 (CC99)	data2 (CC06)
Loop1 (start)	20	0 '127 ( <i>ナ</i> )
Loop2 (end)	30	

(\*\*\*) For endless repetition, set a value of 127(0x7f).

#### Note 1:

For some sequencers, input even in proper order may result in invalid data disordered during conversion into SMF if the data has been set under the same delay time. Avoid setting the same delay time. For VAB attribute data setting, values become valid from key-on immediately after the loading of entered data.

#### Note 2:

In the past, Loop1 settings are CC99 and CC98. Now, they are CC99 and CC06. Because SMF where data has been created under CC99 and CC98 is covered, however, data need not be modified.

#### Marking function Supported by Control Change

A function for marking a position of music has been implemented by NRPN data. In the library, functions invoked when this mark is detected are supported. The following gives the marking format.

ATTRIBUTE	data1 (CC99)	data2 (CC06)
Mark	40	Value of 0 to 127 (Passed to the callback function)



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## Sound Artist Tool User's Manual for Sound Artist Tool Version 1.0

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