SEGA™

Dreamcast Sound Tools

SEGA™

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1. Preparation

1.1 Types of Sound

Music(BGM)	Refers to music which plays while the application is running
Sound Effect(SE)	Refers to the sound produced when an action (e.g. opening the door, an explosion) occurs
Voice(VOICE)	Refers to the human voice such cheer and narration.

1.2 List of Tools & Output Files

1.2.1 MIDI Program Editor

This tool creates tone data (program for use on MIDI.

	Name	Icon	Description
Send file	MIDI Program Bank		This is the bank file which is actually used for downloading data to the target machine.
Save file	Project File		It gathers multiple bank files for saving. It is used when you are doing the editing with the tool.

1.2.2 Sound Data Converter

This tool converts data such as Standard Midi File and AIFF to the MIDI data of the katana format, One Shot, or PCM stream data.

The ADPCM conversion also makes use of this tool.

	Name	Icon	Description
Send file	MIDI Sequence Bank		This is the bank file which gathers the multiple files converted from SMF to MIDI in the Katana format.
	One Shot Bank		This is the bank file which gathers the multiple files with added AIFF or PCM data as One Shot data (or ADPCM conversion).
	16bit PCM Stream Data		This is the data for PCM stream.
	8bit PCM Stream Data		
	ADPCM Stream Data		
Save file	Set File		

1.2.3 FX Program Editor

This tool creates the program data for sound effect. When using this program, you need to set up the FX work RAM and the FX output.

	Name	Icon	Description
Send file	FX Program Data		This is the DSP program file for applying effect.
Save file	FX Program Data		Same as above
	…etc.	…etc.	

1.2.4 Sound Project Manager

This tool creates a memory map on the sound RAM.

	Name	Icon	Description
Send file	Multi Unit		This is the one file that contains all the map information. Be sure to give this file to the programmers.
	FX Program Bank		This is the bank file which gathers the multiple ProgramFiles created in Fx Program Editor.
	FX Output Bank		This is a bank file which gathers the multiple sets of information on pan and sound volume of Fx output channel.
Save file	Manager File		This is a file which records the map information and file information (saved in link format).

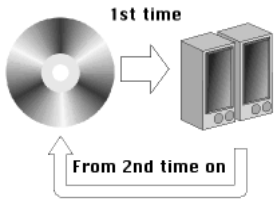
1.3 Playback Method

Playback method is vital in music creation and data creation. There are several types of playback, and each offers both advantages and disadvantages. Be sure to understand their characteristics and select a high quality playback method.

Dreamcast	
Name	**Description**
GD-DA	In this method, the AICA CPU decodes PCM from the GD-ROM to produce sound.
PCM Stream	In this method, Ring Buffer is secured in the AICA memory, then PCM or ADPCM is loaded to produce sound.
One Shot	This method loads One Shot Bank into the AICA memory, then the main CPU performs a request to produce sound.
MIDI	This method loads MIDI Program Bank and MIDI Sequence Bank into the AICA memory, then the main CPU performs a sequence start to produce sound.

1.3.1 GD-DA

Data Flow



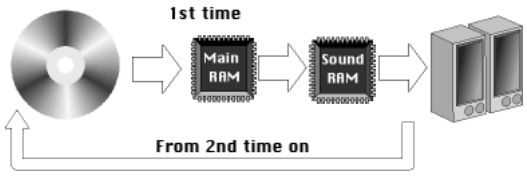
In this method, the AICA CPU decodes PCM from the GD-ROM to produce sound. This can be performed on the GD player which comes standard with Dreamcast. (Commercially available CD players cannot play this data.)

Features

Playing Time	Maximum about 12 minutes
Sound Quality	Same as quality of commercially available CDs.
Data Amount	Large
CPU Load	Very small load to sound CPU and main CPU.
Required Memory	Both sound memory and main memory are not required.
Simultaneous Playback	Only one GD-DA. During GD-DA playback, all CD operations cannot be performed (for example, data loading, PCM Stream for playback from CD, etc.).
Loop Playback	Loop playback with no break is not possible.
Playback Response	Some time lag exists before playback begins.
Change During Playback	Sound volume only.
How to Create	Create music → Recording → Sampling
Good At	BGM

1.3.2 PCM Stream

Data Flow



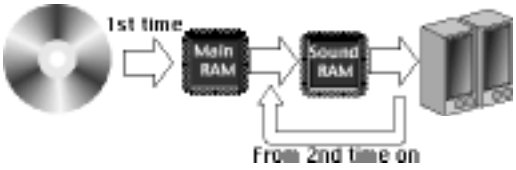
In this method, Ring Buffer is secured in the AICA memory, then PCM or ADPCM is loaded to produce sound.

Features

Playing Time	While it may depend on the sound quality, there is almost no restriction.
Sound Quality	Any quality, from CD quality to rough sound like AM radio broadcast
Data Amount	Increases, in relation to the sound quality. Quality of commercially available CDs is same as GD-DA.
CPU Load	The load is mainly in the main CPU.
Required Memory	While it depends on the number of tracks to play, some area is required for the processing.
Simultaneous Playback	Possible, up to 3 or 4 tracks. GD-DA cannot be simultaneously played.
Loop Playback	Loop playback with no break is possible.
Playback Response	Some time lag exists before playback begins.
Change During Playback	Sound volume, pitch, and pan
How to Create	Create music → Recording → Sampling → Data processing
Good At	BGM, sound effect, and voice

1.3.3 One Shot

Data Flow



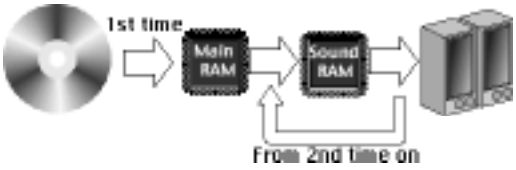
This method loads One Shot Bank into the AICA memory, then the main CPU performs a request to produce sound. Because all the data is placed in the sound RAM, non-sound data (e.g. graphics) would not affect it. All design can be handled by the sound developer.

Features

Playing Time	Up to 65534 samples. Because it is 44.1kHz, you can maximize the playing time by reducing about 1.5 second sound quality.
Sound Quality	Any quality, from CD quality to rough sound like AM radio broadcast.
Data Amount	Each sound takes up to a maximum of 220KB (about 1/10 of the sound memory).
CPU Load	The load is mainly in the sound CPU.
Required Memory	Only sound memory is required.
Simultaneous Playback	Possible, up to 8 tracks. MIDI can also be played simultaneously, so can GD-DA and PCM Stream.
Loop Playback	Loop playback with no break is possible.
Playback Response	No time lag exists before playback begins.
Change During Playback	Sound volume, pitch, and pan
How to Create	Sampling → Data processing
Good At	Sound effect, and voice

1.3.4 Midi

Data Flow



This method loads MIDI Program Bank and MIDI Sequence Bank into the AICA memory, then the main performs a sequence start to produce sound.

Features

Playing Time	From short to long tracks.
Sound Quality	While it can be improved with good techniques, generally speaking the sound quality is not high.
Data Amount	Not required in relation to the length of the tracks.
CPU Load	While this places almost no load on the main CPU, the load to the sound CPU is considerable.
Required Memory	While almost no main memory is required, considerable amount of sound memory is necessary.
Simultaneous Playback	Possible. Simultaneous playback together with all the other types is possible.
Loop Playback	Loop playback with no break is possible.
Playback Response	No time lag exists before playback begins.
Change During Playback	Sound volume, pitch, pan, and tempo
How to Create	Create music → Sampling → Data processing
Good At	BGM and sound effect

1.4 Determining the Sound Configuration

So you see we need to decide in application design how to handle sound. When deciding on the configuration of sound, a number of factors are important. Below are several examples.

- You want to link one scene with another and produce smooth transition.

  For example, say you try as much as possible to reduce the time to take to load sound data, when one scene changes to another, to make the scene transition smooth. This will take too much time to replace all MIDI. The same thing can also be said about One Shot which requires a lot of data to be pre-loaded into the memory.

- You want to loop BGM with sound effects.

  When you understand how to loop BGM, you may want to do more. For example, in addition to the usual BGM, you may want to add the sound effects of sea wave or mechanical noise for looping like BGM.

  However, PCM Stream does not support simultaneous playback of multiple BGMs with varying length. You need to put one PCM Stream, and the other into MIDI, or put both into MIDI.

- The main processing of the software takes too much time.

  For example:

  Main processing of 3D calculation and real-time simulation takes a lot of effort. As a result, processing is hardly available to sound.

  In this case, PCM Stream cannot be used as it consumes a lot of the main CPU resources.

- The access of data on the CD is frequent.

  By the characteristics of the software, it may require frequent access the CD for, for example, frequent playback of movies.

  Then, methods such as GD-DA and PCM Stream which also access the CD are not preferred.

- There is a lot of data that must be stored on the CD.

  If the CD-ROM contains lots of non-sound data such as graphics, then GD-DA is not suitable. Also, when you use PCM, if you try to insert long tracks, then you must be prepared to sacrifice the sound quality.

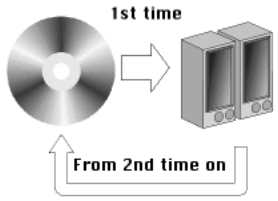
  Therefore, the sound configuration should not be solely the job of the sound manager. All project members including the planners, program managers, graphics managers should study the features and disadvantages of each playback method and then decide on the one that is most suitable for their application.

2. Creating Sound Data (GD-DA)

2.1 Procedure

1) Create music.
   (Vision, Performer, Logic, Overture, etc.)
2) Do the recording at, for example, a studio.
3) Perform sampling from DAT, etc.
   (Audiomedia, ProTools, Sound Designer, etc.)

Data Flow

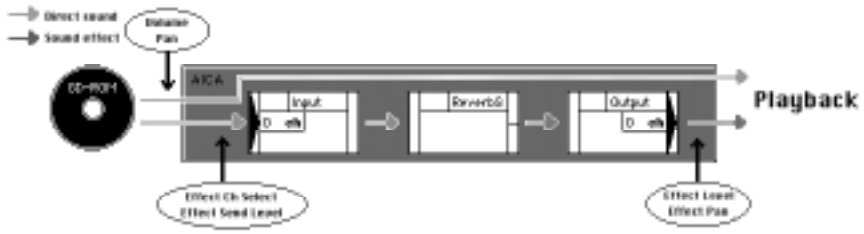


3. Creating Sound Data (GD-DA: Use FX)

3.1 Procedure

1) Create music.
   (Vision, Performer, Logic, Overture, etc.)
2) Do the recording at, for example, a studio.
3) Perform sampling from DAT, etc.
   (Audiomedia, ProTools, Sound Designer, etc.)
4) If Dreamcast effects are used, then create the FX data.
   (FX Program Editor)

Data Flow

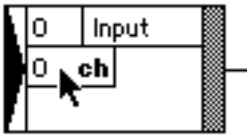


3.2 FX Program Editor

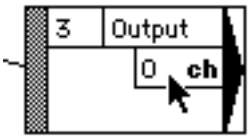
1) Start FX Program Editor.
2) When the file dialog window appears, enter a file name at “File name:”, then click the New button.
3) Run Window/Effect Modules.
4) Select the desired Effect Module for use on GD-DA, then click the Select button.
5) Run Window/I/O Modules.
6) Select Input Module, then click the Select button to prepare two Input Modules.
7) Select Output Module, then click the Select button to prepare two Output Modules.
8) Double-click Effect Module and input the parameters.

   * If number is entered in the number field, then press the enter key to accept the value. Make sure the fader has moved, then close the parameter window.

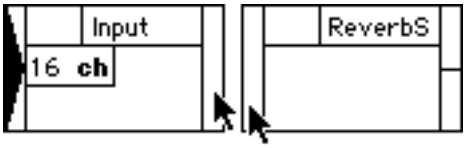
   * GD-DA cannot be played on the sound box. If you want to input while listening to check the effect, it may be a good idea to output sound from One Shot and adjust it. (For details, see One Shot).
9) Duplicate Effect Module.
10) Double-click the cursor position of Input Module, then set Ch to 16 and 17.



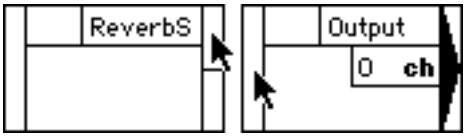
11) * 16 Ch passes through GD-DA's L channel and 17 Ch passes through GD-DA's R channel.



12) Double-click the cursor position of Output Module, then set Ch to any number.

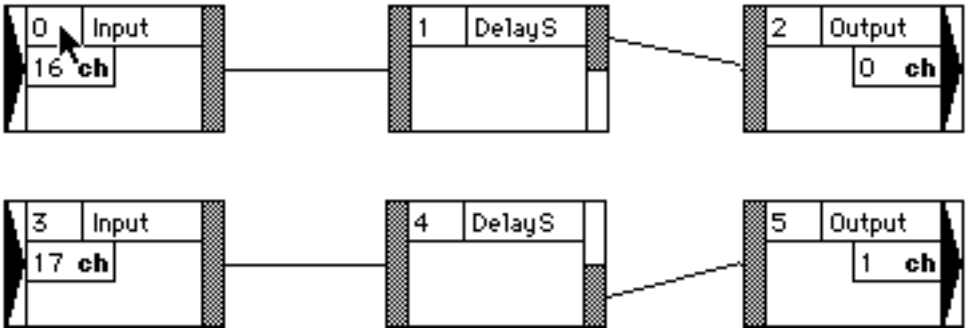


13) Click the cursor position of Input Module of 16 Ch, then click the cursor position of Effect Module to connect these two modules.



14) Click the cursor position of Effect Module, then click the cursor position of Output Module to connect these two modules.

15) Duplicate 17 Ch's Input Module and Effect Module, then connect Output Module as well.



16) Make sure the IDs of the modules (cursor positions) are in the order of Input, Effect, and Output.

* If their IDs are not in the correct order, double-click the ID fields and change them.

17) Run Process/Link.

* If "Ring buffer too small" alert message appears, perform the following.

1. Run Option/Ring buffer.
2. Increase the size of the Ring buffer.
3. Run Process/Link again.

3.3 Sound Project Manager

Data Hierarchy

Sound Driver Bank File	Specifies the sound driver and each bank file
Map Data	Determines how much sound memory is used in which file.
Manager File	Collection of Map Data.

1) Start Sound Project Manager.
2) Double-click Sound Driver block

* If there is no response, (a bug), perform the following:
1. Triple-click the block.

3) Click the Change button.
4) Select Manatee.drv, then click the Open button.
5) Double-click (or triple-click) Free Area.
6) Select FX Program Bank from the new block attributes, then click the OK button.
7) When the dialog window appears, click the Cancel button.
8) Double-click (or triple-click) FX Work area block.
9) At the number input box where the cursor is blinking, refer to the table and enter a number, then click the Change button.

Ring buffer	FX Work Area
8k word	4040H
16k word	8040H
32k word	10040H
64k word	20040H

10) Double-click (or triple-click) FX Output Bank block.
11) Enter Effect Level and Effect Pan of Ch set at Output Module of FX Program Data.
12) From File/Save, save Manager File(.mgf).
13) Run Transfer/Transfer All Banks.

3.4 FX Program Editor

1) Run Process/Link.

   * If the "Ring buffer too small" alert message appears, perform the following.

   1. Run Option/Ring buffer.

   2. Increase the size of the Ring buffer.

   3. Run Process/Link again.

2) Run Process/Download.

   * If the "Cannot send to target" alert message appears, perform the following:

   1. Reset the target machine.

   2. From Sound Project Manager, run Transfer/Transfer All Banks.

   3. Run Process/Link and Process/Download again.

   * If the same alert message appears, check the following:

   - Is the FX Work area of Manager File(.mgf) correctly set up?
   - Has the FX Work area of Manager File(.mgf) been downloaded?

3) From File/Save, save FX Program Data(.fpd).

3.5 Sound Project Manager

1) Double-click FX Program Bank block.

   * If there is no response, (a bug), perform the following:

   1. Triple-click the block.

2) Click the Save button.

3) Select FX Program Data(.fpd), then click the Open button.

4) From File/Save, save Manager File(.mgf).

4. Playing Sound Data (GD-DA)

Note: GD-DA cannot be played on the target machine for sound.

Playback is possible if the target machine is designed for programmers. Therefore, be sure that this feature is put in before playing the data.

5. Delivering Data (GD-DA)

1) Files to deliver to programmer

File to Deliver	
• **PCM File**	
Information to notify programmer	
File Name	Name of file used in GD-DA
Volume	If you want the programmer to adjust the volume, then include this information. Use a relative value, in plus/minus F(H). The initial value is 0.
Pan	If you want the programmer to adjust the pan value, then include this information. Use a relative value, in plus/minus 1F(H). The initial value is 0.

6. Delivering Data (GD-DA: Use FX, Merged)

Multi Unit		Map data in one map, with all banks merged
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) By selecting File/Save Multi-Units, output Multi Unit(.mlt).
3) By selecting File/Save As Text, output Map List.
4) Deliver the following files to the programmer:

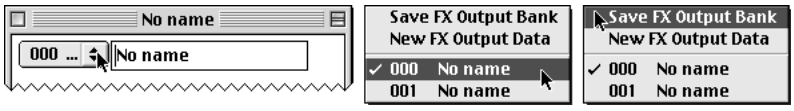
Files to Deliver
• PCM File • Sound Driver • Map List • Multi Unit(.mlt)

Information to notify programmer	
File Name	Name of file used in GD-DA
Volume	If you want the programmer to adjust the volume, then include this information. Use a relative value, in plus/minus F(H). The initial value is 0.
Pan	If you want the programmer to adjust the pan value, then include this information. Use a relative value, in plus/minus 1F(H). The initial value is 0.
FX Program Data no.	Specifies which Program Data is used in FX Program Bank (starting from 0).
FX Output Data no.	Specifies which Output Data is used in FX Output Bank (starting from 0).
Effect Ch no.	Specifies which Input Ch is used in FX Program Data.
Effect Send Level	Specifies the sound level of transmission to Input Module.

7. Delivering Data (GD-DA: Use FX, Individual)

Multi Unit		Only the map data in one map
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) Double-click (or triple-click) FX Program Bank block.
3) Click the Save Bank File button, then output FX Program Bank (.fpb).
4) Double-click (or triple-click) FX Output Bank block.
5) Use the Save Fx Output Bank pull-down menu to output FX Output Bank (.fob).



6) Take note of the address of each block.
7) Run File/New.
8) Run Edit/New Block and select the bank of required attributes. When the dialog window appears, click the Cancel button.
9) Double-click (or triple-click) the block. At where the cursor is blinking, while looking at the note with the address, enter the memory size.

   File is not assigned.
10) Repeat steps 7 to 9 and gather the required blocks.
11) By selecting File/Save Multi-Units, output Multi Unit(.mlt).
12) By selecting File/Save As Text, output Map List.
13) Use a text editor to open Map List, and write down the information about which file is assigned to which address. Then save the file.
14) Deliver the following files to the programmer.

Files to Deliver
• PCM File • Sound Driver • Map List • Multi Unit(.mlt) • FX Program Bank(.fpb) • FX Output Bank(.fob)

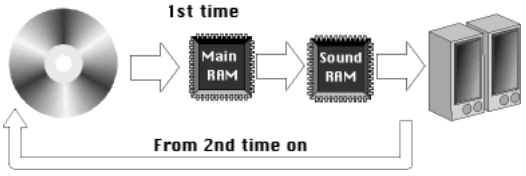
Information to notify programmer	
File Name	Name of file used in GD-DA
Volume	If you want the programmer to adjust the volume, then include this information. Use a relative value, in plus/minus F(H). The initial value is 0.
Pan	If you want the programmer to adjust the pan value, then include this information. Use a relative value, in plus/minus 1F(H). The initial value is 0.
FX Program Data no.	Specifies which Program Data is used in FX Program Bank (starting from 0).
FX Output Data no.	Specifies which Output Data is used in FX Output Bank (starting from 0).
Effect Ch no.	Specifies which Input Ch is used in FX Program Data.
Effect Send Level	Specifies the sound level of transmission to Input Module.

8. Creating Sound Data (PCM Stream)

8.1 Procedure

1) Create music. (Vision, Performer, Logic, Overture, etc.)
2) Do the recording at a studio, etc.
3) Perform sampling from DAT, etc. (Audiomedia, ProTools, Sound Designer, etc.)
4) Process PCM data. (Sound Designer, Alchemy, PEAK, etc.)
5) Perform conversion if it is to be used as ADPCM. (Sound Data Converter)
6) Allocate the sound memory. (Sound Project Manager)

Data Flow



8.2 Sound Data Converter

1) Prepare PCM file in AIFF, SD2, or WAV format.
2) If PCM file is stereo: Split the stereo file into the L and R channels monaural files.
3) Start Sound Data Converter.
4) Run Edit/PCM Stream Convert.
5) Click the “Source” button.
6) Select the file for use in PCM Stream, then click the Open button.
7) If it will be compressed into ADPCM: Turn on [ADPCM] the check box.
8) Click the Convert button, then output PCM Stream Data(.p16) (.p08) (.p04).

8.3 Sound Project Manager

Data Hierarchy		
Sound Driver Bank File		Specifies the sound driver and each bank file
Map Data		Determines how much sound memory is used in which file.
Manager File		Collection of Map Data.

1) Start Sound Project Manager.
2) Double-click Sound Driver block

   * If there is no response, see (a bug), perform the following:

   1. Triple-click the block.
3) Click the Change button.
4) Select Manatee.drv, then click the Open button.
5) Double-click (or triple-click) Free Area.
6) Select PCM Stream Ring buffer from the new block attributes, then click the OK button.
7) Double-click (or triple-click) PCM Stream Ring buffer block.

8) At the Ring buffer Size input box where the cursor is blinking, enter a number, then click the Change button. The Ring buffer Size depends on how much transmission load is applied to SH4.

Ring buffer Size	SH4's Transmission Load
Small	Large
Large	Small

The library's recommended value is 1000H or more. So try to work with the programmer in coming up with a good value.

Another 20H is required for playback. So remember to add this 20H to the size agreed with the programmer.

9) To play PCM Stream in stereo, or for multiple playbacks, repeat steps 5 to 8 to prepare the Ring Buffer for the number of playbacks.

10) From File/Save, save Manager File(.mgf).

Copying & pasting map

While copy & paste is not possible here, there is another method, as follows:

1) Select the map you want to copy.

2) Run File/Export Map, then output Map Data(.map).

3) To paste to another Manager File(.mgf)

Open the Manager File(.mgf) that you want to paste to.

4) To paste to a new Manager File(.mgf):

Run File/New.

5) If required, run Edit/New Memory Map.

6) Select the map you want to paste to.

7) Run File/Import Map.

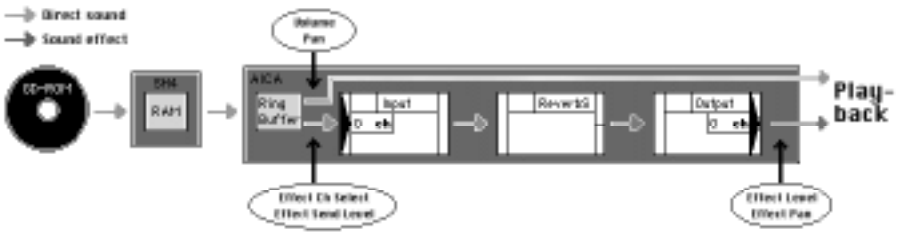
9. Creating Sound Data (PCM Stream: Use FX)

Note: Perform Creating Sound Data: No FX first, then refer to it while continuing with the following operations.

Procedure

1) Create music. (Vision, Performer, Logic, Overture, etc.)
2) Do recording at a studio, for example.
3) Perform sampling from DAT, etc. (Audiomedia, ProTools, Sound Designer, etc.)
4) Process PCM data. (Sound Designer, Alchemy, PEAK, etc.)
5) Perform conversion if it is to be used as ADPCM. (Sound Data Converter)
6) Create FX data if you plan to use Dreamcast effects. (FX Program Editor)
7) Allocate the sound memory. (Sound Project Manager)

Data Flow

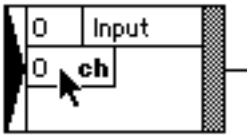


9.1 FX Program Editor

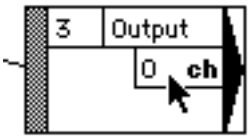
1) Start FX Program Editor.
2) When the file dialog window appears, enter a file name at “File name:”, then click the New button.
3) Run Window/Effect Modules.
4) Select Effect Module for PCM Stream, then click the Select button.
5) Run Window/I/O Modules.
6) Select Input Module and click the Select button to select an input module.
7) Select Output Module, and click the Select button to prepare two output modules for stereo or one output module for monaural.
8) Double-click Effect Module and input the parameters.

   If number is entered in the number field, then press the enter key to accept the value. Make sure the fader has moved, then close the parameter window.

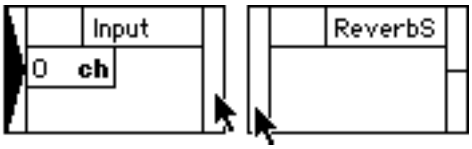
   PCM Stream cannot be played on the sound box. If you want to input while listening to check the effect, it may be a good idea to output sound from One Shot and adjust it.
9) Double-click the cursor position in Input Module, then set Ch to any number.



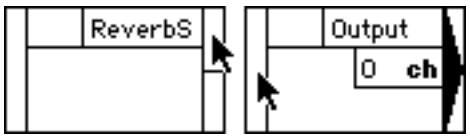
10) Double-click the cursor position in Output Module, then set Ch to any number.



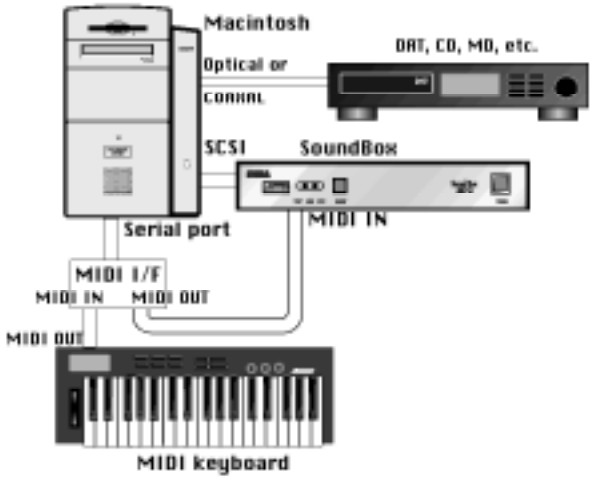
11) Click the cursor position of Input Module, then click the cursor position of Effect Module to connect these two modules.



12) Click the cursor position of Effect Module, then click the cursor position of Output Module to connect these two modules.



13) Make sure the IDs of the modules (cursor positions) are in the order of Input, Effect, and Output. If their IDs are not in the correct order, double-click the ID fields and change them.



9.2 Sound Project Manager

Data Hierarchy		
Sound Driver Bank File		Specifies the sound driver and each bank file.
Map Data		Determines how much sound memory is used in which file.
Manager File		Collection of Map Data.

1) From Sound Project Manager, open Manager File(.mgf) that has been saved.
2) Double-click (or triple-click) Free Area.
3) Select FX Program Bank from the new block attributes, then click OK. button.
4) When the dialog window appears, click the Cancel button.
5) Double-click (or triple-click) FX Work area block.

6) At the number input box where the cursor is blinking, refer to the table and enter a number, then click the Change button.

Ring buffer	FX Work Area
8k word	4040H
16k word	8040H
32k word	10040H
64k word	20040H

7) Double-click (or triple-click) FX Output Bank block.
8) Enter Effect Level and Effect Pan of Ch set at Output Module of FX Program Data.
9) From File/Save, save Manager File(.mgf).
10) Run Transfer/Transfer All Banks.

9.3 FX Program Editor

1) Run Process/Link.

   If the "Ring buffer too small" alert message appears, perform the following.
   1. Run Option/Ring buffer.
   2. Increase the size of the Ring buffer.
   3. Run Process/Link again.

2) Run Process/Download.

   If the "Cannot send to target" alert message appears, perform the following:

   1. Reset the target machine.
   2. From Sound Project Manager, run Transfer/Transfer All Banks.
   3. Run Process/Link and Process/Download again.

   If the same alert message appears, check the following:

   - Is the FX Work area of Manager File(.mgf) correctly set up?
   - Has the FX Work area of Manager File(.mgf) been downloaded?

3) From File/Save, save FX Program Data(.fpd).

9.4 Sound Project Manager

1) Double-click FX Program Bank block.

   If there is no response, (a bug), perform the following:
   1. Triple-click the block.
2) Click the Save button.
3) Select FX Program Data(.fpd), then click the Open button.
4) Run File/Save to save Manager File(.mgf).

SEGA™

10. Playing Sound Data (PCM Stream)

Note: PCM Stream cannot be played on the target machine for sound. Playback is possible if the target machine is designed for programmers. Therefore, be sure that this feature is put in before playing the data.

11. Delivering Data (PCM Stream)

Multi Unit		Map data in one map only
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) By selecting File/Save Multi-Units, output Multi Unit(.mlt).
3) By selecting File/Save As Text, output Map List.
4) Deliver the following files to the programmer:

Files to Deliver
• L channel of PCM/ADPCM File
• R channel of PCM/ADPCM File
• Sound Driver
• Map List
• Multi Unit(.mlt)

Information to notify programmer	
File Name	Names of files used in PCM Stream (L and R).
File Format	Specifies the format of data.
Rate	Specifies the frequency of data.
Port no.	Specifies which port to use.
Volume	If you want the programmer to adjust the volume, then include this information. Use a relative value, in plus/minus F(H). The initial value is 0.
Pan	If you want the programmer to adjust the pan value, then include this information. Use a relative value, in plus/minus 1F(H). The initial value is 0.

12. Delivering Data (PCM Stream: Use FX, Merged)

Multi Unit		Merges map data and all banks in one map.
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File(.mgf) that has been created.
2) By selecting File/Save Multi-Units, output Multi Unit(.mlt).
3) By selecting File/Save As Text, output Map List.
4) Deliver the following files to the programmer:

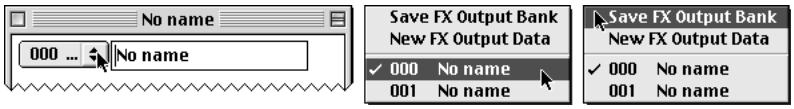
Files to Deliver
• L channel of PCM/ADPCM File
• R channel of PCM/ADPCM File
• Sound Driver
• Map List
• Multi Unit(.mlt)

Information to notify programmer	
File Name	Names of files used in PCM Stream (L and R).
File Format	Specifies the format of data.
Rate	Specifies the frequency of data.
Port no.	Specifies which port to use.
Volume	If you want the programmer to adjust the volume, then include this information. Use a relative value, in plus/minus F(H). The initial value is 0.
Pan	If you want the programmer to adjust the pan value, then include this information. Use a relative value, in plus/minus 1F(H). The initial value is 0.
FX Program Data no.	Specifies which Program Data is used in FX Program Bank (starting from 0).
FX Program Data no.	Specifies which Program Data is used in FX Program Bank (starting from 0).
FX Output Data no.	Specifies which Output Data is used in FX Output Bank (starting from 0).
Effect Ch no.	Specifies which Input Ch is used in FX Program Data.
Effect Send Level	Specifies the sound level of transmission to Input Module.

13. Delivering Data (PCM Stream: Use FX, Individual)

Multi Unit		Only the map data in one map
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File(.mgf) that has been created.
2) Double-click (or triple-click) FX Program Bank block.
3) Click the Save FX Program Bank button, then output FX Program Bank(.fpb).
4) Double-click (or triple-click) FX Output Bank block.
5) Use the Save Fx Output Bank pull-down menu to output FX Output Bank(.fob).



6) Take note of the address of each block.
7) Run File/New.
8) Run Edit/New Block and select the bank of required attributes. When the dialog window appears, click the Cancel button.
9) Double-click (or triple-click) the block. At where the cursor is blinking, while looking at the note with the address, enter the memory size.

   File is not assigned.
10) Repeat steps 7 to 9 and gather the required blocks.
11) By selecting File/Save Multi-Units, output Multi Unit(.mlt).
12) By selecting File/Save As Text, output Map List.
13) Use a text editor to open Map List, and write down the information about which file is assigned to which address. Then save the file.
14) Deliver the following files to the programmer.

Files to Deliver
• L channel of PCM/ADPCM File • R channel of PCM/ADPCM File • Sound Driver • Map List • Multi Unit(.mlt) • FX Program Bank(.fpb) • FX Output Bank(.fob)

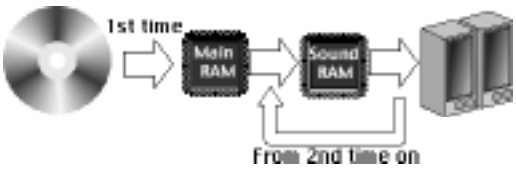
Information to notify programmer	
File Name	Names of files used in PCM Stream (L and R).
File Format	Specifies the format of data.
Rate	Specifies the frequency of data.
Port no.	Specifies which port to use.
Volume	If you want the programmer to adjust the volume only, then include this information. Use a relative value, in plus/minus F(H). The initial value is 0.
Pan	If you want the programmer to adjust the pan value only, then include this information. Use a relative value, in plus/minus 1F(H). The initial value is 0.
FX Program Data no.	Specifies which Program Data is used in FX Program Bank (starting from 0).
FX Output Data no.	Specifies which Output Data is used in FX Output Bank (starting from 0).
Effect Ch no.	Specifies which Input Ch is used in FX Program Data.
Effect Send Level	Specifies the sound level of transmission to Input Module.

14. Creating Sound Data (One Shot)

Procedure

1) Get the source sound data. <-- music CDs, etc.
2) Perform sampling from CD, DAT, etc. <-- Audiomedia, ProTools, Sound Designer, etc.
3) Process PCM data. <-- Sound Designer, Alchemy, PEAK, etc.
4) Create One Shot bank. <-- Sound Data Converter
5) Allocate the sound memory. <-- Sound Project Manager

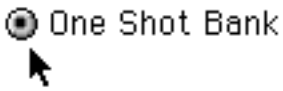
Data Flow



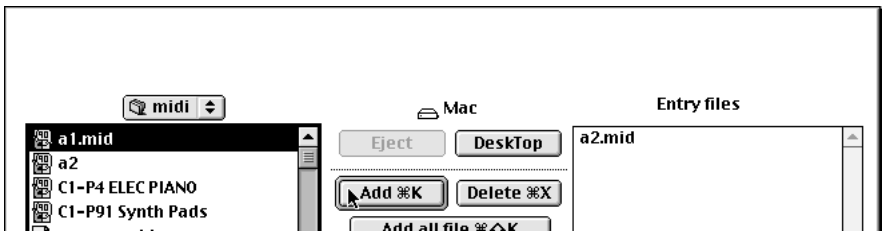
14.1 Sound Data Converter

Data Hierarchy		
One Shot Data		Specifies the PCM/ADPCM file in Dreamcast format.
One Shot Bank		Specifies the collection of One Shot Data.
Set File		Specifies the collection of One Shot Bank or MIDI Sequence Bank.

1) Prepare a monaural file in SD2, AIFF, or WAV format.
2) Start Sound Data Converter.
3) Click the One Shot Bank radio button.



4) Click the Add button.
5) Select PCM File, then click the Add button to add it to the dialog.



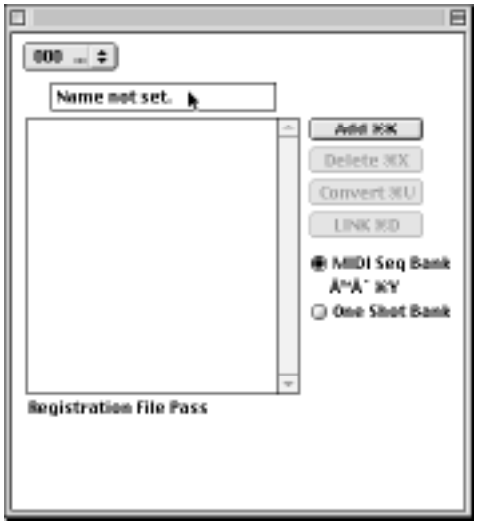
* The One Shot Data numbers follows the order they are added in the dialog window.

The first PCM file added	One Shot Data no.0
The second PCM file added	One Shot Data no.1
The third PCM file added	One Shot Data no.2

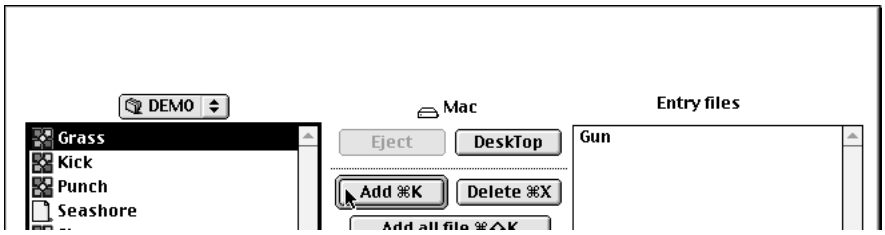
* In the dialog window, to add all PCM files in the folder, click the Add all file button.

6) When the desired PCM files are added, click the Quit button.

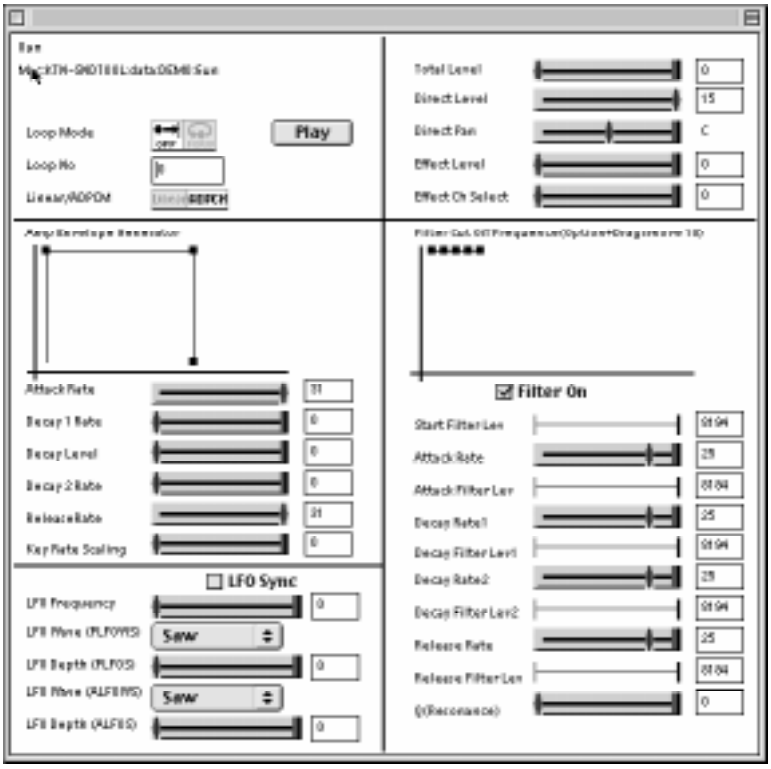
7) Enter the name of the bank.



8) Double-click One Shot Data to open the One Shot Edit window.



9) Edit the parameters.



* To edit while listening to the sound:

1. Press the reset button of the target machine.
2. Run Functions/Check Target.
3. Run Transfer/Transfer Driver.
4. Run Transfer/Transfer Data.
5. Turn on Transfer/Auto Transfer Mode.
6. Press Play and check the sound.

10. Click the Convert button to output One Shot Bank(.osb).
11. From File/Save, save Set File(.stf).

14.2 Sound Project Manager

Data Hierarchy		
Sound Driver Bank File		Specifies the sound driver and each bank file
Map Data		Determines how much sound memory is used in which file.
Manager File		Collection of Map Data.

1) Start Sound Project Manager.
2) Double-click the Sound Driver block.

   If there is no response, (a bug), perform the following:
   1. Triple-click the block.
3) Click the Change button.
4) Select Manatee.drv and click the Open button.
5) Double-click (or triple-click) Free Area.
6) Select One Shot Bank from the new block attributes, then click the OK button.
7) Double-click (or triple-click) One Shot Bank block.
8) Select One Shot Bank(.osb) and click the Open button.
9) From File/Save, save Manager File(.mgf).

Copying & pasting map

While copy & paste is not possible here, there is another method, as follows:

1) Select the map you want to copy.
2) Run File/Export Save, then output Map Data(.map).
3) To paste to another Manager File(.mgf)

   Open the Manager File(.mgf) that you want to paste to.
4) To paste to a new Manager File(.mgf):

   Run File/New.
5) If required, run Edit/New Memory Map.
6) Select the map you want to paste to.
7) Run File/Import Map.

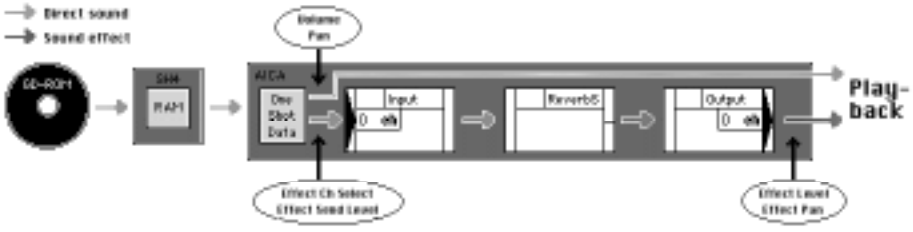
15. Creating Sound Data (One Shot: Use FX)

Perform Creating Sound Data: No FX first, then refer to it while continuing with the following operations.

Procedure

1) Get the source sound data. (music CDs, etc.)
2) Perform sampling from CD, DAT, etc. (Audiomedia, ProTools, Sound Designer, etc.)
3) Process PCM data. (Sound Designer, Alchemy, PEAK, etc.)
4) Create OneShot bank. (Sound Data Converter)
5) Create FX data. (FX Program Editor)
6) Allocate the sound memory. (Sound Project Manager)

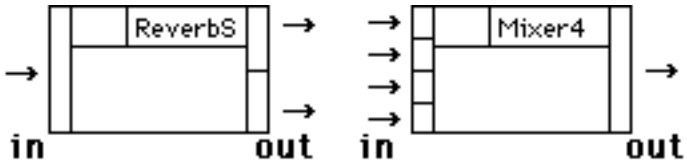
Data Flow



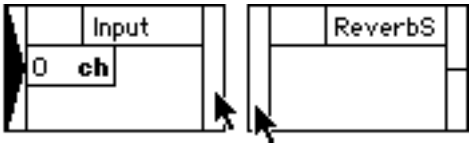
15.1 FX Program Editor

1) Start FX Program Editor.
2) When the file dialog window appears, enter a file name at “File name:”, then click the New button.
3) Run Window/Effect Modules.
4) Select Effect Module, then click the Select button.
5) Repeat steps 3 to 4 to gather the required number of modules.
6) Run Window/I/O Modules.
7) Select Input Module and click the Select button.
8) Select Output Module and click the Select button.
9) Repeat steps 6 to 8 to gather the required number of modules.

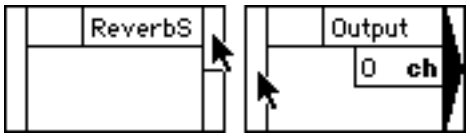
   Usually, you can find out the required number of modules by looking at the dividing lines at the arrow positions of Effect Module.



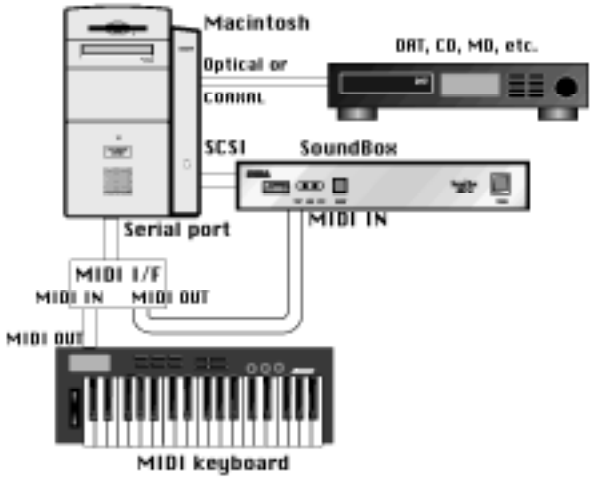
10) Click the cursor position of Input Module, then click the cursor position of Effect Module and connect the modules with a line.



11) Click the cursor position of Effect Module, then click the cursor position of Output Module and connect the modules with a line.

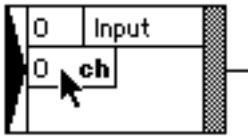


12) Make sure the IDs of the modules (cursor positions) are in the order of Input, Effect, and Output.
If their IDs are not in the correct order, double-click the ID fields and change them.

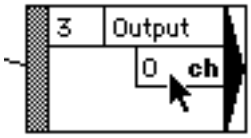


13) Double-click Effect Module and input the parameters.
If number is entered in the number field, then press the enter key to accept the value.
Make sure the fader has moved, then close the parameter window.

14) If there are multiple input modules, then double-click the cursor position and set the input channel.



15) If there are multiple output modules, then double-click the cursor position and set the output channel.



16) Run Process/Link.
If the "Ring buffer too small" alert message appears, perform the following.
1. Run Option/Ring buffer.
2. Increase the size of the Ring buffer.
3. Run Process/Link again.

15.2 Sound Project Manager

Data Hierarchy		
Sound Driver Bank File		Specifies the sound driver and each bank file
Map Data		Determines how much sound memory is used in which file.
Manager File		Collection of Map Data.

1) From Sound Project Manager, open Manager File(.mgf) that has been saved.
2) Double-click (or triple-click) Free Area.
3) Select FX Program Bank from the new block attributes, then click the OK button.
4) When the dialog window appears, click the Cancel button.
5) Double-click FX Work area block.
6) At the number input box where the cursor is blinking, refer to the table and enter a number, then click the Change button.

Ring buffer	FX Work Area
8k word	040H
16k word	8040H
32k word	10040H
64k word	20040H

7) Double-click (or triple-click) FX Output Bank block.
8) Enter Effect Level and Effect Pan of Ch set at Output Module of FX Program Editor
9) From File/Save, save Manager File(.mgf).
10) Run Transfer/Transfer All Banks.

15.3 FX Program Editor & Sound Data Converter

1) From FX Program Editor, run Process/Link.

   If the "Ring buffer too small" alert message appears, perform the following.

   1. Run Option/Ring buffer.

   2. Increase the size of the Ring buffer.

   3. Run Process/Link again.

2) From FX Program Editor, run Process/Download.

   If the "Cannot send to target" alert message appears, perform the following:

   1. Reset the target machine.

   2. From Sound Project Manager, run Transfer/Transfer All Banks.

   3. Run Process/Link and Process/Download again.

   If the same alert message appears, check the following:

   - Is the FX Work area of Manager File(.mgf) correctly set up?
   - Has the FX Work area of Manager File(.mgf) been downloaded?

3) Open Set File(.stf) and select any One Shot Bank.

4) Double-click any One Shot Data to open the One Shot Edit window.

5) AT Effect Ch Select, enter the Input Ch no of Effect Module you want to use.

6) Enter Effect Send Level.

7) Press the reset button of the target machine.

8) Run Transfer/Check Target.

   If the "Target is not connected" alert message appears, check the following:

   Is the target machine recognized at SCSI Probe, Silver Lining, etc.?

   Is SCSI ID 5 already used by another device?

   (You can set the SCSI ID of the target machine to 4 by changing its DIP switch 6 to the ON position. Note that the SCSI ID of the target machine can only be set to either 4 or 5.)

   If the item to check is not found, perform the following:

   1. From FX Program Editor, run Process/Link.

   2. From FX Program Editor, run Process/Download.

   3. From FX Output Bank, run Mixer Change.

   4. Check the sound output again.

9) Run Transfer/Transfer Driver.

   If the "File is not existed" alert message check the following:

   Is Sound Driver located in the same folder?

   Are Sound Driver and the application located in the same folder running?

   Is the application of a different version located in a different folder running?

10) Run Transfer/Transfer Data.

11) Turn on Transfer/Auto Transfer Mode.

12) Press Play, and check to see if sound comes out with effects.
    If no sound comes out, perform the following steps:
    1. Press the reset button of the target machine.
    2. Run Functions/Check Target.
    3. Run Functions/Transfer Driver and Bank.
    4. Press keys on the master keyboard and check the response of the target machine again.
    If the effect does not work, check the following:
    Is Effect Level of FX Output Bank set to 0?
    Is Effect Ch Select of One Shot Edit window requesting a non-existent input channel?
    Is Effect Send Level of One Shot Edit window set to 0?
    If the item to check is not found, perform the following:
    1. From FX Program Editor, run Process/Link.
    2. From FX Program Editor, run Process/Download.
    3. From FX Output Bank, run Mixer Change.
    4. Check the sound output again.
13) Adjust the parameters of each module of FX Program Editor.
14) Run Process/Link and Process/Download and check the sound output.
15) From File/Save, save FX Program Data(.fpd).
16) Adjust the Effect Send Level in the One Shot Edit window.
17) Click the Convert button to output One Shot Bank(.osb).
18) From File/Save, save Set File(.stf)/

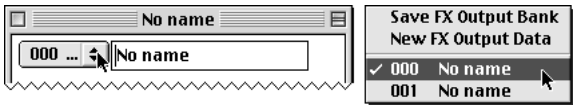
15.4 Sound Project Manager

1) Double-click FX Program Bank block.
   If there is no response, (a bug), perform the following:
   1. Triple-click the block.
2) Click the Save button.
3) Select FX Program Data(.fpd), then click the Open button.
4) From File/Save, save Manager File(.mgf).

16. Playing Sound Data (One Shot)

1) From Sound Project Manager, open Manager File(.mgf) that has been created.
2) To hear with effects:

   1. Double-click (or triple-click) FX Program Bank block.
   2. Select FX Program Data to use.
   3. Click the FX Program Change button.
   4. Double-click (or triple-click) FX Output Bank block.
   5. From the pulldown menu, select Output Data to use.



   6. Click the Mixer Change button.
3) Double-click (or triple-click) One Shot Bank block.
   To load another One Shot Bank:
   While holding down the option key, double click (or triple-click) the block.
4) Select One Shot Data you want to play, then click the Play button.

17. Delivering Data (One Shot: Merged)

Multi Unit		Map data in one map, with all banks merged
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File(.mgf) that has been created.
2) By selecting File/Save Multi-Units..., output Multi Unit(.mlt).
3) By selecting File/Save As Text..., output Map List.
4) Deliver the following files to the programmer:

Files to Deliver	
• Sound Driver • Map List • Multi Unit(.mlt)	
Information to notify programmer	
Data List	Specifies which number of One Shot Data is which music track (tone).

18. Delivering Data (One Shot: Individual, Do Not Use FX)

Multi Unit		Only the map data in one map
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) Take note of the address of each block.
3) Run File/New.
4) Run Edit/New Block and select the bank of required attributes. When the dialog window appears, click the Cancel button.
5) Double-click (or triple-click) the block. At where the cursor is blinking, while looking at the note with the address, enter the memory size.

   File is not assigned.
6) Repeat steps 3 to 5 and gather the required blocks.
7) By selecting File/Multi-Units, output Multi Unit (.mlt).
8) By selecting File/Save As Text, output Map List.

9) Deliver the following files to the programmer:

Files to Deliver
• Sound Driver
• Map List
• Multi Unit(.mlt)
• One Shot Bank(.osb)
• [MIDI Sequence Bank(.msb)]
• [MIDI Program Bank(.mpb) etc...]

Information to notify programmer	
File List	Specifies location and content of each file.
Data List	Specifies which number of One Shot Data is which music track (tone).

19. Delivering Data (One Shot: Individual, Use FX)

Multi Unit		Only the map data in one map
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) Double-click (or triple-click) FX Program Bank block.
3) Click the Save FX Program Bank button, then output FX Program Bank (.fpb).
4) Double-click (or triple-click) FX Output Bank block.
5) Use the Save Fx Output Bank pull-down menu to output FX Output Bank(.fob).
6) Take note of the address of each block.
7) Run File/New.
8) Run Edit/New Block and select the bank of required attributes. When the dialog window appears, click the Cancel button.
9) Double-click (or triple-click) the block. At where the cursor is blinking, while looking at the note with the address, enter the memory size.

   File is not assigned.
10) Repeat steps 7 to 9 and gather the required blocks.
11) By selecting File/Save Multi-Units…, output Multi Unit (.mlt).
12) By selecting File/Save As Text, output Map List.
13) Use a text editor to open Map List, and write down the information about which file is assigned to which address. Then save the file.

14) Deliver the following files to the programmer.

Files to Deliver
• Sound Driver
• Map List
• Multi Unit(.mlt)
• One Shot Bank(.osb)
• FX Program Bank(.fpb)
• FX Output Bank(.fob)
• [MIDI Sequence Bank(.msb)]
• [MIDI Program Bank(.mpb) etc...]

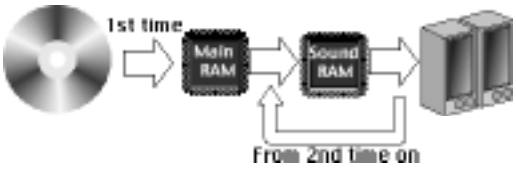
Information to notify programmer	
File List	Specifies location and content of each file.
Data List	Specifies which number of One Shot Data is which music track (tone).

20. Creating Sound Data (MIDI)

Procedure

1) Get the source sound data. <-- music CDs, etc.
2) Perform sampling from CD, DAT, etc.<-- Audiomedia, ProTools, Sound Designer, etc.
3) Process PCM data. <-- Sound Designer, Alchemy, PEAK, etc.
4) Create MIDI program bank<-- MIDI Program Editor
5) Create music. <-- Vision, Performer, Logic, Overture, etc.
6) Output the music data as standard MIDI file.<-- Vision, Performer, Logic, Overture, etc.
7) Convert standard file and create MIDI sequence bank.<--Sound Data Converter
8) Allocate the sound memory.<-- Sound Project Manager

Data Flow



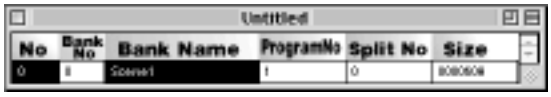
20.1 MIDI Program Editor

Data Hierarchy			On SATURN
Split		Assigns and edits waveform.	Layer
Layer		Handles simultaneous production of sound of split	(None)
Voice		Collection of splits	Voice
MIDI Program Bank		Collection of voice	Tone Bank
Project File		Collection of MIDI Program Bank	Project File

1) Prepare a monaural file in SD2, AIFF, or WAV format
2) Start MIDI Program Editor.
3) Run Functions/Check Target.

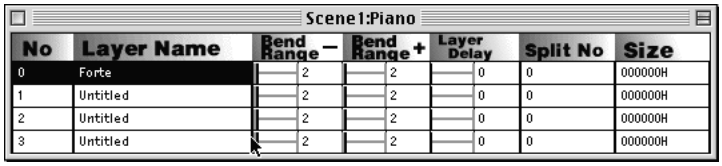
   If the "Target is not connected" alert message appears, check the following:
   Is the target machine recognized at SCSI Probe, Silver Lining, etc.?
   Is SCSI ID 5 already used by another device?
   (You can set the SCSI ID of the target machine to 4 by changing its DIP switch 6 to the ON position. Note that the SCSI ID of the target machine can only be set to either 4 or 5.)

   If the item to check could not be found, try the following:
   1. Press the reset button of the target machine.
   2. Run Functions/Check Target.
4) Run Functions/Transfer Driver.
5) Double-click the cursor position to open the Voice window.

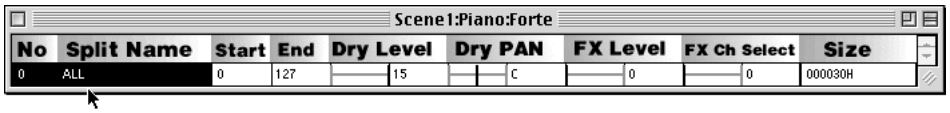


6) Double-click the cursor position to open the Layer window.

7) Double-click the cursor position to open the Split window.



8) Double-click the cursor position to open the Split Edit window.



9) Click the cursor position to assign the waveform.

10) Start the sequencer.

11) From the sequencer, download the following to the target machine:
First, Bank Change (Control Change no.32)
Then, Program Change

12) At the master keyboard, while checking the sound, enter each parameter

If the target machine does not respond to the master keyboard operations, perform the following steps:

1. Press the reset button of the target machine.

2. Run Functions/Check Target.

3. Run Functions/Transfer Driver and Bank.

4. Press keys on the master keyboard and check the response of the target machine again.

If you hear the preset sound from the target machine, check the following:

Is the master keyboard sending MIDI data on MIDI channel 1?

Have Bank Change (Control Change no.32) and Program Change been sent to the target machine?

13) From File/Save Transfer File, output MIDI Program Bank(.mpb).

14) From File/Save, save Project File(.pjf).

Simultaneous sound production of Split

If you want to overlap splits at the same sound range, use layers.

Example: You want to produce the stereo sound of the cymbal waveform. Use the following steps:

1) Split the stereo waveform into the L and R channels in monaural waveforms.
2) Put the L channel of the cymbal waveform split into layer 0.
3) Put the R channel of the cymbal waveform split into layer 1. Layers 0 to 3 can be used.

Copying and pasting voice or split

1) Select the voice number or split number you want to copy.
2) Run Edit/Copy.
3) To paste to another Project File (.pjf): Open the Project File (.pjf) that you want to paste to.
4) To paste to a new Project File (.pjf): Run File/New Project.
5) If required, run Edit/Add.
6) Select the voice number of split number you want to paste.
7) Run Edit/Paste.

Copying and inserting voice or split

Insertion will not work if there is no copied data.

1) Select the voice number or split number you want to copy.
2) Run Edit/Copy.
3) To insert to another Project File (.pjf): Open the Project File(.pjf) that you want to insert to
4) To insert to a new Project File (.pjf): Run File/New Project.
5) Select the voice number or split number you want to insert.
6) While holding down the shift key, run Edit/Insert.

20.2 Sequencer

1) Create MIDI Data using the sequencer

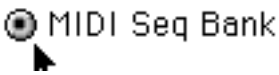
   Always insert Bank Change (Control Change no.32) at the beginning. Then a little far away from it, insert Program Change.

   If Volume (Control Change no.7) and Pan (Control Change no.10) are not inserted.Then the volume and pan of MIDI Program Data will be used at the driver.
2) Output the completed MIDI data as standard MIDI file (called SMF hereafter).

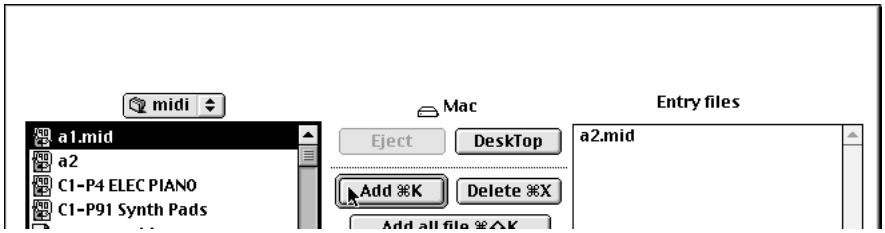
20.3 Sound Data Converter

Data Hierarchy		
MIDI Sequence Data		MIDI file in Dreamcast format
MIDI Sequence Bank		Collection of MIDI Sequence Data
Set File		Collection of MIDI Sequence Bank or One Shot Bank

1) Start Sound Data Converter
2) Click the MIDI Seq Bank radio button.



3) Click the Add button.
4) Select SMF, then click the Add button to add it to the dialog.



The sequence data numbers follows the order the MIDI files are added in the dialog window.

The first MIDI file added	Sequence Data no.0
The second MIDI file added	Sequence Data no.1
The third MIDI file added	Sequence Data no.2

In the dialog window, to add all SMFs in the folder, click the Add all file button.

5) When the desired SMFs are added, click the Quit button.

6) Enter the name of MIDI Sequence Bank.

7) Click the Convert button to output MIDI Sequence Bank(.msb).
8) From File/Save, save Set File(.stf).

20.4 Sound Project Manager

Data Hierarchy		
Sound Driver Bank File		Specifies the sound driver and each bank file
Map Data		Determines how much sound memory is used in which file.
Manager File		Collection of Map Data.

1) Start Sound Project Manager.
2) Double-click the Sound Driver block.

   If there is no response, (a bug), perform the following:

   1. Triple-click the block.
3) Click the Change button.
4) Select Manatee.drv and click the Open button.
5) Double-click (or triple-click) Free Area.
6) Select MIDI Sequence Bank from the new block attributes, then click the Source button.
7) Double-click (or triple-click) MIDI Sequence Bank block.

8) Select MIDI Sequence Bank(.msb) and click the Open button.

   If you want to load another file to the block which already has a file loaded: While holding down the option key, double-click (or triple-click) the block.

9) Double-click (or triple-click) Free Area.
10) Select MIDI Program Bank from the new block attributes, then click the OK button.
11) Double-click (or triple-click) MIDI Program Bank block.
12) Select MIDI Program Bank(.mpb) and click the Open button.
13) From File/Save, save Manager File(.mgf).

Copying & pasting map

While copy & paste is not possible here, there is another method, as follows:

1) Select the map you want to copy.
2) Run File/Export Map, then output Map Data(.map).
3) To paste to another Manager File(.mgf): Open the Manager File(.mgf) that you want to paste to.
4) To paste to a new Manager File(.mgf): Run File/New Project.
5) If required, run Edit/New Memory Map.
6) Select the map you want to paste to.
7) Run File/Import Map.

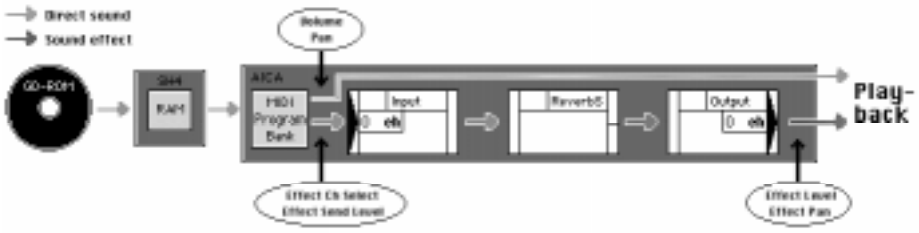
21. Creating Sound Data (MIDI): Use FX

Perform Creating Sound Data: No FX first, then refer to it while continuing with the following operations.

Procedure

1) Get the source sound data. (music CDs, etc.)
2) Perform sampling from CD, DAT, etc. (Audiomedia, ProTools, Sound Designer, etc.)
3) Process PCM data. (Sound Designer, Alchemy, PEAK, etc.)
4) Create MIDI program bank. (MIDI Program Editor)
5) Create FX data. (FX Program Editor)
6) Create music. (Vision, Performer, Logic, Overture, etc.)
7) Output the music data as standard MIDI file (Vision, Performer, Logic, Overture, etc.)
8) Convert the standard MIDI file and create MIDI sequence bank. (Sound Data Converter)
9) Allocate the sound memory. (Sound Project Manager)

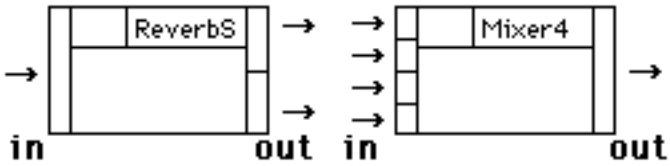
Data Flow



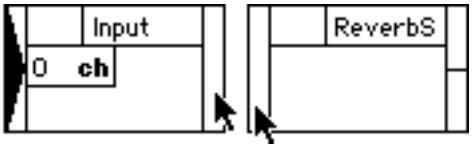
21.1 FX Program Editor

1) Start FX Program Editor.
2) When the file dialog window appears, enter a file name at “File name:”, then click the New button.
3) Run Window/Effect Modules.
4) Select Effect Module, then click the Select button.
5) Repeat steps 3 to 4 to gather the required number of modules.
6) Run Window/I/O Modules.
7) Select Input Module and click the Select button.
8) Select Output Module and click the Select button.
9) Repeat steps 6 to 8 to gather the required number of modules.

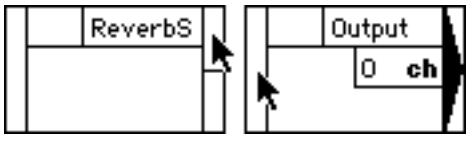
   Usually, you can find out the required number of modules by looking at the dividing lines at the arrow positions of Effect Module.



10) Click the cursor position of Input Module, then click the cursor position of Effect Module and connect the modules with a line.

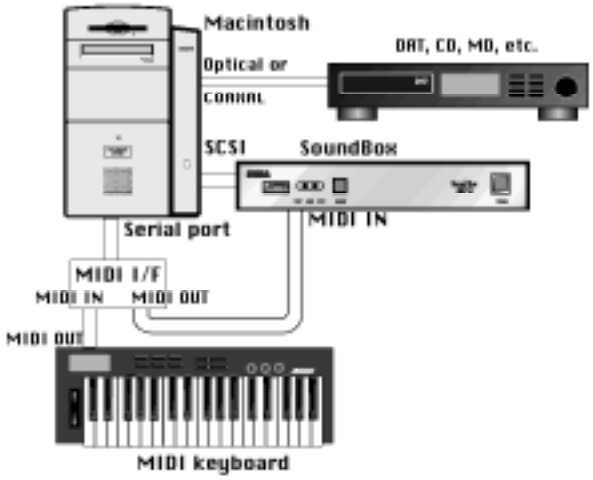


11) Click the cursor position of Effect Module, then click the cursor position of Output Module and connect the modules with a line.



12) Make sure the IDs of the modules (cursor positions) are in the order of Input, Effect, and Output.

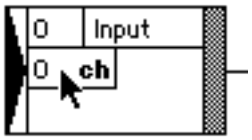
If their IDs are not in the correct order, double-click the ID fields and change them.



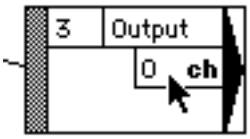
13) Double-click Effect Module and input the parameters.

If number is entered in the number field, then press the enter key to accept the value. Make sure the fader has moved, then close the parameter window.

14) If there are multiple input modules, then double-click the cursor position and set the input channel.



15) If there are multiple output modules, then double-click the cursor position and set the output channel.



16) Run Process/Link.

If the "Ring buffer too small" alert message appears, perform the following.

1. Run Option/Ring buffer.
2. Increase the size of the Ring buffer.
3. Run Process/Link again.

21.2 Sound Project Manager

Data Hierarchy		
Sound Driver Bank File		Specifies the sound driver and each bank file
Map Data		Determines how much sound memory is used in which file.
Manager File		Collection of Map Data.

1) From Sound Project Manager, open Manager File(.mgf) that has been saved.
2) Double-click (or triple-click) Free Area.
3) Select FX Program Bank from the new block attributes, then click the OK button.
4) When the dialog window appears, click the Cancel button.
5) Double-click FX Work area block.
6) At the number input box where the cursor is blinking, refer to the table and enter a number, then click the Change button.

Ring buffer	FX Work Area
8k word	4040H
16k word	8040H
32k word	10040H
64k word	20040H

7) Double-click (or triple-click) FX Output Bank block.
8) Enter Effect Level and Effect Pan of Ch set at Output Module of FX Program Data.
9) From File/Save, save Manager File (.mgf).
10) Run Transfer/Transfer All Banks.

21.3 FX Program Editor & MIDI Program Editor & Sequencer

1) From FX Program Editor, run Process/Link.

   If the "Ring buffer too small" alert message appears, perform the following.

   1. Run Option/Ring buffer.
   2. Increase the size of the Ring buffer.
   3. Run Process/Link again.

2) From FX Program Editor, run Process/Download.

   If the "Cannot send to target" alert message appears, perform the following:

   1. Reset the target machine.
   2. From Sound Project Manager, run Transfer/Transfer All Banks.
   3. Run Process/Link and Process/Download again.

   If the same alert message appears, check the following:

   Is the FX Work area of Manager File(.mgf) correctly set up?

   Has the FX Work area of Manager File(.mgf) been downloaded?

3) From MIDI Program Editor, open Project File(.pjf) that has been created.
4) If data is in automatic transmission, then run Functions/Transfer Bank.
5) Start Sequencer.
6) Send Bank Change and Program Change.
7) Play the master keyboard and check the sound output.

   If no sound comes out, hen perform the following steps:

   1. Press the reset button of the target machine.
   2. Run Functions/Check Target.
   3. Run Functions/Transfer Driver and Bank.
   4. Press keys on the master keyboard and check the response of the target machine again.

8) At the of Effect Ch Select of the split of MIDI Program Bank, enter the Input Ch no. of the effect module you want to use.
9) Enter Effect Send Level of the split of MIDI Program Bank.
10) Play the master keyboard and check to see if the sound comes with the effect.

    If the effect does not work, check the following:

    Is Effect Level of FX Output Bank set to 0?

    Is Effect Ch Select of the split of MIDI Program Bank requesting a non-existent input channel?

    Is Effect Send Level of the split of MIDI Program Bank set to 0?

    If the item to check is not found, perform the following:

    1. From FX Program Editor, run Process/Link.
    2. From FX Program Editor, run Process/Download.
    3. From FX Output Bank, run Mixer Change.
    4. Check the sound output again.

11) Adjust the parameters of each module of FX Program Data(.fpd).
12) Run Process/Link and Process/Download and check the sound output.
13) Run File/Save to save FX Program Data(.fpd).
14) While listening to the sound from the master keyboard or from the MIDI file of Sequencer, adjust the Effect Send Level of the split of MIDI Program Bank.
15) Run File/Save Transfer File to output MIDI Program Bank (.mpb).
16) From File/Save, save Project File (.pjf).

21.4 Sound Project Manager

1) Double-click FX Program Bank block.

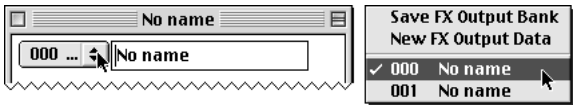
   If there is no response, (a bug), perform the following:

   1. Triple-click the block.
2) Click the Save button.
3) Select FX Program Data (.fpd), then click the Open button.
4) Run File/Save to save Manager File (.mgf).

22. Playing Sound Data (MIDI)

1) From Sound Project Manager, open Manager File(.mgf) that has been created.
2) To hear with effects:

   1. Double-click (or triple-click) FX Program Bank block.
   2. Select FX Program Data to use.
   3. Click the FX Program Change button.
   4. Double-click (or triple-click) FX Output Bank block.
   5. From the pulldown menu, select Output Data to use.



   6. Click the Mixer Change button.
3) Double-click (or triple-click) MIDI Sequence Bank block.

   To load another MIDI Sequence Bank:
   While holding down the option key, double click (or triple-click) the block.
4) Select MIDI Sequence Data you want to play, then click the Play button.

23. Delivering Data (MIDI: Merged)

Multi Unit		Map data in one map, with all banks merged
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) By selecting File/Save Multi-Units, output Multi Unit (.mlt).
3) By selecting File/Save As Text, output Map List.
4) Deliver the following files to the programmer:

Files to Deliver	
	• Sound Driver
	• Map List
	• Multi Unit(.mlt)
Information to notify programmer	
Data List	Specifies which number of MIDI Program Data is which music track (tone).

24. Delivering Data (MIDI: Individual, Do Not Use FX)

Multi Unit		Only the map data in one map
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File(.mgf) that has been created.
2) Take note of the address of each block.
3) Run File/New.
4) Run Edit/New Block and select the bank of required attributes. When the dialog window appears, click the Cancel button.
5) Double-click (or triple-click) the block. At where the cursor is blinking, while looking at the note with the address, enter the memory size.

   File is not assigned.
6) Repeat steps 3 to 5 and gather the required blocks.
7) By selecting File/Multi-Units..., output Multi Unit(.mlt).
8) By selecting File/Save As Text..., output, output Map List.

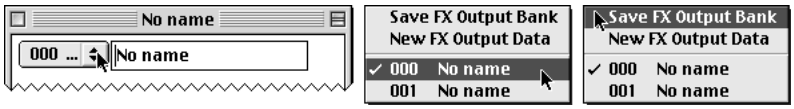
9) Deliver the following files to the programmer.

Files to Deliver	
• Sound Driver	
• Map List	
• Multi Unit(.mlt)	
• MIDI Sequence Bank(.msb)	
• MIDI Program Bank(.mpb)	
• [One Shot Bank(.osb) etc...]	
Information to notify programmer	
File List	Specifies location and content of each file.
Data List	Specifies which number of MIDI Program Data is which music track (tone).

25. Delivering Data (MIDI: Individual), Use FX

Multi Unit		Only the map data in one map
Map List		List of map data of all maps (which file is assigned to which address)

1) From Sound Project Manager, open Manager File (.mgf) that has been created.
2) Double-click (or triple-click) FX Program Bank block.
3) Click the Save FX Program Bank button, then output FX Program Bank (.fpb).
4) Double-click (or triple-click) FX Output Bank block.
5) Use the Save Fx Output Bank pull-down menu to output FX Output Bank (.fob).



6) Take note of the address of each block.
7) Run File/New.
8) Run Edit/New Block and select the bank of required attributes. When the dialog window appears, click the Cancel button.
9) Double-click (or triple-click) the block. At where the cursor is blinking, while looking at the note with the address, enter the memory size.

   File is not assigned.
10) Repeat steps 7 to 9 and gather the required blocks.
11) By selecting File/Save Multi-Units, output Multi Unit (.mlt).
12) By selecting File/Save As Text, output Map List.
13) Use a text editor to open Map List, and write down the information about which file is assigned to which address. Then save the file.

14) Deliver the following files to the programmer.

Files to Deliver
• Sound Driver
• Map List
• Multi Unit(.mlt)
• MIDI Sequence Bank(.msb)
• MIDI Program Bank(.mpb)
• FX Program Bank(.fpb)
• FX Output Bank(.fob)
• [One Shot Bank(.osb) etc...]

Information to notify programmer	
File List	Specifies location and content of each file.
Data List	Specifies which number of MIDI Program Data is which music track (tone).