MIDI System Exclusive Implementation Specification - version 3.11 for: SD–1 and SD–1/32 Voice

1 Introduction and Overview

This section describes the MIDI System Exclusive (SysEx) communication protocol used when the SD–1 is communicating with an external computer (EXT). The protocol is designed to aid the implementation of editing programs running on EXT, and so this information is especially relevant to designers and programmers of editing programs. The commands described here allow editor/librarian programs to collect and alter information about presets, programs, and the tracks within the SD–1. *Note that the SysEx implementation of the SD–1 is based on that of the VFX family of products (VFX, VFX^{SD}, and VFX^{SD} Version II) and they are upwardly compatible with the SD–1. The SD-1/32 Voice is identical to the SD-1 with respect to the SysEx implementation.*

1.1 Universal System Exclusive Device Inquiry Message

The SD–1 supports the MIDI Device Inquiry message which allows instruments and computers to ascertain the identity of the unit(s) to which they are connected via MIDI. The SD–1 responds to the following Identity Request message by sending an Identity Reply message. The SD–1 will respond to the inquiry if the channel information in the message contains *either* the base MIDI channel of the SD–1 *or* the all channel broadcast code ($7F) but not both.

11110000	F0	System Exclusive status byte
01111110	7E	Non Real Time message code
0000nnnn	0x	Base MIDI channel number
or		
01111111	7F	All Channel Broadcast code
00000110	06	General Information message code
00000001	01	Identity Request message code
11110111	F7	End of System Exclusive

1.2 System Exclusive Device Identity Reply Message

The following Identity Reply message contains information about the SD–1, and is transmitted in response to an Identity Request.

11110000	F0	System Exclusive status byte
01111110	7E	Non Real Time message code
0000nnnn	0x	Base MIDI channel number
00000110	06	General Information message code
00000010	02	Identity Reply message code
00001111	0F	ENSONIQ manufacturer's Code
00000101	05	VFX Product Family ID code - LSByte
00000000	00	VFX Product Family ID code - MSByte
00000000	**03**	SD–1 Family Member (Model ID) code LSByte
00000000	00	SD–1 Family Member (Model ID) code MSByte
00000000	00	Software revision information
00000000	00	(not used)
0nnnnnnn	NN	Major Version Number (integer portion)
0nnnnnnn	NN	Minor Version Number (decimal fraction portion)
11110111	F7	End of System Exclusive

Note: The SD–1 Family Member (Model ID) code LSByte is set to **03** to identify the new model. This difference appears only in this Identity Reply message; all other messages have the standard VFX Product Family header information. Here are all of the Family Member codes:

VFX	Family Member 00
VFX^{SD}	Family Member 01
VFX^{SD} Version II	Family Member 02
SD–1	Family Member 03

2 MIDI System Exclusive Packet Pieces

A packet is a bunch of information, i.e. a message, in the form of a MIDI data stream. Each packet can be divided into three sections or pieces. The first and last packet pieces form the *frame* for a message. The message contains the commands described in section 3. Every message must be preceded with a SysEx head and followed with a SysEx tail. A complete packet looks like this:

SysEx Head . . . . . Message . . . . . SysEx Tail

2.1 MIDI System Exclusive Packet Head

This is the common MIDI system exclusive header which must be used on all system exclusive messages to and from the SD–1. These six bytes are always sent preceding the message portion of the packet. The VFX Model ID Code in this header is different from the SD–1 Family Member (Model ID) code in the Device ID message in order to allow transfer of common messages between other VFX Product Family members and the SD–1. All messages which are not common to both machines will be ignored.

11110000	F0	System Exclusive status byte
00001111	0F	ENSONIQ Code
00000101	05	VFX Family ID Code
00000000	00	VFX Model ID Code
0000nnnn	0x	Base MIDI channel number
00000nnn	0x	Message Type (see section 3)

2.2 MIDI System Exclusive Packet Tail

For every head there is a tail. The tail follows the message portion, and is the last byte of every complete SysEx packet.

11110111	F7	End of System Exclusive

2.3 Message Format

The SD–1 message format within the packet frame allows 8 bit data bytes to be transmitted and received using the 7 bit data of MIDI. The MSB of the data bytes must always be a zero, so the bytes are converted to two 4 bit nybbles. These nybbles are converted to bytes whose upper four bits are all zero for transmission. Note that bytes whose value is zero must still be nybblized and sent as two bytes to preserve the expected MIDI byte counts. This is a description of the format of all data bytes within the packet frame as they are transmitted or received via MIDI. The details of each message are given in section 3.

0000HHHH	H = Hi 4 bits of data byte - transmitted first
0000LLLL	L = Lo 4 bits of data byte

This represents how the 8 bit byte HHHHLLLL would be transmitted.

2.4 Receiver Errors

If the message received by the SD–1 is not understood, then an informative error message will be displayed and an error message will be sent as described in section 3.2. Errors typically occur when the MIDI cable is accidentally unplugged during a long dump message such as an All Programs Dump message. If EXT cannot handle the error message, then the displayed message will prompt the user to retransmit the original message after re-connecting the MIDI cable or otherwise correcting the cause of the error.

3 Message Type List

The next few sections describe the messages to be used between EXT and SD–1. The message type corresponds to the last byte of the system exclusive packet head described in section 2.1.

Note: The SysEx messages outlined below appear as an ordered description of bytes which do not necessarily represent the MIDI format described in section 2.3. Remember, full 8–bit data bytes are always sent as two "nybble-ized" bytes. Message types are part of the head and are sent as bytes, but Command types are considered data and are sent as two nybbles.

3.1 Command Messages (Message Type = 00)

All messages which need some interpretation by the receiver are called *command messages.* Every command message is transmitted using the message format described in section 2.3. The first byte of each command message is the command type byte, which follows the message type byte in the packet head. The command type is shown in the section headings.

3.1.1 Virtual Buttons (Command Type = 00)

EXT can simulate button presses from the front panel of the SD–1 by sending this command. Sending the listed button numbers in a command will simulate a single button down being held *down.* Button *up* commands add an offset of 96 to the the button down numbers. The button number follows the command type byte in the message. Remember to send a button up command for every button down command that is sent. Button up commands were implemented in version 2.01 and above. *Note: a delay of 2-300 msecs between button commands, or at least pairs of button commands, is recommended.*

3.1.1.1 Button Numbers

Standard VFX button numbers:

Logical Number	Front Panel Button Name	Logical Number	Front Panel Button Name
0	unnamed bank 0	29	Wave
1	unnamed bank 1	33	Pitch
2	unnamed bank 2	34	Pitch Mod
3	unnamed bank 3	35	Filters
4	unnamed bank 4	37	Output
5	unnamed bank 5	40	LFO
6	unnamed bank 6	42	Env1
7	unnamed bank 7	45	Env2
8	unnamed bank 8	48	Env3
9	unnamed bank 9	51	Effects (Programming)
10	BankSet (formerly Cart)	60	Select Voice
11	Sounds	61	Copy
12	Presets	62	Write
13	Storage	63	Compare
14	up arrow, INC	64	Volume
15	down arrow, DEC	65	Pan
16	soft key 0, top left	66	Timbre
17	soft key 1, top middle	67	Key Zone
18	soft key 2, top right	68	Transpose
19	soft key 3, bottom left	69	Release
20	soft key 4, bottom middle	70	Patch Select
21	soft key 5, bottom right	73	MIDI (Performance)
22	Master	76	Effects (Performance)
25	MIDI Control	80	Multi A
27	Program Control	81	Multi B
28	Mod Mixer	83	Replace Program

SD–1 – sequencer specific button numbers:

Logical Number	Front Panel Button Name	Logical Number	Front Panel Button Name
54	Seq Control	85	Edit Seq
57	Click	86	Edit Track
58	Locate	89	Record
82	Sequence Bank Select	90	Play
84	Edit Song	92	Stop

Example:
(in hexadecimal notation, assuming Base MIDI Chan = 01, transmitted as 00)

Header	*Msg*	*Cmd*	*Button*	*EOX*	
F0 0F 05 00 00	00	00 00	00 0E	F7	Up Arrow button down
F0 0F 05 00 00	00	00 00	06 0E	F7	Up Arrow button up

3.1.2 Parameter Change (Command Type = 01)

Single parameters can be edited by EXT using this command. Since this is a short message relative to the much longer bulk dump length of a complete program, program editors running on EXT can change single parameters by using this command faster than by sending a complete program dump when only one or a few parameters change.

Absolute parameter values depend on the parameter page and slot numbers which uniquely define each parameter. Slot numbers are equivalent to soft button numbers. See section 5 of this appendix for the page and slot definitions. Most parameter values are in the low byte of the absolute value word; key range parameter types use the whole word.

00000001	01	Command Type
00000nnn	0x	Voice Number, [0..5]
000nnnnn	0x	Parameter Page Number, [0..31]
00000nnn	0x	Parameter Slot Number, [0..5]
HHHHLLLL	HL	Absolute Value Hi Byte, [0..255]
hhhhllll	hl	Absolute Value Lo Byte, [0..255]

3.1.3 Edit Change Status (Command Type = 02)

This command is only *transmitted* by the SD–1; it is not received. It allows the external editor to retain synchronization with the compare buffer in the SD–1. The edit change status command is sent whenever an edit operation initiated from the front panel of the SD–1 causes more than one parameter to change. The edit change status command will always be preceded by at least one parameter change message. Although the SD–1 will send parameter change messages, it may not be able to send the new value of every parameter that changed, due to the complexities of internal editing. When EXT receives this message, it should request a complete program dump to re-establish editing sync. The command type is the only byte in this command.

3.1.4 ESP Microcode Program Load (Command Type = 03)

The ESP is the audio effects processor of the SD–1. ESP microcode can be downloaded using this command which can facilitate creating new effect programs. This command is currently not implemented, and is reserved for future use.

3.1.5 Poke Byte to RAM or Cartridge (Command Type = 04)

This command is not implemented on the SD–1. It is used by the VFX only for making demo cartridges.

Note: The SD–1 does not transmit the following Dump Request commands (command types 05 to 0A). The command type is the only byte in these commands.

3.1.6 Single Program Dump Request (Command Type = 05)
The SD–1 will dump the current program using the bulk dump message described in section 3.3.1 when it receives this command. If the current program is being edited, the edited version of the program will be transmitted.

3.1.7 Single Preset Dump Request (Command Type = 06)
The SD–1 will dump the current preset using the bulk dump message described in section 3.3.3 when it receives this command. If the current preset is being edited, the edited version of the preset will be transmitted.

3.1.8 Track Parameter Dump Request (Command Type = 07)
The SD–1 will dump the track parameters using the bulk dump message described in section 3.3.7 when it receives this command.

3.1.9 Dump Everything Request (Command Type = 08)
The SD–1 will dump the internal RAM program banks, the internal RAM preset banks, and the track parameters using the bulk dump messages described in section 3.3 when it receives this command. Each dump is a separate message, i.e. the messages are not combined into one.

3.1.10 Internal Program Bank Dump Request (Command Type = 09)
The SD–1 will dump the internal RAM program banks using the bulk dump message described in section 3.3.2 when it receives this command.

3.1.11 Internal Preset Bank Dump Request (Command Type = 0A)
The SD–1 will dump the internal RAM preset banks using the bulk dump message described in section 3.3.4 when it receives this command.

***Sequence Dump Protocol**: Since the receiver of a sequence dump message must be prepared to store the sequence data, sequence dumps are performed using two messages from the transmitter and a handshaking message from the receiver. The transmitter sends the dump command which informs the receiver of the next message. The receiver should respond with an error message containing an ACK or NAK error code (see section 3.2.1). If the receiver does not respond within one second, the transmitter will send the dump message anyway. This timeout feature allows "dumb" System Exclusive recorders to store SD–1 sequence data. If the receiver responds with a NAK error code, the transmitter should not send the dump message.*

Note: If the SD–1 sequencer software is not loaded, the receiving SD–1 will respond with a NAK error message to any sequence dump command.

3.1.12 Single Sequence Dump (Command Type = 0B)

This message is the first message of a sequence dump. The message contains the size of the sequence data which will follow in the single sequence dump message.

00001011	0B	Command Type
HHHHHHHH	HH	Sequence Data Size in bytes Hi Byte Hi Word
hhhhhhhh	hh	Sequence Data Size in bytes Lo Byte Hi Word
LLLLLLLL	LL	Sequence Data Size in bytes Hi Byte Lo Word
llllllll	ll	Sequence Data Size in bytes Lo Byte Lo Word

Note: A Track Parameter bulk dump message will be transmitted after the completion of the single sequence dump. This will allow a receiving VFX to be configured for sound expansion, i.e. any sequence track in the SD–1 can have a MIDI status which will allow the receiving VFX to respond properly.

3.1.13 All Sequence Memory Dump (Command Type = 0C)

This message is the first message of a complete sequence memory dump. The message contains the size of the sequence data which will follow in the all sequence dump message.

00001100	0C	Command Type
HHHHHHHH	HH	Sequence Data Size in bytes Hi Byte Hi Word
hhhhhhhh	hh	Sequence Data Size in bytes Lo Byte Hi Word
LLLLLLLL	LL	Sequence Data Size in bytes Hi Byte Lo Word
llllllll	ll	Sequence Data Size in bytes Lo Byte Lo Word

3.1.14 Single Sequence Dump Request (Command Type = 0D)

The SD–1 will dump the currently selected sequence using the bulk dump message described in section 3.1.12 when it receives this command. The command type is the only byte in this command.

3.1.15 All Sequence Dump Request (Command Type = 0E)

The SD–1 will dump all sequence memory using the bulk dump message described in section 3.1.13 when it receives this command. The command type is the only byte in this command.

3.2 Error Messages (Message Type = 01)

Error messages are transmitted by the SD–1 when an error occurs while processing any of the command messages described in section 3.1. The SD–1 ignores error messages unless a sequence dump is being processed.

3.2.1 Command Message Error Codes

These codes are the data byte of error messages.

Code	Name	Meaning
00	NAK	The preceding command message could not be processed. The receiver is busy or the message is unintelligible. The preceding dump command is not acceptable.
01	INVALID PARAMETER NUMBER	The parameter voice, page, or slot in the preceding parameter value message doesn't make sense.
02	INVALID PARAMETER VALUE	The parameter value in the preceding parameter value message is out of range.
03	INVALID BUTTON NUMBER	The button number in the preceding virtual button message doesn't correspond to any real button number.
04	ACK	The preceding dump command is acceptable.

3.3 Bulk Dumps of Programs, Presets, Track Parameters, and Sequences

Bulk dump data messages are transmitted using the message format described in section 2.3. The message type byte, which is part of the system exclusive header, is given in hexadecimal with the name of the dump message. The actual data bytes for programs, presets, and sequences are described in section 4. The MIDI data byte lengths are listed in decimal for each message type.

3.3.1 One Program (Message Type = 02)

MIDI Data byte length = 1060 + head and tail = 1067

The current selected program is transmitted. If the compare buffer is active (the Compare LED is on), then the program in the compare buffer will be transmitted. If this message is received, the new program will be put in the compare buffer so it can be written to internal or cartridge memory. Remember that the compare buffer is over-written by the incoming data and its previous contents are lost.

3.3.2 All Programs (Message Type = 03)

MIDI Data byte length = 1060*60 = 63600 + head and tail = 63607

All 60 programs in the 10 internal RAM program banks are contained in this message.

3.3.3 One Preset (Message Type = 04)

MIDI Data byte length = 96 + head and tail = 103
The current selected preset is transmitted. If this message is received, the new preset will be put in the preset buffer so it can be written to any preset location. If presets are being edited (the preset LED on, but no preset number LEDs are on), then the received preset will become the current preset.

3.3.4 All Presets (Message Type = 05)

MIDI Data byte length = 96*20 = 1920 + head and tail = 1927
All 20 presets in the 2 internal RAM preset banks are contained in this message.

3.3.5 Single Sequence Dump (Message Type = 09)

MIDI Data byte length = variable depending on amount of sequence data
This message is transmitted according to the sequence dump protocol described before section 3.1.12. It contains sequence data and track parameters.

3.3.6 All Sequence Dump (Message Type = 0A)

MIDI Data byte length = variable depending on amount of sequence data
This message is transmitted according to the sequence dump protocol described before section 3.1.12. It contains global sequence parameters, sequence data, and sequence track parameters.

3.3.7 Track Parameters (Message Type = 0B)

MIDI Data byte length = 22*12 = 264 + 12 + 11 + head and tail = 294
All track parameter data for the 12 tracks, the track status array, and the tracks effect parameters are transmitted.

4 Parameter Block Data Descriptions

This is a description of the parameter blocks transmitted using the bulk dump messages described in section 3.3. The names and byte offsets of each block parameter are given. The parameter value ranges are included in section 5. The following byte layout is the internal representation and not the MIDI byte format which is described in section 2.3.

4.1 Program Parameters

The first group of parameters through byte offset 82 describe one of the six possible voices in a program. All of the global program parameters are at the bottom of this list. When the program has a custom pitch table installed, voices 5 and 6 are replaced with the pitch table data. In this case, starting at the beginning of voice 5, there is a packed list of fourteen bit records consisting of a 7 bit MIDI key number and 7 bits of pitch fine tune. There are 88 records for the complete keyrange A0 - C8.

Byte Offset	Parameter Name
0	Env1 Initial Level
1	Env1 Attack Time
2	Env1 Peak Level
3	Env1 Decay Time 1
4	Env1 Breakpoint 1
5	Env1 Decay Time 2
6	Env1 Breakpoint 2
7	Env1 Decay Time 3
8	Env1 Sustain Level
9	Env1 Release Time
10	Env1 Level Velocity Sensitivity
11	Env1 Attack Time Velocity Sensitivity
12	Env1 Keyboard Tracking
13	Env1 Mode (hi nybble) and Velocity Curve (lo nybble)
14	Env2 Initial Level
15	Env2 Attack Time
16	Env2 Peak Level
17	Env2 Decay Time 1
18	Env2 Breakpoint 1
19	Env2 Decay Time 2
20	Env2 Breakpoint 2
21	Env2 Decay Time 3
22	Env2 Sustain Level
23	Env2 Release Time
24	Env2 Level Velocity Sensitivity
25	Env2 Attack Time Velocity Sensitivity
26	Env2 Keyboard Tracking
27	Env2 Mode (hi nybble) and Velocity Curve (lo nybble)
28	Env3 Initial Level
29	Env3 Attack Time
30	Env3 Peak Level
31	Env3 Decay Time 1
32	Env3 Breakpoint 1
33	Env3 Decay Time 2
34	Env3 Breakpoint 2
35	Env3 Decay Time 3
36	Env3 Sustain Level
37	Env3 Release Time

Byte Offset	Parameter Name
38	Env3 Level Velocity Sensitivity
39	Env3 Attack Time Velocity Sensitivity
40	Env3 Keyboard Tracking
41	Env3 Mode (hi nybble) and Velocity Curve (lo nybble)
42	Pitch Root Key
43	Pitch Fine Tune
44	Pitch Table
45	Pitch Env1 Modulation Amount
46	Pitch LFO Modulation Amount
47	Pitch Glide (hi nybble) and Pitch Modulation Source (lo nybble)
48	Pitch Modulation Amount
49	Filter #1 Cutoff
50	Filter #1 Keyboard Modulation Amount
51	Filter #1 Env2 Modulation Amount
52	Filter Mode (hi nybble) and Filter #1 Modulation Source
53	Filter #1 Modulation Amount
54	Filter #2 Cutoff
55	Filter #2 Keyboard Modulation Amount
56	Filter #2 Env2 Modulation Amount
57	Filter #2 Modulation Source
58	Filter #2 Modulation Amount
59	Volume Fade Shape
60	Volume Fade Key Zone Low
61	Volume Fade Key Zone High
62	Volume and Pre-Gain Switch (MSB)
63	Pan Mod Source (hi nybble) and Volume Mod Source (lo nybble)
64	Volume Modulation Amount
65	Pan
66	Pan Modulation Amount
67	Voice Priority (hi nybble) and Output Routing (lo nybble)
68	LFO Waveshape (hi nybble) and LFO Mod Source (lo nybble)
69	LFO Depth
70	LFO Restart Mode (hi nybble) and LFO Speed Mod Source (lo nybble)
71	LFO Speed Modulation Amount
72	LFO Speed
73	LFO Delay Time
74	Waveform
75	Wave Class (hi nybble) and Wave Mod Source (lo nybble)
76	Wave Mod Amount
77	Wave Start Index
78	Noise Source Rate
79	Wave Delay Time
80	Mixer Curve (hi nybble) and Mixer Mod Source #1 (lo nybble)
81	Mixer Scaler (hi nybble) and Mixer Mod Source #2 (lo nybble)
82	Velocity Threshold

(end of Voice #1 structure)

Byte Offset	Parameter Name
83	Voice #2 (same structure as Voice #1)
166	Voice #3 (same structure as Voice #1)
249	Voice #4 (same structure as Voice #1)
332	Voice #5 (same as Voice #1 or program pitch table data, if enabled)
415	Voice #6 (same as Voice #1 or program pitch table data, if enabled)
498	Program Name - (11 bytes or characters)
509	Program Patch #1 (lo 6 bits)
	Program Pressure (Performance parameter) - (hi 2 bits)
510	Program Patch #2 (lo 6 bits)
511	Program Patch #3 (lo 6 bits)
512	Program Patch #4 (lo 6 bits)
513	*reserved* (hi nybble) and Pitch Table Switch (lo nybble)
514	Program Glide Time
515	Program Delay Factor (hi nybble) and Global Bend Range (lo nybble)
516	Program Restrike
517	Program Timbre (Performance parameter)
518	Program Release (Performance parameter)
519	Program Effect Parameters 1 to 8
527	Program Effect FX1 Mix
528	Program Effect FX2 Mix
529	Program Effect Select

4.2 Preset Parameters

4.2.1 Track Parameter Structure

The parameters from each of the three individual tracks of a Preset are stored as an array of variable size bit fields packed into 11 consecutive bytes.
Note: the internal packing scheme actually ***inverts*** *each of the individual bytes. When they are received, they will appear to be inverted (mirror images) of the bit masks as described below. They must be transmitted in the inverted state. Note that the internal program number is* ***not*** *inverted!*

Byte Offset	Bit Mask	Parameter Name
0	VVVVVVVC	Volume (7 bits) and first bit of MIDI Channel
1	CCCSSTTT	MIDI Channel (lo 3 bits), Status (2 bits), and Timbre controller value (hi 3 bits)
2	TTTTXXXX	Timbre controller value (lo 4 bits) and X(transpose) (hi 4 bits)
3	XXXXLLLL	X(transpose) (lo 4 bits) and Low key (hi 4 bits)
4	LLLHHHHH	Low key (lo 3 bits) and High key (hi 5 bits)
5	HHSSSPPP	High key (lo 2 bits), patch Select (3 bits), and MIDI Program number (hi 3 bits)
6	PPPPRRLL	MIDI Program number (lo 4 bits), pRessure type (2 bits), and reLease time (hi 2 bits)
7	LLLLLLPP	reLease time (lo 6 bits) and Pan (hi 2 bits)
8	PPPPPPEE	Pan (lo 6 bits) and Effect routing (hi 2 bits)
9	ESxxxxxx	Effect routing (lo bit) and Sustain pedal on/off (1 bit) x = spare bits reserved for future use
10	iiiiiiii	internal program number (non-inverted!)

4.2.2 Preset Effect Parameter Structure

The parameters from the preset effect are stored as an array of variable size bit fields packed into 11 consecutive bytes. The effect select and mix values are packed into 7 bits each, and the parameters are packed as 8 bit numbers.
Note: the internal packing scheme actually ***inverts*** *each of the individual bytes. When they are received, they will appear to be inverted (mirror images) of the bit masks as described below. They must be transmitted in the inverted state.*

Byte Offset	Bit Mask	Parameter Name
0	EEEEEEEM	Effect select (7 bits) and hi bit of FX1 Mix
1	MMMMMMmm	FX1 Mix (lo 6 bits) and hi 2 bits of FX2 mix
2	mmmmm111	FX2 mix (lo 5 bits) and param 1 (hi 3 bits)
3	11111222	param 1 (lo 5 bits) and param 2 (hi 3 bits)
4	22222333	param 2 (lo 5 bits) and param 3 (hi 3 bits)
5	33333444	param 3 (lo 5 bits) and param 4 (hi 3 bits)
6	44444555	param 4 (lo 5 bits) and param 5 (hi 3 bits)
7	55555666	param 5 (lo 5 bits) and param 6 (hi 3 bits)
8	66666777	param 6 (lo 5 bits) and param 7 (hi 3 bits)
9	77777888	param 7 (lo 5 bits) and param 8 (hi 3 bits)
10	88888xxx	param 8 (lo 5 bits) and 3 spare bits (x)

4.2.3 Preset Dump Structure

A complete preset dump is composed of three sets of packed track parameters (33 bytes), followed by a 3 bytes track status array containing information about layering, an effect definition (11 bytes), and a spare byte for a total of 48 bytes.

Byte Offset	Parameter Name
0	Preset Track 0 parameters
11	Preset Track 1 parameters
22	Preset Track 2 parameters
33	Preset Track status array
36	Preset Effect parameters
47	spare (reserved for future use)

4.3 Track Parameters

This message consists of specific track parameters from the 12 tracks, the track status array, and an effect definition.

Byte Offset	Parameter Name
0	Track 1 Program number and pointer (4 bytes = **NPPP**) **N**= First byte = Program number 0..179 **P** = Next 3 bytes = 24 bit pointer to program data. This pointer will be recalculated based on the program number when the dump is received by the SD–1.
4	Track 1 Timbre
6	Track 1 Release
8	Track 1 Mix 7F
10	Track 1 Effect Routing Override 03
12	Track 1 Patch Select override 0
13	Track 1 Sustain Enable switch 60
14	Track 1 MIDI Channel Sequence
15	Track 1 MIDI Program number Seq
16	Track 1 MIDI Pressure type (off,mono,poly) 01
17	Track 1 MIDI Status (local,midi,both) 01
18	Track 1 Key Zone low key 15
19	Track 1 Transpose 00
20	Track 1 Key Zone high key 6C
21	Track 1 Pan FF

(end of Track 1 structure)

22	Track 2 parameters (same structure as Track 1)
44	Track 3 parameters (same structure as Track 1)
66	Track 4 parameters (same structure as Track 1)
88	Track 5 parameters (same structure as Track 1)
110	Track 6 parameters (same structure as Track 1)
132	Track 7 parameters (same structure as Track 1)
154	Track 8 parameters (same structure as Track 1)
176	Track 9 parameters (same structure as Track 1)
198	Track 10 parameters (same structure as Track 1)
220	Track 11 parameters (same structure as Track 1)
242	Track 12 parameters (same structure as Track 1)
264	Multi Track status array
276	Tracks Effect Parameters 1 to 8
284	Tracks Effect FX1 Mix
285	Tracks Effect FX2 Mix
286	Tracks Effect Select

Note: The sequencer data format is not currently documented, so these blocks are only described in general terms.

4.4 Single Sequence Dump Parameters

This message consists of the data from one sequence and the sequence header.

Byte Offset	Parameter Name
0	Sequence Data
n	Sequence Header

4.5 All Sequence Dump Parameters

This message consists of the data for all of the defined sequences and songs, 60 sequence and song headers, and the global sequencer parameters.

Byte Offset	Parameter Name
0	Sequence Data Pointer Offsets - each offset is a long word from the beginning of the parameter block. There are 60 offsets, one for each sequence/song.
239	Sequence Data
n	Sequence Header Segment
n+header_size	Global Parameters

In an unexpanded system, the Sequence Data segment can contain a maximum of 102,400 bytes. In an expanded system (with SQX-70), the maximum is 299,008 bytes. The individual Sequence Header size is 188 bytes. The complete Sequence Header Segment is 11,408 bytes, which includes 60 headers, a table of pointers and some additional overhead. The Global Parameters segment is variable in size up to 48 bytes. Remember that all of this data is transmitted via MIDI as nybblized bytes, so the actual number of bytes transmitted is twice as large for each component of the dump. The size in actual MIDI bytes of the largest dump for an unexpanded SD–1 may be calculated as follows:

component	*actual size in bytes*	
SysEx Header	6	
Data Pointer Table	480	(240 * 2 nybblized)
Sequence Data	204,800	(102,400 * 2 nybblized)
Sequence Headers	22,816	(11,408 * 2 nybblized)
Global Parameters	96	(48 * 2 nybblized)
End of Exclusive	1	
Total Number of bytes sent:	*228,199*	

This implies that an expanded system would have a maximum dump size that was larger by twice the difference in the Sequence Data segment size (i.e. two times 299,008 - 102,400 or 393,216 bytes). Therefore, the largest dump size for a fully expanded system would be a total of 621,415 MIDI bytes (or 1214 blocks).

5 Parameter Page and Slot Definitions

This is a table of all parameter page and slot (or soft button) numbers for voice and system parameters including the parameter value ranges. Note that in cases where more than one slot number is assigned to a parameter that the *highest* number should be used in all Parameter Change messages (section 3.1.2). Messages containing the alternate slot numbers will be ignored.

Page	Slot	Range	Parameter Name and Description
Master pages			
0	0	-128..+127	Master Tune
0	1	0..15	Touch: - SOFT,MED,FIRM,HARD 1-4
0	2	0..12	System Bend Range
0	3		undefined
0	4	0..4	FS1 Auxiliary Footswitch Configuration: - UNUSED,SOSTENU,PATCH L,ADVANCE
0	5	0,1	FS2 Footswitch Configuration: - SUSTAIN,PATCH R
1	0		undefined
1	1	0,1	Slider mode: - NORMAL,TIMBRE
1	2	0,1	CV Pedal Configuration: - VOL,MOD
1	3,4		undefined
1	5	0,1	System Pitch Table: - CUSTOM,NORMAL
2	0	0..127	Maximum Keyboard Velocity
2	1,2	0,1	MIDI track naming: - OFF,ON
2	3,4		Voice Muting: - OFF,ON
2	5	0,1	Keyboard naming: - OFF,ON
MIDI Control pages			
3	0	0..15	MIDI Base Channel
3	1	0,1	MIDI All Notes Off Switch: - OFF,ON
3	2	0,1	MIDI Send Channel: - BASE,TRACK
3	3	0..4	MIDI Mode: - OMNI,POLY,MULTI,MONO A,MONO B
3	4	0..2	MIDI Transpose: - SEND,RECV,BOTH
3	5	0..95	MIDI External Controller number
4	0	0,1	MIDI Loop Switch: - OFF,ON
4	1	0,1	MIDI Controllers enable flag: - OFF,ON
4	2	0,1	MIDI Song Select enable flag: - OFF,ON
4	3	0,1	MIDI Send Start/Stop flag: - OFF,ON
4	4	0,1	MIDI System Exclusive enable flag: - OFF,ON
4	5	0..2	MIDI Program Change enable flag: - OFF,ON,NEW
Program Control page			
5	0,1	0,1	Pitch Table enable flag: - OFF,ON,MAP
5	2	0..13	Program Bend Range (13=global)
5	3	0..3	Delay Multiplier: - X1,X2,X4,X8
5	4	0..99	Program Restrike Delay Time
5	5	0..99	Program Glide Time
Mod Mixer page			
6	0		undefined
6	1	0..15	Mod Mixer Mod Source #1
6	2	0..15	Mod Mixer Mod Source #2
6	3,4	0..15	Mod Mixer Scaler
6	5	0..15	Mod Mixer Shape

Page	Slot	Range	Parameter Name and Description
Select Voice (voice status) page			
38	0-5	0..2	Voice Status: - OFF, ON, SOLO

Wave page — pages 7-10 are used for all of the wave types or classes but there are different interpretations of parameters depending on the current wave class. When changing wave page parameters, be sure the wave class is set first, otherwise parameter values may be invalid. When the wave class is changed, the other wave parameters are reset to default values. *Note - these are always output as page 7, but should be input as pages 7..10, depending on wave class.*

7..10	0	0..167	Wave Name (fewer for other Product Family members)
7..10	1	0..15	Wave Class (fewer for other Product Family members)
7..10	2	0..251	Delay Time (251=key up)

The following wave parameter descriptions also contain the *byte offset* number of the actual parameter used for the slot.

Page	Slot	Range	Offset	Parameter Name and Description
For the sampled wave classes (strings, brass, bass, breath, tuned percussion, and percussion) slots 3 to 5 are defined as follows:				
7	3	0..127	77	Wave Start Index
7	4	-127..127	76	Wave Velocity Start Mod
7	5	0,1	75 Lo	Wave Direction: - FORWARD, REVERSE
For TRANSWAVE class (6) the same slots are specifically defined as follows:				
8	3	0..127	77	Wave Start Index
8	4	0..15	75 Lo	Wave Mod Source
8	5	-127..+127	76	Wave Mod Amount
Slots 3 to 5 are not defined for the WAVEFORM and INHARMONIC classes (7 and 8, respectively).				
9	3-5			undefined
The same slots are specifically defined for the looping MULTI-WAVE class (9) as follows:				
10	3	0..249	77	Loop Wave Start number
10	4	1..243	76	Loop Length
10	5	0,1	75 Lo	Loop Direction: - FORWARD, REVERSE

Page	Slot	Range	Parameter Name and Description
Pitch page			
11	0	-4..+4	Pitch Octave
11	1	-12..+12	Pitch Semitone
11	2	-127..127	Pitch Fine Tune
11	3,4	0..2	Pitch Table type: - SYSTEM, ALL–C4, CUSTOM
11	5		undefined
Pitch Mod page			
12	0		undefined
12	1	0..15	Pitch Mod Source
12	2	-99..+99	Pitch Mod Amount
12	3	0..4	Glide Mode: - NONE, PEDAL, MONO, LEGATO, TRIGGER, MINIMOD
12	4	-127..+127	Pitch Env1 Mod Amount
12	5	-127..+127	Pitch LFO Mod Amount

Page	Slot	Range	Parameter Name and Description
Filter pages			
13	0	0,1	Filter #1 Type: - LO–PASS/2,LO–PASS/3
13	1	0..127	Filter #1 Cutoff
13	2	-127..+127	Filter #1 Keyboard Tracking Amount
13	3	0..15	Filter #1 Mod Source
13	4	-127..+127	Filter #1 Mod Amount
13	5	-127..+127	Filter #1 Env2 Mod Amount
14	0	0..3	Filter #2 Type: - HI–PASS/2, HI–PASS/1, LO–PASS/2, LO–PASS/1
14	1	0..127	Filter #2 Cutoff
14	2	-127..+127	Filter #2 Keyboard Tracking Amount
14	3	0..15	Filter #2 Mod Source
14	4	-127..+127	Filter #2 Mod Amount
14	5	-127..+127	Filter #2 Env2 Mod Amount
Output pages			
15	0	0..127	Volume
15	1	0..15	Volume Mod Source
15	2	-127..+127	Volume Mod Amount
15	3	-128..+127	Keyboard Scaling amount (-128=ZONE)
15	4,5	21..108	Scaling Key Range (low and high keys)
16	0		undefined
16	1,2	0..3	Output Destination: - DRY, FX1, FX2, AUX
16	3	0..127	Pan
16	4	0..15	Pan Mod Source
16	5	-127..+127	Pan Mod Amount
17	0	0,1	Voice Pre-Gain Switch: - OFF, ON
17	1,2	0..2	Voice Priority: - LO, MED, HI
17	3		undefined
17	4,5	-127..+127	Voice Velocity Threshold
LFO pages			
18	0	0..99	LFO Rate
18	1	0..15	LFO Rate Mod Source
18	2	-127..+127	LFO Rate Mod Amount
18	3	0..127	LFO Depth
18	4	0..15	LFO Depth Mod Source
18	5	0..99	LFO Delay
19	0,1	0..6	LFO Waveshape: TRIANGLE, SINE, SINE/TRI, POS/SIN, SAWTOOTH, SQUARE
19	2	0,1	LFO Restart Switch: - OFF,ON
19	3,4,5	0..127	Noise Source Rate

	Page	Slot	Range	Parameter Name and Description
Envelope pages				
	20	0		undefined
	20	1	0..127	Env1 Initial Level
	20	2	0..127	Env1 Peak Level
	20	3	0..127	Env1 Breakpoint 1 Level
	20	4	0..127	Env1 Breakpoint 2 Level
	20	5	0..127	Env1 Sustain Level
	21	0		undefined
	21	1	0..99	Env1 Attack Time
	21	2	0..99	Env1 Decay 1 Time
	21	3	0..99	Env1 Decay 2 Time
	21	4	0..99	Env1 Decay 3 Time
	21	5	-100..+99	Env1 Release Time
	22	0	-127..+127	Env1 Keyboard Tracking
	22	1,2	0..9	Env1 Velocity Curve
	22	3	0..2	Env1 Mode: - NORMAL,FINISH,REPEAT
	22	4	0..127	Env1 Level Velocity Sensitivity
	22	5	0..127	Env1 Attack Time Velocity Sensitivity
	23	0		undefined
	23	1	0..127	Env2 Initial Level
	23	2	0..127	Env2 Peak Level
	23	3	0..127	Env2 Breakpoint 1 Level
	23	4	0..127	Env2 Breakpoint 2 Level
	23	5	0..127	Env2 Sustain Level
	24	0		undefined
	24	1	0..99	Env2 Attack Time
	24	2	0..99	Env2 Decay 1 Time
	24	3	0..99	Env2 Decay 2 Time
	24	4	0..99	Env2 Decay 3 Time
	24	5	-100..+99	Env2 Release Time
	25	0	-127..+127	Env2 Keyboard Tracking
	25	1,2	0..9	Env2 Velocity Curve
	25	3	0..2	Env2 Mode: - NORMAL,FINISH,REPEAT
	25	4	0..127	Env2 Level Velocity Sensitivity
	25	5	0..127	Env2 Attack Time Velocity Sensitivity
	26	0		undefined
	26	1	0..127	Env3 Initial Level
	26	2	0..127	Env3 Peak Level
	26	3	0..127	Env3 Breakpoint 1 Level
	26	4	0..127	Env3 Breakpoint 2 Level
	26	5	0..127	Env3 Sustain Level
	27	0		undefined
	27	1	0..99	Env3 Attack Time
	27	2	0..99	Env3 Decay 1 Time
	27	3	0..99	Env3 Decay 2 Time
	27	4	0..99	Env3 Decay 3 Time
	27	5	-100..+99	Env3 Release Time
	28	0	-127..+127	Env3 Keyboard Tracking
	28	1,2	0..9	Env3 Velocity Curve
	28	3	0..2	Env3 Mode: - NORMAL,FINISH,REPEAT
	28	4	0..127	Env3 Level Velocity Sensitivity
	28	5	0..127	Env3 Attack Time Velocity Sensitivity

The appearance and content of the effect parameter pages is dependent on the currently selected effect. When changing effect page parameters, be sure the effect type is selected first, otherwise parameter values may be invalid. When the effect type is changed, the other effect parameters assume preset values.

The following table interprets the values of Effect Type (page 29, slot 0,1), but does *not* reflect the order of the list shown by the system. The system rearranges the effects into more logical categories for display. Note that the Parameter Set Name entry corresponds to the sets of parameter descriptions found on the following pages.

Effect Type	Preset Name	Parameter Set Name
0	LARGE.HALL.REVRB	Hall Reverb
1	ROOM.REVERB.1	Hall Reverb
2	DYNAMIC.REVERB	Dynamic Reverb
3	8-VOICE.CHORUS.1	Multi-Voice Chorus
4	CHORUS+REVERB.1	Chorus and Reverb
5	FLANGER+REVERB.1	Flanger and Reverb
6	SMALL.HALL.REVRB	Hall Reverb
7	ROOM.REVERB.2	Hall Reverb
8	CHORUS+REVERB.2	Chorus and Reverb
9	FLANGER+REVERB.2	Flanger and Reverb
10	DELAY+REVERB.1	Delay and Reverb
11	DELAY+REVERB.2	Delay and Reverb
12	FLANGE+DLY+REV.1	Flanger, Delay, and Reverb
13	FLANGE+DLY+REV.2	Flanger, Delay, and Reverb
14	ROTO-SPKR+DELAY	Rotary Speaker Simulator
15	CONCERT REVERB	Hall and Room Reverb
16	WARM CHAMBER	Hall and Room Reverb
17	GATED+ROOM.VERBS	Gated and Room Reverb
18	DIRTY-ROTO+DELAY	Rotary Speaker Simulator with Distortion
19	DYNAMIC.HALL	Dynamic Reverb
20	8-VOICE.CHORUS.2	Multi-Voice Chorus
21	DLY+FLANGE+HALL	Flanger, Delay, and Reverb
22	DIST+CHORUS+REV	Chorus and Reverb with Distortion
23	PHASER+REVERB	Phaser and Reverb
24	LPF+DIST+CHO+REV	Filter, Distortion, Chorus and Reverb
25	WARM.HALL.REVERB	Detuned Hall Reverb
26	PLATE.REVERB	Plate Reverb

Notes regarding the parameter descriptions on the following pages:

1. Except where noted as *(special case)*, assume that the first four slots [0..3] of the first effect page (page 29) are common to all effects, and reflect the descriptions found in the first parameter set.

2. The parameter ranges described are the actual internal parameter values (as opposed to the externally visible values). Parameter change messages sent to the SD–1 should use these actual values.

Hall Reverb

Page	Slot	Range	Parameter Name and Description
29	0,1	0..15	Effect Type
29	2	0..99	Decay Time
29	3		undefined
29	4	0..127	Reverb (FX1) Mix
29	5	0..127	Reverb (FX2) Mix
30	0,1		undefined
30	2	0..250	Pre-delay Time
30	3		undefined
30	4,5	0..127	Early Reflection
31	0		undefined
31	1,2	0,1	FX2 Mode:- NORMAL.STEREO.SEND, LEFT.WET/RIGHT.DRY
31	3		undefined
31	4,5	0..99	High Frequency Damping

Dynamic Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Reverb (FX1) Mix
29	5	0..127	Reverb (FX2) Mix
30	0,1	-128..127	Decay Modulation Amount
30	2	0..250	Pre-delay Time
30	3	0..11	Decay Modulation Source
30	4,5	0..127	Early Reflection
31	0		undefined
31	1,2	0,1	FX2 Mode:- NORMAL.STEREO.SEND, LEFT.WET/RIGHT.DRY
31	3		undefined
31	4,5	0..99	High Frequency Damping

Multi-Voice Chorus

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Chorus (FX1) Mix
29	5	0..127	Chorus (FX2) Mix
30	0	0..99	Chorus Rate
30	1	0..127	Chorus Depth
30	2	0..100	Chorus Delay Time
30	3	-128..127	Chorus Feedback
30	4,5		undefined
31	0		undefined
31	1,2	0,1	FX2 Mode:- NORMAL.STEREO.SEND, LEFT.WET/RIGHT.DRY
31	3-5		undefined

Chorus and Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Chorus (FX1) to Reverb Mix
29	5	0..127	Reverb (FX2) Mix
30	0	0..99	Chorus Rate
30	1	0..127	Chorus Depth
30	2	0..250	Chorus Delay Time
30	3	-128..127	Chorus Rate Modulation Amount
30	4	-128..127	Chorus Depth Modulation Amount
30	5	0..127	Chorus Mix
31	0,1	0,1	LFO Waveshape
31	2	0..11	Chorus Mod Source
31	3		undefined
31	4,5	0,1	Reverb High Frequency Cut Switch: - OFF,ON

There is a variation of the Chorus and Reverb effect, which includes a distortion parameter and eliminates the LFO Waveshape parameter.

Chorus and Reverb with Distortion

31	0,1		undefined
31	3	0..15	Overdrive Output Level (16 values from 00..99)

Flanger and Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Flanger (FX1) to Reverb Mix
29	5	0..127	Reverb (FX2) Mix
30	0	0..99	Flanger Rate
30	1	0..127	Flanger Minimum
30	2	0..127	Flanger Maximum
30	3	0..11	Flanger Rate Modulation Source
30	4	-128..127	Flanger Minimum Modulation Amount
30	5	-128..127	Flanger Maximum Modulation Amount
31	0	0..15	Flanger Mix Level
31	1		undefined
31	2	-128..127	Flanger Feedback
31	3		undefined
31	4,5	0,1	Reverb High Frequency Cut Switch: - OFF,ON

Delay and Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Delay (FX1) to Reverb Mix
29	5	0..127	Reverb (FX2) Mix
30	0	0..250	Delay Time
30	1	-128..127	Delay Regeneration
30	2		undefined
30	3	-128..127	Delay Time Modulation Amount
30	4	-128..127	Delay Regeneration Modulation Amount
30	5	0..127	Delay Mix
31	0,1		undefined
31	2	0..11	Delay Modulation Source
31	3		undefined
31	4,5	0,1	Reverb High Frequency Cur Switch: - OFF,ON

Flanger, Delay, and Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Flanger and Delay (FX1) to Reverb Mix
29	5	0..127	Reverb (FX2) Mix
30	0	0..99	Flanger Rate
30	1	0..127	Flanger Minimum
30	2	0..127	Flanger Maximum
30	3	-128..127	Flanger Feedback
30	4,5		undefined
31	0	0..200	Delay Time
31	1	-128..127	Delay Regeneration
31	2	0..127	Delay Mix
31	3		undefined
31	4,5	0,1	Reverb High Frequency Cut Switch: - OFF,ON

Rotary Speaker Simulator

Page	Slot	Range	Parameter Name and Description
29	2	0..250	Delay Time *(special case)*
29	4	0..127	Rotating Speaker (FX1) to Delay Mix
29	5	0..127	Delay (FX2) Mix
30	0	0..99	Rotor Speed Low
30	1	0..99	Rotor Speed High
30	2	0,1	Lo-Rotor Switch: - OFF,ON
30	3,4	0..11	Rotor Speed Modulation Source
30	5	0..2	Motor Mode: - CONTIN,SWITCH,TOGGLE
31	0	0..100	Feedback Lag
31	1		undefined
31	2	-128..127	Delay Repeats
31	3	-128..127	Feedback Lag Amount
31	4,5	0..127	Stereo Width

Hall and Room Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Reverb (FX1) Mix
29	5	0..127	Reverb (FX2) Mix
30	0		undefined
30	1	0..127	Diffusion
30	2	0..250	Pre-delay Time
30	3,4	0..127	Early Reflection Level
30	5	0..200	Early Reflection Time
31	0		undefined
31	1,2	0,1	FX2 Mode:- NORMAL.STEREO.SEND,LEFT.WET/RIGHT.DRY
31	3	-128..+127	Low Frequency Decay
31	4,5	0..99	High Frequency Damping

Gated and Room Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Reverb (FX1) Mix
29	5	0..127	Reverb (FX2) Mix
30	0	0..200	Gate Time
30	1	0..100	Slope
30	2	0..127	Threshold
30	3,4	0..200	Pre-delay Time
30	5	0..200	Release Time
31	0		undefined
31	1,2	0..250	Pre-delay Time
31	3		undefined
31	4,5	0..99	High Frequency Damping

Rotary Speaker Simulator with Distortion

Page	Slot	Range	Parameter Name and Description
29	2	0..250	Delay Time *(special case)*
29	4	0..127	Rotating Speaker (FX1) to Delay Mix
29	5	0..127	Delay (FX2) Mix
30	0	0..99	Rotor Speed Low
30	1	0..99	Rotor Speed High
30	2	0..15	Overdrive
30	3,4	0..11	Rotor Speed Modulation Source
30	5	0..2	Motor Mode: - CONTIN,SWITCH,TOGGLE
31	0	0..100	Feedback Lag
31	1		undefined
31	2	-128..127	Delay Repeats
31	3	-128..127	Feedback Lag Amount
31	4,5	0..15	Low Rotor Volume

Phaser and Reverb

Page	Slot	Range	Parameter Name and Description
29	2	0..127	Decay Time *(special case)*
29	4	0..127	Phaser (FX1) to Reverb Mix
29	5	0..127	Reverb (FX2) Mix
30	0	0..99	Phaser Rate
30	1	0..127	Phaser Depth
30	2	0..127	Phaser Center Frequency
30	3,4		undefined
30	5	-128..127	Feedback Amount
31	0,1		undefined
31	2	0..127	Reverb Detune Amount
31	3,4	0..127	High Frequency Bandwidth
31	5	0..99	High Frequency Damping

Filter, Distortion, Chorus and Reverb

Page	Slot	Range	Parameter Name and Description
29	2	0..127	Decay Time *(special case)*
29	4	0..127	Distortion/Chorus (FX1) to Reverb Mix
29	5	0..127	Reverb (FX2) Mix
30	0,1	0..15	Low Pass Filter Resonance
30	2	0..127	Distortion Amount
30	3	0..127	Low Pass Filter Cutoff Frequency
30	4	0..11	Filter Cutoff Mod Source
30	5	-128..127	Filter Cutoff Modulation Amount
31	0	0..15	Chorus Rate
31	1,2	0..127	Distortion to Chorus Mix Ratio
31	3	0..127	Chorus Depth
31	4,5	0..15	Reverb High Frequency Bandwidth

Detuned Hall Reverb

Page	Slot	Range	Parameter Name and Description
29	4	0..127	Reverb (FX1) Mix
29	5	0..127	Reverb (FX2) Mix
30	0,1	0..127	Diffusion
30	2	0..250	Pre-delay Time
30	3,4,5		undefined
31	0,1	-128..+127	Low Frequency Decay
31	2	0..127	Reverb Detune Amount
31	3,4	0..127	High Frequency Bandwidth
31	5	0..99	High Frequency Damping

Plate Reverb

Page	Slot	Range	Parameter Name and Description
29	2	0..127	Decay Time *(special case)*
29	4	0..127	Reverb (FX1) Mix
29	5	0..127	Reverb (FX2) Mix
30	0,1	0..127	Diffusion
30	2	0..250	Pre-delay Time
30	3,4,5		undefined
31	0,1,2		undefined
31	3,4	0..127	High Frequency Bandwidth
31	5	0..99	High Frequency Damping