PCM 80

MIDI Implementation Details

Lexicon

Lexicon, Inc. • 3 Oak Park • Bedford, MA 01730 USA • Tel 781=280-0300 • Fax 781-280-0490

Lexicon Part No. 070-10820 Printed in U.S.A.

Contents

Controller Automation
For applications where it is desirable to "automate" changes made to PCM 80 effects with its own controls (ADJUST knob, Foot Pedal , Footswitch 1 or Footswitch 2), we recommend assigning the controllers to MIDI destinations and recording the changes with a MIDI sequencer (see Control Mode parameter 3.5, MIDI Destinations).

Reset All Controllers
The PCM 80 recognizes the "Reset All Controllers" message. When received, all patched parameters are reset to their stored values. Patched parameters may also be reset from the PCM 80 front panel —Control Mode parameter 3.0. The message will also be transmitted from the PCM 80 on its transmit channel.

MIDI Clock and Clock Commands
The PCM 80 recognizes MIDI clock messages when Tempo Mode parameter 0.2, Tempo Source is set to MIDI. Any Delay or LFO parameter set to display tempo values will be synchronized to the tempo of the incoming MIDI clock.

MIDI Clock and Clock Commands are also available as Dynamic MIDI patch sources. The value of MIDI Clock when used as a patch source is a linear scaling of 0 to 127 (0 = 40 BPM and 127 = 400 BPM). The value of Clock Commands when used as a Dynamic MIDI patch source is 1 for START and CONTINUE and 0 for STOP.

Dynamic MIDI
The following MIDI messages are available as Dynamic MIDI patch sources:

MIDI Controllers 1-119
Pitch Bend (most significant 7 bits)
After Touch (Polyphonic and Channel combined)
Velocity (Note On)
Last Note
Low Note
High Note
Tempo (Linear scaled value is always available, and will reflect the selected source: Internal or MIDI.)
Clock Commands

These MIDI messages are also available as threshold sources for several Modulation parameters: AR Env, Latch, Sw 1 and Sw 2. They may also be used as a tap source for controlling Tempo.

Bulk Data Dumps

Control mode 3.8 (**MIDI Dump**) allows selection of the following types of bulk data to be dumped directly from the PCM 80 to another PCM 80, or to editor/librarian software.

Displayed Name	Description
CurrentPgm	Currently running effect
Bank R	Internal Register Bank
Bank C0-CK	Card Banks (card must be inserted)
Map 0, 1	Internal Program Change Maps
Map 2-33	Card Program Change Maps (card must be inserted)
Chain 0-9	Internal Program Chains
Chain 10-19	Card Program Chains (card must be inserted)
Int Chains	All Internal Program Chains
Ext Chains	All Card Program Chains (card must be inserted)
Setup C	Current Setup
Setup 0-4	Internal Setups
Setup 5-9	Card Setups

Use ADJUST to select the bulk data type. Press **Store** to transmit the data .

SysEx Implementation

There are two primary classes of SysEx messages: Requests and Dumps. The PCM-80 must be enabled for receipt of SysEx messages (Control mode 3.7) or incoming SysEx messages will be ignored.

SysEx Header

All SysEx messages are preceded by the standard header:

1	F0	Sysex ID
2	06	Lex ID
3	07	PCM80 ID
4	0iii iiii	Device ID (Values 0-126 are defined as specific addresses. Any connected and enabled PCM 80 will recognize messages sent to device 127.)

The byte immediately following the header is the identifier for the type of SysEx message.

Requests

A request is initiated by a remote host (never by a PCM-80). A request usually results in a dump.

Dumps

A dump is data transmitted by a PCM-80 in response to a request, or as a result of specific front-panel dump or SysEx automation instruction.

A dump can be purely informational, containing version information, etc. This sort of dump will be transmitted by the PCM-80 only as the result of an external request. It can be considered as unidirectional. The PCM 80 will ignore any such requests received.

All other dumps (effect dumps, parameter dumps, etc) can be treated as bidirectional. If transmitted by a PCM-80, such dumps show the current internal state of the machine. When received by a PCM-80, they will cause state changes.

To receive dumps or requests, the PCM 80 must be enabled for receipt of SysEx message at **Control 3.1**. If receipt of SysEx messages is not enabled, all SysEx messages will be ignored.

System Configuration

System Configuration will be transmitted by the PCM 80 to a remote host on request.

Byte #	ByteValue	Description
1-4		Header
5	0x0	Config Data
6	0iii iiii	Major Version #
7	0iii iiii	Minor Version #
8-15	0iii iiii	Time string
16-26	0iii iiii	Date string
27-34	0n	Nibbleized longword (LS first) that defines size of 56K memory in 64k word blocks.
35-150	0iii iiii	Bank info. 2 characters for each bank. First character is the bank size. A size of 0 indicates bank not present. A non-zero in the second byte indicates that the bank is a preset bank (not writeable).
151	0n	Card Present (non-zero if present)
152	0n	Card write protect (non-zero if protected)
153	0iii iiii	Card version*
154	0iii iiii	Card Type*
155-164	0iii iiii	Name string for card*
165	0iii iiii	Card page count (1 page = 64K)*
166	0iii iiii	Count of algorithms online
167-190	0iii iiii	List of algorithm IDs (only 'count' are valid)
191	0iii iiii	Current mode of user interface
192	0iii iiii	User interface is in a submode (0=FALSE, 1=TRUE)
193	0iii iiii	Compare mode (0=OFF, 1=ON)
194	0iii iiii	Bypass (0=OFF, 1=ON)
195	0xF7	End of SysEx

* Should be ignored if Card Present is zero.

Effect Bulk Data (Bank dump)
This is a bidirectional dump which can be initiated from front-panel as a bank dump.

Byte #	ByteValue	Description
1-4		Header
5	0x1	Effect bulk Data
6	0iii iiii	Bank (source bank if sent by PCM 80. Target bank if received by PCM 80)
7-43706	xxxxxxxx	50 Single effect data packets, with checksums after each. (See Single Effect).
43707	0xF7	End of SysEx

Single Effect
This is a bidirectional dump which can be initiated from the front-panel as a current-effect dump. NOTE: The internal data is bit-packed and must be decoded according to bitpacking information in this document. These messages should be treated as read-only.

Byte #	ByteValue	Description
1-4		Header
5	0x2	Single Effect Data
6	0iii iiii	Bank #*
7	0iii iiii	Program #
8-877	0x0n	Nibbleized data (Least-significant nibble first).
878-879	0iii iiii	Valid. This is an 8-bit value, nibblized with LSB first. (0 - not a valid effect, 1 -valid effect)
880-881	0iii iiii	Checksum. This is an 8-bit value, nibblized with LSB first. It is a simple additive checksum that starts at the beginning of nibblized data and goes through the Validity flag byte.
882	0xF7	End of SysEx

If both Bank and Program values are set to 0x7f, the dump will consist of the contents of the current edit buffer. If the dump is received by a PCM 80 (and Bank and Program values are set to 0x7f), the incoming data will be put into the edit buffer (the effect will be loaded), but the dump is not stored.

Table
This bidirectional dump describes a complete program table (map). This dump can be initiated from the front-panel as a map dump.

Byte #	ByteValue	Description
1-4		Header
5	0x3	Table Data
6	0iii iiii	Table (map) #
7	0iii iiii	Bank for table position 0
8	0iii iiii	Offset for table position 0 (offset refers to program #)
9-262		Bank/offset for positions 1-127
263	0xF7	End of SysEx

Table Element Message
This bidirectional dump describes a single position in a program table (map).

Byte #	ByteValue	Description
1-4		Header
5	0x4	Table Element Data
6	0iii iiii	Table (map) #
7	0iii iiii	Offset in table
8	0iii iiii	Bank
9	0iii iiii	Offset
10	0xF7	End of SysEx

Bulk Chain
This bidirectional dump describes a set of program chains (either the internal set of 10, or 10 from a card). This can be initiated from the front-panel as a bulk chain dump.

Byte #	ByteValue	Description
1-4		Header
5	0x5	Chain Bulk
6	0000 000i	Internal/Card (0=Internal, 1=Card)
7-26	0iii iiii	Data for chain 0 (10 if card). See description for Chain message (0x6), bytes 7-26 for details
27-206	....	Data for chains 1-9 (11-19 if card)
207	0xF7	End of SysEx

Chain
This bidirectional dump describes a complete program chain. This can be initiated from the front-panel as a chain dump.

Byte #	ByteValue	Description
1-4		Header
5	0x6	Chain Data
6	0iii iiii	Chain #
7	0iii iiii	Bank for chain position 0 (0x7f if nothing is mapped to this position)
8	0iii iiii	Offset for chain position 0 (0x7f if nothing is mapped to this position).
9-26		Bank/offset for positions 1-9
27	0xF7	End of SysEx

Chain Element
This is a bidirectional dump which describes a single position in a program chain.

Byte #	ByteValue	Description
1-4		Header
5	0x7	Chain Element Data
6	0iii iiii	Chain #
7	0iii iiii	Offset in chain
8	0iii iiii	Bank
9	0iii iiii	Offset
10	0xF7	End of SysEx

Display
This is a bidirectional dump. When transmitted from the PCM-80, this holds the current display information. When received by a PCM-80, this text is briefly displayed (for 2 seconds).

Byte #	ByteValue	Description
1-4		Header
5	0x08	Display message
6-25	0iii iiii	Top line of display (blank-padded, no NULL terminator)
26-45	0iii iiii	Bottom line of display (blank-padded, no NULL terminator)
46	0xF7	End of SysEx

Note: Any characters below 0x20 (space) or above 0x7e (tilde) are converted to space.

Matrix

The matrix dump gives general information about the front-panel layout of the Edit, Control and Tempo modes, including row labels, etc. It does not give a full description of the various parameters assigned, since it is assumed that editing programs will manipulate parameters directly by ID.

Byte #	ByteValue	Description
1-4		Header
5	0x09	Matrix dump
6	0n	Matrix type: 0 - Control 1 - Tempo 2 - Edit (matrix for current prog)
7	0iii iiii	Algorithm ID (only for Edit mode)
8-23	0iii iiii	Algorithm name string (only for Edit mode)
24	0iii iiii	Count of rows
25-1124	0	10 Row description buffers (1610 bytes total. See description below).
1125	0xF7	End of SysEx

Row description buffer — There are 10 of these in the packet, although only Byte 20 (Count of rows) is meaningful.

0-8	0iii iiii	Row label
9	0n	Number of columns in the row
10-109		10 column description buffers (150 bytes total. See below for description)

Column description buffer — There are 10 of these in each row description buffer, although only Byte 10 (Number of columns in the row) is meaningful.

0-8	0iii iiii	Column label
9	0n	Column type. Types of objects are: 0 - param 1 - multiparam 2 - patch 3 - text 4 - map 5 - chain 6 - 9 reserved 10 - special multiparam

The matrix dump could be used by a self-configuring editing program. SysEx and bitpacking information will be available for for any PCM 80 algorithms released on cards.

Parameter

This bidirectional message can be transmitted or received by a PCM-80. This is the message that is used when a PCM-80 is transmitting SysEx automation. There are three types of parameters: System, Patchable, and NonPatchable.

System Parameters	These are not saved with an effect, but are part of the system setup. They include things such as Midi Channel, etc. These values are also transmitted in Setup Data.
Patchable Parameters	These are saved with an effect, and include all parameters that can be patch destinations.
NonPatchable Parameters	These are saved with the effect but are not patch destinations. They include things such as envelope thresholds, etc.

Byte #	ByteValue	Description
1-4		Header
5	0B	Parameter Value
6	0x	Parameter Type 0 - system 1 - patchable 2 - nonpatchable
7	0iiiiiii	Parameter Offset
8	0000000i	Tempo Mode Flag (Defines the value as an absolute 16-bit value (0) or as a ratio split into bytes (1). It also forces the parameter into the appropriate mode. This flag should be 0 except for those parameters that support tempo mode.) 0 - Absolute mode 1 - Tempo Mode
9	0000iiii	Least-significant nibble of absolute value or numerator byte.
10	0000iiii	Next nibble of absolute value or numerator byte.
11	0000iiii	Next nibble of absolute value or denominator byte.
12	0000iiii	Most-significant nibble of absolute value or denominator byte.
13	F7	End of SysEx

Button

This is a bidirectional message. The following buttons are transmitted in SysEx automation mode: Compare, Tap, Bypass. Any button will be received, and PCM 80 response will be identical to front panel button press responses.

Byte #	ByteValue	Description
1-4		Header
5	0xC	Button message
6	0iii iiii	Button # 0 - UP 1 - DN 2 - PRG 3 - LOAD 4 - REG 5 - STORE 6 - EDIT 7 - COMPARE 8 - CTL 9 - BYP 10 - TEMPO 11 - TAP 12 - Reserved 13 - Footswitch 2 14 - Reserved 15 - Footswitch 1
7	0xF7	End of SysEx

Button SysExes may be sent in quick succession (faster than 40 ms) to mimic holds.

Soft Row Assignment

Bidirectional. Assigns a PRO-mode slot to a GO-mode soft slot.

Byte #	ByteValue	Description
1-4		Header
5	0x12	SoftRowAssign
6	0n	Soft Row Slot (0-9)
7	0n	Substitute Row* (0-9)
8	0n	Substitute Column (0-9)
9	0xF7	End of SysEx

* This is the row/column that will appear in the soft row slot. A soft row position can be deassigned by setting both row and column to 0x0f. The number of rows and columns is dependent on the current algorithm (obtainable from a matrix dump, or from the documentation.) Slots in the Patch row cannot be assigned to the Soft Row.

Patch Assignment

Bidirectional.

Byte #	ByteValue	Description
1-4		Header
5	0x13	PatchAssign
6	0n	PatchID (0-9)
7-8	0iii iiii	Patch Source. Nibblized with less significant part first. This is the index on the source control list. Source list indices are fixed (not variable by preset, algorithm, or card).
9	0iii iiii	Patch Destination (0x7f = disconnect). All other values remain valid.
10	0n	Point Count (0-8) (Only the 'n' values are meaningful. Remaining values should be set to 0.

This point packet is repeated 8 times...

10	0iii iiii	Point Position (0-127). Positions should be in ascending order, and may not be duplicated.
11	0000 iiii	Point Value LS nibble . The point value is independent of the specific parameter range. The point value range is from 0 [minimum] to 0xffff [maximum]. This format allows a new patch destination to be chosen while maintaining the contour of the patch table.
12	0000 iiii	Point Value next nibble
13	0000 iiii	Point Value next nibble
14	0000 iiii	Point Value MS nibble.
15	000i iiii	Tempo value Numerator (1-24)
16	000i iiii	Tempo value Denominator (1-24)

7 additional 7-byte point packets...

67	0xF7	End of SysEx

Knob

Host to PCM-80 only. Knob values can be sent via the following SysEx. Knobs operate within the current context of the user interface. For example, in Register mode, ADJUST is a soft knob. In Edit mode, ADJUST varies the displayed parameter.

Byte #	ByteValue	Description
1-4		Header
5	0x14	Knob Code
6	0n	Knob ID: 0 - Select Knob 1 - Adjust Knob
7	0n	Least-significant nibble of 2's complement knob delta (16 bits) Due to knob ballistic calculations, large deltas may result in very large value changes.
8	0n	Next nibble
9	0n	Next nibble
10	0n	Most-significant nibble
11	0xF7	End of SysEx

Note: In automation mode, the PCM-80 sends parameter values, not knob deltas.

Program Change

Bidirectional, used in SysEx automation to effect Program change. The current MIDI program change mode (mapped, chained, off, etc) is ignored.

Byte #	ByteValue	Description
1-4		Header
5	0x15	Prog Change Code
6	0iii iiii	Bank
7	0iii iiii	Program
8	0xF7	End of SysEx

Parameter Specification

PCM-80 to host only. This dump returns information about a specific parameter. It is provided for an editing program that doesn't know the count, range or name of a parameter.

Byte #	ByteValue	Description
1-4		Header
5	0x16	Param Spec Data
6	0n	Type (see the param message)
7	0n	Offset
8	0iii iiii	Flags (tempo mode available, etc). There are two bits defined in this field: Bit 0 (0x01) Parameter supports tempo mode Bit 3 (0x08) Parameter is not patchable. This overrides the type field.
9-20	0xxx xxxx	Parameter name (space-filled)
21	0n	Least-significant nibble of the maximum parameter value (16-bit unsigned).
22	0n	Next nibble
23	0n	Next nibble
24	0n	Most-significant nibble
25	0xF7	End of SysEx

Parameter Display

PCM-80 to host only. This dump returns the current display for a specific parameter. It is provided for an editing program that doesn't know the display specifics for a parameter. Note: This is the momentary active value. If the parameter is currently driven by a patch, the value at the time of inquiry will be transmitted, but the tru value may continue to change.

Byte #	ByteValue	Description
1-4		Header
5	0x17	Param display data
6	0n	Type (see param message)
7	0n	Offset
8-27	0iii iiii	20-char display string. String is space-padded, no NULLS.
28	0xF7	End of SysEx

System Setup

This dump is both transmitted and received by the PCM80. It contains all system parameters (those parameters that are not part of a preset).

Byte #	ByteValue	Description
1-4		Header
5	0x18	Setup Data
6	0iii iiii	Setup ID (0x7f=Current, 0-4=Internal, 5-9=Card)
7-15		Setup name (ASCII, space-filled)
16-19	On	Nibbleized unsigned short param value (LS first) for first param
20-183	On	Remaining params
184	0xF7	End of SysEx

Data Request

Host to PCM-80 only. The host may request that a message be sent by the PCM-80.

Byte #	ByteValue	Description
1-4		Header
5	0x7F	Data request
6	0iii iiii	Type of data requested. This matches the message IDs described above, but not all messages may be requested. See table below.
7-11		Parameters for request. These depend on the type of message requested. Any unused parameters should be set to 0. See table below. Parameters are not nibblized.
12	0xF7	End of SysEx

Request	Request Byte	Parameter bytes
System Config	0x00	no parameters
Effect Bulk	0x01	Bank
Effect Single	0x02	Bank, Offset
Table	0x03	TableID
Table element	0x04	TableID, Offset
Chain	0x06	ChainID
Chain element	0x07	ChainID, Offset
Display	0x08	no parameters
Matrix	0x09	Mode
Param	0x0b	Type, Offset
Soft Row	0x12	Offset (0-9)
Patch	0x13	PatchID (0-9)
Param spec	0x16	Type, Offset
Param display	0x17	Type, Offset
System setup	0x18	ID of setup
Program Info	0x1a	Bank, Offset

Note: The entire 12-byte request must be sent with unused parameters set to 0.

Bank assignments

Effects in the PCM 80 are accessed by Bank and Program numbers. Banks are assigned as follows:

Bank 0-3	Internal presets
Bank 4	User-generated effects
Bank 5-9	Extension presets. Presets are loaded into these banks from algorithm cards.
Bank 10-up	Card banks (either user-generated or preset, depending on card type).

Program numbers are 0-49. Any program numbers greater than 49 are ignored. The exception is Map mode, in which a program number (0-127) is used to look up a bank/program combination from a map.

Patch sources by Index

The following values allow sources to be selected for patches, for Tap sources, or for other control sources such as AR Source.

SourceIndex	Controller
0-30	MIDI controllers 1 - 31
31-117	MIDI controllers 33 - 119
118	Pitch bend
119	Channel pressure
120	Velocity of last-played note
121	Last note number
122	Lowest current note number
123	Highest current note number
124	Clock commands
125	LFO (selectable output)
126	LFO Sine
127	LFO Cosine
128	LFO Square
129	LFO Sawtooth
130	LFO Pulse
131	LFO Triangle
132	Left Envelope follower
133	Right Envelope follower
134	AR envelope generator
135	Latch
136	Timeswitch 1
137	Timeswitch 2
138	Composite Timeswitch
139	Mono input level
140	Left input level
141	Right input level
142	Voltage pedal
143	Footswitch 1
144	Footswitch 2
145	ADJUST knob
146	Tempo
147-253	Reserved
254	ON (always on)
255	OFF (always off)

Note: MIDI controllers 0 and 32 are used for Bank change, and are not available as controllers.

System parameters

These parameters are global (not part of a preset).

Param#	Description	MaxValue
0	Wordclock source	2
1	Analog input level	100
2	Digital input level	100
3	MIDI Receive on/off/channel	18
4	MIDI transmit on/off/channel	17
5	External tap source	see patch source list
6	External tap threshold	127
7	MIDI controller ID for continuous pedal	118
8	MIDI controller ID for footswitch 1	118
9	MIDI controller ID for ADJUST knob	118
10	MIDI sysex device ID	126
11	MIDI sysex enable	1
12	Memory protect	1
13	Pro Mode/Go Mode	1
14	Mix Prg/Global	1
15	Tempo Prg/Global	1
16	Autoload	1
17	Bypass Mode	3
18	MIDI controller ID for footswitch 2	118 (footnote 2)
19	Patch update mode	1
20	MIDI program change mode	3
21	Map select	127
22	Chain select	127 (footnote 3)
23	Pgm+ source	120
24	Pgm- source	120
25	Program change bypass mode	1
26	Global Mix value	100
27	Transmit MIDI clock	1
28	Dump speed	2
29	MIDI automation mode	1
30	Transmitted device ID for automation	127
31	Tempo blink on/off	1
32	Global tempo value	360
33	Dig In status	0
34	Selects display of digital error	5
35	Autolock enable	1
36	Transmitted SCMS selection	2
37	Transmitted emphasis selection	2
38	Tempo source (internal/MIDI)	1
39	Analog output level	1
40	Sample dump output resolution	20
42	Bypass controller assign	78

Note: The PCM 80 ignores received values for parameters 10 and 11 (Device ID and SysEx Enable). These values can only be changed from the PCM 80 front panel (Control 3.7), or by restoring a setup from internal memory or from a card. The values are transmitted correctly.

Patchable Parameters

These are the patchable parameters that are the same (both offset and range) for all algorithms.

Param#	Description	MaxValue
0	Mix (when mix mode is PRG)	100
1	LFO rate	2500
2	LFO waveform select	5
3	LFO pulsewidth	98
4	Left Envelope follower	500
5	Right Envelope follower	500
6	AR envelope generator rise time	500
7	AR envelope generator fall time	500
8	AR envelope generator mode	3
9	Timeswitch 1 mode	2
10	Timeswitch 1 rate	2500
11	Timeswitch 1 pulsewidth (1-99%)	98
12	Timeswitch 2 mode	2
13	Timeswitch 2 rate	2500
14	Timeswitch 2 pulsewidth	98
15	LFO depth	100

Nonpatchable parameters

These are the non patchable parameters that are the same (both offset and range) for all algorithms.

Param#	Description	MaxValue
0	Tempo (when mode is PRG)	360
1	AR threshold	127
2	Timeswitch 1 threshold	127
3	Timeswitch 2 threshold	127
4	Latch lower limit	127
5	Latch upper limit	127
6	AR source	255 (patch source list)
7	Timeswitch 1 source	255 (patch source list)
8	Timeswitch 2 source	255 (patch source list)
9	Latch source	255 (patch source list)
10	Tap value	14
11	Tempo beat value	6
12	Tap average (tap window)	6
13	Adjust knob lower limit	127
14	Adjust knob upper limit	127

MIDI Inquiry Message

The MIDI specification defines a global message that allows a host device to determine what sorts of devices are connected. The specification is somewhat ambiguous in its own wording and in the way it is supported by different manufacturers. Here is the way the message is interpreted by the PCM 80.

Inquiry to the PCM 80:

Byte #	ByteValue	Description
1	0xf0	Sysex header
2	0x7e	Universal non-realtime header
3	0iii iiii	Channel. Treated as the sysex device ID assigned to the PCM 80.
4	0x06	General information
5	0x01	Device inquiry
6	0xF7	EOX

Response from the PCM 80:

Byte #	ByteValue	Description
1	0xf0	Sysex header
2	0x7e	Universal non-realtime header
3	0iii iiii	Channel. Sysex device ID assigned to the PCM 80.
4	0x06	General information
5	0x02	Device id message
6	0x06	Lexicon sysex ID
7	0x00	Family code LSB
8	0x00	Family code MSB
9	0x07	Family member code LSB. This is the PCM 80 sysex product code (byte 3 of a standard sysex).
10	0x00	Family member code MSB
11	0iii iiii	Major software revision #
12	0iii iiii	Minor software revision #
13	0iii iiii	Release code. For normal released code, this byte is 0. Any other value indicates test code that is not under general release.
14	0x00	Unused revision data.
15	0xf7	EOX

Single Effect Message Format

Bytes 8-879 of the System Exclusive Single Effect Message are described as “Nibbleized data”. The 872 nibbleized bytes, when reassembled make up 435 bytes that are the PCM 80 Effect Register and a 1-byte checksum. The 435-byte record is of the following format:

Bytes	Description
1-2	Count of valid bytes (n) (ls byte first)
3	Algorithm Id
4	Position in Edit Matrix
5-16	Register Name – space filled
17-25	ADJUST Knob Name – space filled
26-n	Bitpacked Effect Control Data
(n+1)-435	Zero Fill

Effect Register Header Information

Algorithm ID

PCM 80 software includes ten algorithms. The numbering and naming is as follows:

Byte Value	Algorithm Name
00	Plate
01	Chamber
02	Infinite
03	Inverse
04	Concert Hall
05	M-Band+Rvb
06	Glide>Hall
07	Chorus+Rvb
08	Res1>Plate
09	Res2>Plate

Position In Edit Matrix

Position in the Edit Matrix refers to the row and slot numbers given in the PCM 80 User Guide for each algorithm, the same as the displayed row.slot number. The format of this Edit Matrix Position is:

Bit	Meaning
rrrrssss	rrrr = row (0x0 through 0xf) ssss = slot (0x0 through 0xf)

Register Name

The Register Name is the text name that appears when the register is selected from any of the Program, Register, or Card banks. This text is always 12 bytes of ASCII characters with no NULL (0x00) characters, padded with spaces (0x20) if needed to fill out the 12 bytes.

ADJUST Knob Name

The ADJUST Knob Name is the text name that appears when a register has been loaded, at least one parameter has been patched to the ADJUST knob, and the ADJUST knob is turned. This text is always 9 bytes of ASCII characters with no NULL (0x00) characters, padded with spaces (0x20) if needed to fill out the 12 bytes.

Bitpacked Effect Control Data

The Bitpacked Effect Control Data contains all of the parameter values and patching information that make up the effect. Details of this data make up the entire remainder of this document.

Bitpacking

General Bitpacking Method

All PCM 80 effect control data fields are words from 1-16 bits in length utilizing the minimum number of bits necessary to represent the full range of the field. The values of these fields are packed into bytes right justified.

As an example, let us say we have fields a, b, and c which are, respectively, 5, 14, and 9 bits wide.

aaaaa	first field bits
bbbbbbbbbbbbbb	second field bits
ccccccccc	third field bits
. . . . .	unused bits

Our bitpack bytes would initially be all zeroes and the first several bytes would look like this:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
.....	.....	.....	.....	.....	.....

The first field is loaded right justified into the first byte.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
...aaaaa	.....	.....	.....	.....	.....

The second field's 3 least significant bits are loaded into the remaining 3 bits of Byte 1...

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
bbbaaaaa	.....	.....	.....	.....	.....

...the next (middle) eight bits are loaded into Byte 2...

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
bbbaaaaa	bbbbbbbb	.....	.....	.....	.....

...and finally the remaining (most significant) 3 bits of the second field are loaded right justified into Byte 3.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
bbbaaaaa	bbbbbbbb	.....bbb	.....	.....	.....

The 5 least significant bits of the third field are loaded into the remaining bits of Byte 3...

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
bbbaaaaa	bbbbbbbb	cccccbbb	.....	.....	.....

...and the remaining (most significant) 4 bits of the third field are loaded right justified into Byte 4.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
bbbaaaaa	bbbbbbbb	cccccbbb	cccc	.....	.....

If the values of those three fields had been 0x1f, 0x2222, 0x147 respectively, the bitpack field would look like this:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
01011111	01010101	00111101	1010	.....	.....

If there we only three fields in this effect register, the remaining 4 most significant bits of Byte 4 would be assigned to zero and the remaining 406 bytes would also be zero filled.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	-> Byte 410
01011111	01010101	00111101	00001010	00000000	00000000

Bitpack Data Groups

The bitpacked Effect Control Data contains five distinct groups of information pertaining to the effect:

Soft Row Assignments
Unpatchable Parameter Information
ADJUST Knob Initial Value
Patchable Parameter Information
Patching Information

The first three Bitpacked Effect Control Data Groups: Soft Row Assignments, Unpatchable Parameter Information, and ADJUST Knob Initial Value, are exactly the same for all algorithms. Patchable Parameter Information, is different for every algorithm both in the number of fields and in the bit width for each field. Patching Information follows a methodology that is the same for every algorithm, but which is dependent on field values from the Patchable Parameter Information, so the Patching Information cannot not be said to be “identical” in all the algorithms.

Soft Row Assignments

Familiarize yourself in the PCM 80 User Guide with respect to the “Soft Row” which occupies the top row of every effect edit matrix. The edit matrix parameters in each of the 10 slots of the Soft Row are assignable. Soft Row assignments in the Bitpacked Effect Control Data consists of ten 8-bit fields, i.e. one byte for each of the Soft Row slots S.0-S.9. Each field contains the row and slot of the parameter that is to be mapped to the Soft Row. The value of the 8-bit field is a pseudo BCD format, in that the upper nibble of the byte is the row number of the parameter to be mapped, and the lower nibble of the byte is the slot number.

For example, a Soft Row Assignment Value of 0x00 means that the parameter in the Edit Matrix at row 0 slot 0 will be mapped to this particular Soft Row slot. Row 0 Slot 0 happens to be the Wet/Dry Mix in every algorithm. A Soft Row Assignment Value of 0x84 means that the Edit Matrix row 8 slot 4 parameter will be mapped to the Soft Row Slot. Valid Soft Row Assignment Values are 0x00 through 0x09, 0x10 through 0x19, and so forth up to 0x90 through 0x99. The value 0x7f is reserved to indicate a Soft Row Assignment that is specifically unassigned. Any other value put in a Soft Row Assignment, including valid values for which that particular algorithm has no parameter (like 0x29 in the Plate Algorithm) will produce UNKNOWN results.

Unpatchable Parameter Information

The Unpatchable Parameter Information contains only the values of fifteen unpatchable parameters. This list of unpatchable parameters is identical for every algorithm

Seq	Bits	Range	Field	Found	Where
0	9	360	Tempo	Rate	Tempo Matrix
1	7	127	AR Env	T Lvl	Edit Matrix Mod Row
2	7	127	Sw 1	T Lvl	Edit Matrix Mod Row
3	7	127	Sw 2	T Lvl	Edit Matrix Mod Row
4	7	127	Latch	Low	Edit Matrix Mod Row
5	7	127	Latch	High	Edit Matrix Mod Row
6	8	255	AR Env	T Src	Edit Matrix Mod Row
7	8	255	Sw 1	T Src	Edit Matrix Mod Row
8	8	255	Sw 2	T Src	Edit Matrix Mod Row
9	8	255	Latch	Src	Edit Matrix Mod Row
10	4	14	Tap	Duration	Tempo Matrix
11	3	6	Tempo	BeatValue	Tempo Matrix
12	3	6	Tap	Average	Tempo Matrix
13	7	127	Controls	ADJUST Low Limit	Edit Matrix Control Row
14	7	127	Controls	ADJUST High Limit	Edit Matrix Control Row

ADJUST Knob Initial Value

The ADJUST Knob Initial Value is a single 7-bit field which defines the value, 0-127, to which the ADJUST knob will be assigned when the effect register is loaded. Please note that the initial value of the knob ought to lie in the range defined by Controls ADJUST Low Limit and High Limit fields in the Unpatchable Parameter Information.

Patchable Parameter Information

As stated earlier, the Patchable Parameter Information is different for every algorithm. The actual list of fields for each algorithm is provided earlier in this document. To give you an idea of what you will find there, the first six parameters in every algorithm looks like this:

Seq	Bits	Range	Field	
0	7	100	Controls	Mix
1	7	80	Controls	FX ADJUST
2	8	160	Controls	InLvl L
3	8	160	Controls	InLvl R
4	7	100	Controls	InPan L
5	7	100	Controls	InPan R

Look through the Edit Matrix picture for the algorithms in the PCM 80 User Guide, you will notice that the sequence of these fields matches the order of the parameters found in the Edit Matrix, starting at Row 0 Slot 0 and going through the slots in Row 0. The Patchable Parameter Information is in fact derived from the sequence of patchable parameters in the Edit Matrix. If you took the entire list of every parameter in the Edit Matrix, then removed all the unpatchable parameters, the remaining list would be the patchable parameters.

Patching Information

As the first Bitpacked Effect Control Data Group is the soft row information, which occupies the very beginning of the Edit Matrix of the algorithms, followed by the unpatchable parameters, the ADJUST knob value, and the patchable parameters (all of which draw from more and more of the Edit Matrix of the algorithms), it is consistent that the last row of every Edit Matrix, the Patch row, finishes off the content of the bitpack groups.

The Patching Information consists of 10 variable length blocks, one for each of the 10 patches in the Patch row. Each block can be as small as 1 bit or as large as 204 bits (25 bytes, 4 bits).

A Patch Information Block always begins with a 1-bit field which indicates whether there is ANY patch information for that patch. 0 means that there is no patch in that slot, 1 means that the data to follow is to be interpreted as patch information. Therefore, an effect register which contains NO patches will have a sequence of 10 zero-bits immediately after the Patchable Parameter Information in the bitpack parameter data, each zero signifying an unassigned patch.

When the Patch Validity Value bit is a 1, it is immediately followed by the Patch Block Header with the following format:

Bits	Contents
7	Patch Source ID Value
1	Destination Patchable Parameter List ID Value
8	Destination Patchable Parameter Number Value
4	Count of Patch Points Value

If the Count of Patch Points is 0, the Patch Information Block will end with the above information. The Count of Patch Points can be anywhere from 0-8. For values 1-8, the patch's information block will be filled out with the following sequence repeated for as many points as are defined.

	Bits	Contents
	7	Patch Point Value (0 -27)
	n	Destination Patchable Parameter Value for that patch point

For the second field, the "n" bit count is anywhere from 1-16. It is the number of bits needed to represent any value for that patchable parameter. For example, refer to the partial list of Patchable Parameter Information in the previous section. If a patch destination parameter was Controls Mix, the number of bits for the Destination Patchable Parameter Value would be 7, and the range of values for that parameter would be 0-100. For every patch point there would be 7 bits to hold the Patch Point Value, and 7 bits to hold the Destination Parameter Value. If the patch destination parameter was Control InLvl L, the number of bits would be 8 and the range of values would be 0-160. For every patch point there would be 7 bits to hold the Patch Point Value, and 8 bits to hold the Destination Parameter Value.

Bitpack Field Interdependencies

As mentioned in the previous section, there are details of implementation in the Patching Information that are dependent (on an algorithm-by-algorithm basis) on the order of fields in the previous group, the Patchable Parameter Information. The Plate Algorithm (Algorithm 0x00) will be used as an example to point out these details.

There are 88 fields in the Patchable Parameter Information for the Plate Algorithm. Earlier information might lead you to take the Edit Matrix for Plate from the User Guide, to count all the parameters from Controls Mix up to (but not including) the Patch 0 information, to remove all the unpatchable parameters from that list, count them all and see that there are 88 parameters. . . Not exactly so. . . You would find there are 74 patchable parameters in the Plate Edit Matrix. The reason there are 88 fields in the Patchable Parameter Information is that 14 of the 74 parameters in the Plate Edit Matrix are parameters which can be represented in Tempo form in addition to some standard form (milliseconds, Hz, ...). Therefore, each of those 14 parameters needs an additional 1-bit indicator flag as to whether the value for the parameter is to be interpreted in its standard form or in tempo. 74 + 14 = 88.

Dest List ID and Dest List Number
The Patch Information Block has the following format:

Bits	Contents
7	Patch Source Value
1	Destination Patchable Parameter List ID Value
8	Destination Patchable Parameter Number Value
4	Count of Patch Points Value

You will notice that the Plate Algorithm Patchable Parameter Information list contains columns Dest List ID and Dest Number for all the non-Tempo fields. The values in these columns are the exact values used in the Patching Information to select the Destination Patchable Parameter for the patch.

Looking over the Patchable Parameter Information for all the algorithms (see Appendix.) you begin to notice the pattern that all the algorithm edit matrix parameters before the Modulation parameters are of Dest List ID 0, and that all the Modulation parameters are of Dest List ID 1. Why did we make this seemingly annoying distinction instead of just having one long list of patchable parameters, sequenced 0-73? The Modulation row is identical in every PCM 80 algorithm. It would have taken up a lot of space to duplicate all the control information for all those parameters ten times, so we combined “algorithm specific” and “general” patchable parameters in order to eliminate needless duplication in the software.

Patching a Tempo
Patching a parameter that can be in Tempo form has some subtle details which are best pointed out by comparing four examples:

Patching a short delay time parameter to milliseconds.
Patching the same parameter to tempo.
Patching a long delay time parameter to milliseconds.
Patching the same parameter to tempo.

The reason for this lengthy example session will become very clear if you follow it through.

Patching a short delay time parameter to milliseconds
Here again, a few lines from the Plate Algorithm Patchable Parameter Information list.

Seq	Bits	Dest List ID	Dest Number	Range	Parameter	
14	1			1	<Tempo Flag>	
15	10	0	14	465	Rvb Time	Pre Delay

The range 0-465 in Rvb Time Pre Delay for the Plate Algorithm represents the value 0-930 milliseconds. Each increment is 2 milliseconds.

Recall the format of the beginning of a Patch Information Block.

Bits	Contents
7	Patch Source Value
1	Destination Patchable Parameter List ID Value
8	Destination Patchable Parameter Number Value
4	Count of Patch Points Value

We want to patch to the Rvb Time Pre Delay. The Tempo Flag bit field preceding the Rvb Time Pre Delay parameter field in the Patchable Parameter Information list is assigned a 0 to indicate that the Pre Delay parameter is in standard form. In the Patch Information Block, we assign the Destination Patchable Parameter List ID Value to 0 and the Destination Patchable Parameter Number Value to 14 (0x0c). We want two points, so we put a 2 in the Count of Patch Points Value.

Therefore, the Patch Information Block should be completed with the following 4 fields.

Bits	Contents
7	First Patch Point Value (0 through 127)
10	First Destination Patchable Parameter Value
7	Second Patch Point Value (0 through 127)
10	Second Destination Patchable Parameter Value

We want to patch a source point value of 0 to 0 milliseconds and a source point value of 100-500 milliseconds.

The first 7-bit field will contain a 0 to indicate point value 0. The first 10-bit field will contain a 0 to indicate 0 milliseconds. The second 7-bit field will contain 0x64 to indicate point value 100. The second 10-bit field will contain 0xfa (250 decimal) to indicate 500 milliseconds.

Patching a short delay time parameter to Tempo

We want to patch to the Rvb Time Pre Delay again. The Tempo Flag bit field preceding the Rvb Time Pre Delay parameter field in the Patchable Parameter Information list is assigned a 1 to indicate that the Pre Delay parameter is in Tempo form. Down in the Patch Information Block, we put a 0 in the Destination Patchable Parameter List ID, and a 14 (0x0c) in the Destination Patchable Parameter Number. We want two points again, so we put a 2 in the Count of Patch Points.

Again the Patch Information Block should be completed with the following 4 fields.

Bits	Contents
7	First Patch Point Value (0 through 127)
10	First Destination Patchable Parameter Value
7	Second Patch Point Value (0 through 127)
10	Second Destination Patchable Parameter Value

We want to patch a source point value of 0 to 2 echoes/beat and a source point value of 10 to 4 echoes/ 5 beats.

The first 7-bit field will contain a 0 to indicate point value 0. The first 10-bit field will contain an 0x041 to indicate 2 echoes/beat. (Go binary for a minute. 10 bits, two 5-bit fields. The first 5 bits contains a decimal 2, which would be 00010 binary. The second 5 bits contains a decimal 1, which would be 00001 binary. Put it together: 0001000001 binary = 0x041 hex.) The second 7-bit field will contain 0x0a to indicate point value 10. The second 10-bit field will contain 0x0a4 to indicate 5 echoes/4 beats. (5 decimal = 00101 binary, 4 decimal = 00100 binary. 0010100100 binary = 0x0a4 hex.)

Note that this implies that you MUST know the state of the Tempo Flag bit field back in the Patchable Parameter Information when you are assigning parameter values in a patch.

Patching a long delay time parameter to milliseconds

Here is some information from the Glide>Hall Algorithm Patchable Parameter Information list, found earlier in this document.

Seq	Bits	Dest List ID	Dest Number	Range	Parameter	
52	1			1	<Tempo Flag>	
53	16	0	49	42325	DelayTime	Voice1

Note: The range 0-42325 in DelayTime Voice1 for the Glide>Hall Algorithm represents the value 0-42325 milliseconds. Each increment is 1 millisecond. -(Be aware that you can only ACCESS 42.325 seconds of audio when you have 4 Meg of audio memory installed. -The box is shipped with enough memory to access 2645 milliseconds).

We want to patch to the DelayTime Voice1. The Tempo Flag field bit preceding the DelayTime Voice1 parameter field in the Patchable Parameter Information list is assigned a 0 to indicate that the Delaytime Voice1 parameter is in standard form. Down in the Patch Information Block, we put a 0 in the Destination Patchable Parameter List ID, and a 49 (0x31) in the Destination Patchable Parameter Number. We want two points, so we put a 2 in the Count of Patch Points.

The Patch Information Block should be completed with the following 4 fields.

Bits	Contents
7	First Patch Point Value (0 through 127)
16	First Destination Patchable Parameter Value
7	Second Patch Point Value (0 through 127)
16	Second Destination Patchable Parameter Value

We want to patch a source point value of 0 to 0 milliseconds and a source point value of 127 to 1270 milliseconds.

The first 7-bit field will contain a 0 to indicate point value 0. The first 16-bit field will contain a 0 to indicate 0 milliseconds. The second 7-bit field will contain 0x7f to indicate point value 127. The second 16-bit field will contain 0x04f6 (1270 decimal) to indicate 1270 milliseconds.

Patching a long delay time parameter to Tempo
We want to patch to the DelayTime Voice1 again. The Tempo Flag field bit preceding the DelayTime Voice1 parameter field in the Patchable Parameter Information list is assigned a 1 to indicate that the parameter is in Tempo form. Down in the patching we put a 0 in the Destination Patchable Parameter List ID, and a 49 (0x31) in the Destination Patchable Parameter Number. We want two points again, so we put a 2 in the Count of Patch Points.

The Patch Information Block should be completed with the following 4 fields.

Bits	Contents
7	First Patch Point Value (0 through 127)
10	First Destination Patchable Parameter Value
7	Second Patch Point Value (0 through 127)
10	Second Destination Patchable Parameter Value

STOP RIGHT THERE. Look at the count of bits on those four parameters. Notice that instead of putting 16 bits (the maximum number of bits for the DelayTime Voice1 Parameter in the Glide>Hall algorithm), we only put TEN bits. This is intentional, and is the reason these four examples are so explicit.

When the Tempo Flag field bit is assigned to 1 for a parameter, and the parameter is the destination of a patch, the bit count for the parameter in the patching block is always 10 bits, even though the bit count back in the Patchable Parameter Information may have been greater than 10 bits, as in this example.

Finishing off this example...
We want to patch a source point value of 0 to 10 echoes/3 beats and a source point value of 127 to 3 echoes/10 beats.

The first 7-bit field will contain a 0 to indicate point value 0. The first 10-bit field will contain an 0x143 to indicate 10 echoes/3 beats. (10 decimal=01010 binary, 3 decimal=00011 binary. 0101000011 binary=0x143 hex.) The second 7-bit field will contain 0x7f to indicate point value 127. The second 10-bit field will contain 0x0a4 to indicate 5 echoes/4 beats. (0001101010 binary=0x06a hex.)

Parsing Prime Blue

The first effect preset register in the PCM80 is Prime Blue. A hex dump of the 435-byte effect register for Prime Blue follows:


```
d2 00 07 f0 50 72 69 6d 65 20 42 6c 75 65 20 20
45 66 78 2f 52 76 62 20 58 00 03 05 11 13 14 20
50 80 85 29 00 3c 24 80 f7 7f 78 b8 78 02 e0 0f
22 13 41 41 01 e4 f7 ac b2 5a 99 6b 60 33 b0 19
d0 03 c0 03 80 96 74 43 7d 14 27 a6 27 66 a7 27
99 0c 00 4c 20 9d 24 e0 9c 2c 40 03 ba c2 28 34
37 f8 24 30 39 e8 18 30 29 24 c9 57 81 57 81 55
59 32 80 25 43 26 2f 85 00 62 64 00 00 8c 01 a0
09 c4 8c 02 31 f7 21 0a 00 f0 27 ef 63 14 00 f9
0f 18 e9 30 00 80 bb fb 27 77 84 10 40 65 7f b4
46 f2 0c 20 0e 84 f9 c7 1c 09 34 80 38 10 e6 1f
73 a4 1e 01 c8 20 6d b0 c2 7f e1 48 3f 02 90 41
da 60 85 ff c2 88 8a 02 00 fc c9 11 21 05 40 fe
03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00
```

The hex dump for Prime Blue is first broken down into 7 primary groups of data:

```
d2 00                                             Number of valid bytes
      07                                          Algorithm Id
         f0                                       Last Edit Matrix Position
            50 72 69 6d 65 20 42 6c 75 65 20 20   Name of register
45 66 78 2f 52 76 62 20 58                        Name of ADJUST knob
                           00 03 05 11 13 14 20   Bitpack Data
50 80 85 29 00 3c 24 80 f7 7f 78 b8 78 02 e0 0f
22 13 41 41 01 e4 f7 ac b2 5a 99 6b 60 33 b0 19
d0 03 c0 03 80 96 74 43 7d 14 27 a6 27 66 a7 27
99 0c 00 4c 20 9d 24 e0 9c 2c 40 03 ba c2 28 34
37 f8 24 30 39 e8 18 30 29 24 c9 57 81 57 81 55
59 32 80 25 43 26 2f 85 00 62 64 00 00 8c 01 a0
09 c4 8c 02 31 f7 21 0a 00 f0 27 ef 63 14 00 f9
0f 18 e9 30 00 80 bb fb 27 77 84 10 40 65 7f b4
46 f2 0c 20 0e 84 f9 c7 1c 09 34 80 38 10 e6 1f
73 a4 1e 01 c8 20 6d b0 c2 7f e1 48 3f 02 90 41
da 60 85 ff c2 88 8a 02 00 fc c9 11 21 05 40 fe
03 00

      00 00 00 00 00 00 00 00 00 00 00 00 00 00   Zero fill
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

The number of valid bytes 0x00d2 tells us where the zero padding begins. The algorithm id 0x07 tells us it is Chorus+Rvb. The last edit matrix position 0xf0 says Soft Row Slot 0. The name of register (`50 72 69 6d 65 20 42 6c 75 65 20 20`) spells "Prime Blue ". The name of the ADJUST knob (`45 66 78 2f 52 76 62 20 58`) spells "Efx/Rvb X".

The remaining data in the Prime Blue register is the bitpack information, as follows:

```
00 03 05 11 13 14 20 50 80 85 29 00 3c 24 80 f7
7f 78 b8 78 02 e0 0f 22 13 41 41 01 e4 f7 ac b2
5a 99 6b 60 33 b0 19 d0 03 c0 03 80 96 74 43 7d
14 27 a6 27 66 a7 27 99 0c 00 4c 20 9d 24 e0 9c
2c 40 03 ba c2 28 34 37 f8 24 30 39 e8 18 30 29
24 c9 57 81 57 81 55 59 32 80 25 43 26 2f 85 00
62 64 00 00 8c 01 a0 09 c4 8c 02 31 f7 21 0a 00
f0 27 ef 63 14 00 f9 0f 18 e9 30 00 80 bb fb 27
77 84 10 40 65 7f b4 46 f2 0c 20 0e 84 f9 c7 1c
09 34 80 38 10 e6 1f 73 a4 1e 01 c8 20 6d b0 c2
7f e1 48 3f 02 90 41 da 60 85 ff c2 88 8a 02 00
fc c9 11 21 05 40 fe 03 00
```

Conveniently, the first 10 bytes of the bitpack information is 10 8-bit fields for the 10 soft row positions. Therefore, `00 03 05 11 13 14 20 50 80 85` tells us that the 10 soft row parameters are taken from the following Algorithm Edit Matrix positions:

0.0	Controls Mix
0.3	Controls High Cut
0.5	Controls FX Width
1.1	RvbTime Mid Rt
1.3	RvbTime Rt HC
1.4	RvbTime Pre Delay
2.0	RvbDesign Size
5.0	Chorus Mstr
8.0	MOD:LFO
8.5	MOD:Sw 1

Rather than detailing parsing of the remaining 1400 bits of the bitpack information, we will detail the parsing of the first few fields and then give an annotated dump of the entire Prime Blue register.

The first six bytes immediately following the soft row assignments are:

```
29 00 3c 24 80 f7
```

In binary they would be:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0010 1001	0000 0000	0011 1100	0010 0100	1000 0000	1111 0111

The first field after the soft row assignments is from the unpatchable parameter information. It is Tempo Rate and is 9 bits. To get the value of Tempo Rate we take the entire first byte (0010 1001) and the least significant bit of the next byte (0) to get 0 0010 1001, a decimal value of 41 which means a tempo rate of 81 BPM.

Remaining bits for unpacking:

Byte 1	Byte 2	Byte 2	Byte 4	Byte 5	Byte 6
xxxx xxxx	0000 000x	0011 1100	0010 0100	1000 0000	1111 0111

The next field in the unpatchable parameter information is AR Env T Lvl and it is 7 bits. The next 7 bits from the bitpack field are 0000 000, a decimal value of 0 which means AR Env T Lvl of Threshold 0.

Remaining bits for unpacking:

Byte 1	Byte 2	Byte 2	Byte 4	Byte 5	Byte 6
xxxx xxxx	xxxx xxxx	0011 1100	0010 0100	1000 0000	1111 0111

Next, Sw 1 T Lvl, 7 bits. Those bits would be 011 1100, a decimal value of 60 for a display value of Threshold 60.

Remaining bits for unpacking:

Byte 1	Byte 2	Byte 2	Byte 4	Byte 5	Byte 6
xxxx xxxx	xxxx xxxx	0xxx xxxx	0010 0100	1000 0000	1111 0111

Next, Sw 2 T Lvl, 7 bits. Those bits would be 10 0100 0, a decimal value of 72 for a display value of Threshold 72.

Remaining bits for unpacking:

Byte 1	Byte 2	Byte 2	Byte 4	Byte 5	Byte 6
xxxx xxxx	xxxx xxxx	xxxx xxxx	00xx xxxx	1000 0000	1111 0111

Summary of Effect Register Format

Nibbleized data bytes (872 bytes)
- Effect Register (435 bytes)
  - Count of valid bytes (n) in the register (2 bytes)
  - Algorithm Id (1 byte)
  - Position in Edit Matrix (1 byte)
  - Register Name (12 ASCII bytes)
  - ADJUST Knob Name (9 ASCII bytes)
  - Bitpacked Effect Control Data Groups (variable bytes)
    - Ten Soft Row Assignments
      - Soft Row Slot Assignment Value
    - Unpatchable Parameter Information
      - Edit/Tempo Matrix Parameter Values
    - ADJUST Knob Initial Value
    - Patchable Parameter Information
      - Edit Matrix Parameter Values
      - Edit Matrix Parameter Tempo Flag Values
    - Patching Information
      - Ten Patch Information Blocks
        - Patch Validity Value
        - Patch Header
          - Patch Source Value
          - Destination Patchable Parameter List ID Value
          - Destination Patchable Parameter Number Value
          - Count of Patch Points Value
          - Zero to Eight Patch Points
            - Patch Point Value
            - Patch Parameter Value
  - Bitpack Zero Fill (needed to pad to 410 bytes)
- Checksum (1 byte)

Patch Sources

Val	Patch	Source	Val	Patch	Source	Val	Patch	Source
0	(001)	Mod Wheel	50	(052)	Ctl 52	100	(102)	Ctl 102
1	(002)	Breath	51	(053)	Ctl 53	101	(103)	Ctl 103
2	(003)	Ctl 3	52	(054)	Ctl 54	102	(104)	Ctl 104
3	(004)	Foot Ctl	53	(055)	Ctl 55	103	(105)	Ctl 105
4	(005)	PortaTime	54	(056)	Ctl 56	104	(106)	Ctl 106
5	(006)	DataEntry	55	(057)	Ctl 57	105	(107)	Ctl 107
6	(007)	Volume	56	(058)	Ctl 58	106	(108)	Ctl 108
7	(008)	Balance	57	(059)	Ctl 59	107	(109)	Ctl 109
8	(009)	Ctl 9	58	(060)	Ctl 60	108	(110)	Ctl 110
9	(010)	Pan	59	(061)	Ctl 61	109	(111)	Ctl 111
10	(011)	Xpression	60	(062)	Ctl 62	110	(112)	Ctl 11
11	(012)	Effect 1	61	(063)	Ctl 63	111	(113)	Ctl 113
12	(013)	Effect 2	62	(064)	Sustain	112	(114)	Ctl 114
13	(014)	Ctl 14	63	(065)	Porta On	113	(115)	Ctl 115
14	(015)	Ctl 15	64	(066)	Sostenuto	114	(116)	Ctl 116
15	(016)	General 1	65	(067)	SoftPedal	115	(117)	Ctl 117
16	(017)	General 2	66	(068)	Legato	116	(118)	Ctl 118
17	(018)	General 3	67	(069)	Hold 2	117	(119)	Ctl 119
18	(019)	General 4	68	(070)	Sound Var	118	MIDI	P Bend
19	(020)	Ctl 20	69	(071)	Timbre	119	MIDI	A Touch
20	(021)	Ctl 21	70	(072)	Release	120	MIDI	Velocity
21	(022)	Ctl 22	71	(073)	Attack	121	MIDI	Last Note
22	(023)	Ctl 23	72	(074)	Bright	122	MIDI	Low Note
23	(024)	Ctl 24	73	(075)	Sound 6	123	MIDI	High Note
24	(025)	Ctl 25	74	(076)	Sound 7	124	MIDI	Clk Cmnds
25	(026)	Ctl 26	75	(077)	Sound 8	125	Int	LFO
26	(027)	Ctl 27	76	(078)	Sound 9	126	nt	Sine
27	(028)	Ctl 28	77	(079)	Sound 10	127	Int	Cosine
28	(029)	Ctl 29	78	(080)	General 5	128	Int	Square
29	(030)	Ctl 30	79	(081)	General 6	129	Int	Sawtooth
30	(031)	Ctl 31	80	(082)	General 7	130	Int	Pulse
31	(033)	Ctl 33	81	(083)	General 8	131	Int	Triangle
32	(034)	Ctl 34	82	(084)	Porta Ctl	132	Int	Env L
33	(035)	Ctl 35	83	(085)	Ctl 85	133	Int	Env R
34	(036)	Ctl 36	84	(086)	Ctl 86	134	Int	AR Env
35	(037)	Ctl 37	85	(087)	Ctl 87	135	Int	Latch
36	(038)	Ctl 38	86	(088)	Ctl 88	136	Int	Sw 1
37	(039)	Ctl 39	87	(089)	Ctl 89	137	Int	Sw 2
38	(040)	Ctl 40	88	(090)	Ctl 90	138	Int	Sw 1 & 2
39	(041)	Ctl 41	89	(091)	FX1 Depth	139	Int	Mono Lvl
40	(042)	Ctl 42	90	(092)	FX2 Depth	140	Int	Left Lvl
41	(043)	Ctl 43	91	(093)	FX3 Depth	141	Int	Right Lvl
42	(044)	Ctl 44	92	(094)	FX4 Depth	142	Int	FootPedal
43	(045)	Ctl 45	93	(095)	FX5 Depth	143	Int	Foot Sw 1
44	(046)	Ctl 46	94	(096)	Data Inc	144	Int	Foot Sw 2
45	(047)	Ctl 47	95	(097)	Data Dec	145	Int	ADJUST
46	(048)	Ctl 48	96	(098)	NRPN LSB	146	Int	Tempo
47	(049)	Ctl 49	97	(099)	NRPN MSB	147-253		UNDEFINED
48	(050)	Ctl 50	98	(100)	RPN LSB	254	Int	On
49	(051)	Ctl 51	99	(101)	RPN MSB	255	Int	Off

Unpatchable Parameter Information

Seq	Bits	Range	Field		Range Decode
0	9	360	Tempo	Rate	1
1	7	127	AR Env	T Lvl	2
2	7	127	Sw 1	T Lvl	2
3	7	127	Sw 2	T Lvl	2
4	7	127	Latch	Low	2
5	7	127	Latch	High	2
6	8	255	AR Env	T Src	3
7	8	255	Sw 1	T Src	3
8	8	255	Sw 2	T Src	3
9	8	255	Latch	Src	3
10	4	14	Tap	Duration	4
11	3	6	Tempo	BeatValue	5
12	3	6	Tap	Average	6
13	7	127	Controls	Low Limit	7
14	7	127	Controls	High Limit	8

26	5	0	22	30	Rvb Time	EkoFbk R	23
27	1			1	<Tempo Flag>		0
28	10	0	23	600	Rvb Time	EkoDly R	21
29	7	0	24	100	Rvb Time	PstMix	9
30	1			1	<Tempo Flag>		0
31	11	0	25	1365	Rvb Time	PstDly L	24
32	1			1	<Tempo Flag>		0
33	11	0	26	1365	Rvb Time	PstDly R	24
34	7	0	27	100	Rvb Time	GldResp	25
35	11	0	28	1365	Rvb Time	GldRange	24
36	8	0	29	144	RvbDesign	Size	26
37	7	0	30	00	RvbDesign	Diffusion	9
38	8	0	31	255	RvbDesign	Shape	20
39	8	0	32	255	RvbDesign	Spread	29
40	6	0	33	50	RvbDesign	Spin	28
41	1	0	34	1	RvbDesign	Link	20
42	10	0	35	720	RvbDesign	Rvb Width	14
43	7	0	36	80	RvbDesign	Rvb In	32
44	4	0	37	15	RvbDesign	Rvb Out	22
45	7	0	38	80	Levels	+ R V W	33
46	8	0	39	160	Levels	Voice1	11
47	8	0	40	160	Levels	Voice2	11
48	8	0	41	160	Levels	Voice3	11
49	8	0	42	160	Levels	Voice4	11
50	8	0	43	200	DelayTime	Host	9
51	7	0	44	100	DelayTime	GldResp	25
52	11	0	45	1365	DelayTime	GldRange	24
53	1	0	46	1	DelayTime	Clear	20
54	1			1	<Tempo Flag>		0
55	11	0	47	1365	DelayTime	Voice1	24
56	1			1	<Tempo Flag>		0
57	11	0	48	1365	DelayTime	Voice2	24
58	1			1	<Tempo Flag>		0
59	11	0	49	1365	DelayTime	Voice3	24
60	1			1	<Tempo Flag>		0
61	11	0	50	1365	DelayTime	Voice4	24
62	7	0	51	100	Feedback	Host	9
63	8	0	52	200	Feedback	Voice1	34
64	8	0	53	200	Feedback	Voice2	34
65	8	0	54	200	Feedback	Voice3	34
66	8	0	55	200	Feedback	Voice4	34
67	7	0	56	100	Panning	Host	12
68	7	0	57	100	Panning	Voice1	12
69	7	0	58	100	Panning	Voice2	12
70	7	0	59	100	Panning	Voice3	12
71	7	0	60	100	Panning	Voice4	12
72	1			1	<Tempo Flag>		0
73	12	1	0	2500	MOD:LFO	Rate	35
74	3	1	1	5	MOD:LFO	Shape	36
75	7	1	2	98	MOD:LFO	P Width	37
76	7	1	3	100	MOD:LFO	Depth	9
77	9	1	4	500	MOD:AR Env	Attack	38
78	9	1	5	500	MOD:AR Env	Release	38
79	2	1	6	3	MOD:AR Env	Mode	39
80	9	1	7	500	MOD:Env L	Release	38
81	9	1	8	500	MOD:Env R	Release	38
82	1			1	<Tempo Flag>		0
83	12	9	2	500	MOD:Sw 1	Rate	35
84	7	1	10	98	MOD:Sw 1	P Width	37
85	2	1	11	2	MOD:Sw 1	Mode	40
86	1			1	<Tempo Flag>		0
87	12	1	12	2500	MOD:Sw 2	Rate	35
88	7	1	13	98	MOD:Sw 2	P Width	37
89	2	1	14	2	MOD:Sw 2	Mode	40

Inverse Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FX ADJUST	10
2	8	0	2	160	Controls	InLvl L	11
3	8	0	3	160	Controls	InLvl R	11

4	7	0	4	100	Controls	InPan L	12
5	7	0	5	100	Controls	InPan R	12
6	7	0	6	121	Controls	High Cut	13
7	7	0	7	100	Controls	Voice Dif	9
8	7	0	8	100	Controls	FX Mix	9
9	10	0	9	720	Controls	FX Width	14
10	6	0	10	32	Rvb Time	Low Slope	19
11	6	0	11	32	Rvb Time	Mid Slope	19
12	6	0	12	60	Rvb Time	Crossover	17
13	6	0	13	48	Rvb Time	Rt HC	18
14	1			1	<Tempo Flag>		0
15	10	0	14	465	Rvb Time	Pre Delay	21
16	4	0	15	15	Rvb Time	RefLvl L	22
17	1			1	<Tempo Flag>		0
18	10	0	16	400	Rvb Time	RefDly L	21
19	4	0	17	15	Rvb Time	RefLvl R	22
20	1			1	<Tempo Flag>		0
21	10	0	18	400	Rvb Time	RefDly R	21
22	7	0	19	100	Rvb Time	PstMix	9
23	1			1	<Tempo Flag>		0
24	11	0	20	1365	Rvb Time	PstDly L	24
25	1			1	<Tempo Flag>		0
26	11	0	21	1365	Rvb Time	PstDly R	24
27	7	0	22	100	Rvb Time	GldResp	25
28	11	0	23	1365	Rvb Time	GldRange	24
29	7	0	24	112	RvbDesign	Duration	27
30	7	0	25	100	RvbDesign	Diffusion	9
31	8	0	26	255	RvbDesign	Shape	25
32	10	0	27	720	RvbDesign	Rvb Width	14
33	7	0	28	80	RvbDesign	Rvb In	32
34	7	0	29	80	Levels	Host	33
35	8	0	30	160	Levels	Voice1	11
36	8	0	31	160	Levels	Voice2	11
37	8	0	32	160	Levels	Voice3	11
38	8	0	33	160	Levels	Voice4	11
39	8	0	34	200	DelayTime	Host	9
40	7	0	35	100	DelayTime	GldResp	25
41	11	0	36	1365	DelayTime	GldRange	24
42	1	0	37	1	DelayTime	Clear	20
43	1			1	<Tempo Flag>		0
44	11	0	38	1365	DelayTime	Voice1	24
45	1			1	<Tempo Flag>		0
46	11	0	39	1365	DelayTime	Voice2	24
47	1			1	<Tempo Flag>		0
48	11	0	40	1365	DelayTime	Voice3	24
49	1			1	<Tempo Flag>		0
50	11	0	41	1365	DelayTime	Voice4	24
51	7	0	42	100	Feedback	Host	9
52	8	0	43	200	Feedback	Voice1	34
53	8	0	44	200	Feedback	Voice2	34
54	8	0	45	200	Feedback	Voice3	34
55	8	0	46	200	Feedback	Voice4	34
56	7	0	47	100	Panning	Host	12
57	7	0	48	100	Panning	Voice1	12
58	7	0	49	100	Panning	Voice2	12
59	7	0	50	100	Panning	Voice3	12
60	7	0	51	100	Panning	Voice4	12
61	1			1	<Tempo Flag>		0
62	12	1	0	2500	MOD:LFO	Rate	35
63	3	1	1	5	MOD:LFO	Shape	36
64	7	1	2	98	MOD:LFO	P Width	37
65	7	1	3	100	MOD:LFO	Depth	9
66	9	1	4	500	MOD:AR Env	Attack	38
67	9	1	5	500	MOD:AR Env	Release	38
68	2	1	6	3	MOD:AR Env	Mode	39
69	9	1	7	500	MOD:Env L	Release	38
70	9	1	8	500	MOD:Env R	Release	38
71	1			1	<Tempo Flag>		0
72	12	1	9	2500	MOD:Sw 1	Rate	35
73	7	1	10	98	MOD:Sw 1	P Width	37
74	2	1	11	2	MOD:Sw 1	Mode	40
75	1			1	<Tempo Flag>		0
76	12	1	12	2500	MOD:Sw 2	Rate	35
77	7	1	13	98	MOD:Sw 2	P Width	37
78	2	1	14	2	MOD:Sw 2	Mode	40

Concert Hall Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FXADJUST	10
2	8	0	2	160	Controls	InLvlL	11
3	8	0	3	160	Controls	InLvlR	11
4	7	0	4	100	Controls	InPanL	12
5	7	0	5	100	Controls	InPanR	12
6	7	0	6	121	Controls	HighCut	13
7	7	0	7	100	Controls	VoiceDif	9
8	7	0	8	100	Controls	FXMix	9
9	10	0	9	720	Controls	FXWidth	14
10	4	0	10	9	RvbTime	LowRt	15
11	6	0	11	63	RvbTime	MidRt	16
12	6	0	12	60	RvbTime	Crossover	17
13	6	0	13	48	RvbTime	RtHC	18
14	1			1	<TempoFlag>		0
15	10	0	14	465	RvbTime	PreDelay	21
16	4	0	15	15	RvbTime	RefLvlL	22
17	1			1	<TempoFlag>		0
18	10	0	16	600	RvbTime	RefDlyL	21
19	4	0	17	15	RvbTime	RefLvlR	22
20	1			1	<TempoFlag>		0
21	10	0	18	600	RvbTime	RefDlyR	21
22	7	0	19	100	RvbTime	PstMix	9
23	1			1	<TempoFlag>		0
24	11	0	20	1365	RvbTime	PstDlyL	24
25	1			1	<TempoFlag>		0
26	11	0	21	1365	RvbTime	PstDlyR	24
27	7	0	22	100	RvbTime	GldResp	25
28	11	0	23	1365	RvbTime	GldRange	24
29	9	0	24	304	RvbDesign	Size	26
30	7	0	25	100	RvbDesign	Diffusion	9
31	7	0	26	100	RvbDesign	Def	30
32	4	0	27	15	RvbDesign	Depth	25
33	6	0	28	50	RvbDesign	Spin	28
34	4	0	29	10	RvbDesign	Chorus	31
35	1	0	30	1	RvbDesign	Link	20
36	10	0	31	720	RvbDesign	RvbWidth	14
37	7	0	32	80	RvbDesign	RvbIn	32
38	4	0	33	15	RvbDesign	RvbOut	22
39	7	0	34	80	Levels	Host	33
40	8	0	35	160	Levels	Voice1	11
41	8	0	36	160	Levels	Voice2	11
42	8	0	37	160	Levels	Voice3	11
43	8	0	38	160	Levels	Voice4	11
44	8	0	39	200	DelayTime	Host	9
45	7	0	40	100	DelayTime	GldResp	25
46	11	0	41	1365	DelayTime	GldRange	24
47	1	0	42	1	DelayTime	Clear	20
48	1			1	<TempoFlag>		0
49	11	0	43	1365	DelayTime	Voice1	24
50	1			1	<TempoFlag>		0
51	11	0	44	1365	DelayTime	Voice2	24
52	1			1	<TempoFlag>		0
53	11	0	45	1365	DelayTime	Voice3	24
54	1			1	<TempoFlag>		0
55	11	0	46	1365	DelayTime	Voice4	24
56	7	0	47	100	Feedback	Host	9
57	8	0	48	200	Feedback	Voice1	34
58	8	0	49	200	Feedback	Voice2	34
59	8	0	50	200	Feedback	Voice3	34
60	8	0	51	200	Feedback	Voice4	34
61	7	0	52	100	Panning	Host	12
62	7	0	53	100	Panning	Voice1	12
63	7	0	54	100	Panning	Voice2	12
64	7	0	55	100	Panning	Voice3	12
65	7	0	56	100	Panning	Voice4	12
66	1			1	<TempoFlag>		0
67	12	1	0	2500	MOD:LFO	Rate	35
68	3	1	1	5	MOD:LFO	Shape	36
69	7	1	2	98	MOD:LFO	PWidth	37
70	7	1	3	100	MOD:LFO	Depth	9
71	9	1	4	500	MOD:AREnv	Attack	38

72	9	1	5	500	MOD:AREnv	Release	38
73	2	1	6	3	MOD:AREnv	Mode	39
74	9	1	7	500	MOD:EnvL	Release	38
75	9	1	8	500	MOD:EnvR	Release	38
76	1			1	<TempoFlag>		0
77	12	1	9	2500	MOD:Sw1	Rate	35
78	7	1	10	98	MOD:Sw1	PWidth	37
79	2	1	11	2	MOD:Sw1	Mode	40
80	1			1	<TempoFlag>		0
81	12	1	12	2500	MOD:Sw2	Rate	35
82	7	1	13	98	MOD:Sw2	PWidth	37
83	2	1	14	2	MOD:Sw2	Mode	40

M-Band+Rvb Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FX ADJUST	10
2	8	0	2	160	Controls	InLvl L	11
3	8	0	3	160	Controls	InLvl R	11
4	7	0	4	100	Controls	InPan L	12
5	7	0	5	100	Controls	InPan R	12
6	7	0	6	100	Controls	FX Mix	9
7	10	0	7	720	Controls	FX Width	14
8	4	0	8	9	Rvb Time	Low Rt	15
9	6	0	9	63	Rvb Time	Mid Rt	16
10	6	0	10	60	Rvb Time	Crossover	17
11	6	0	11	48	Rvb Time	Rt HC	18
12	1			1	<Tempo Flag>		0
13	10	0	12	465	Rvb Time	PreDelay	21
14	4	0	13	15	Rvb Time	RefLvl L	22
15	1			1	<Tempo Flag>		0
16	10	0	14	600	Rvb Time	RefDly L	21
17	4	0	15	15	Rvb Time	RefLvl R	22
18	1			1	<Tempo Flag>		0
19	10	0	16	600	Rvb Time	RefDly R	21
20	5	0	17	30	Rvb Time	EkoFbk L	23
21	1			1	<Tempo Flag>		0
22	10	0	18	600	Rvb Time	EkoDly L	21
23	5	0	19	30	Rvb Time	EkoFbk R	23
24	1			1	<Tempo Flag>		0
25	10	0	20	600	Rvb Time	EkoDly R	21
26	8	0	21	144	RvbDesign	Size	26
27	7	0	22	100	RvbDesign	Diffusion	9
28	8	0	23	255	RvbDesign	Shape	20
29	8	0	24	255	RvbDesign	Spread	29
30	6	0	25	50	RvbDesign	Spin	28
31	1	0	26	1	RvbDesign	Link	20
32	4	0	27	15	RvbDesign	Rvb Out	23
33	7	0	28	80	Levels	Host	33
34	8	0	29	160	Levels	Voice1	11
35	8	0	30	160	Levels	Voice2	11
36	8	0	31	160	Levels	Voice3	11
37	8	0	32	160	Levels	Voice4	11
38	8	0	33	160	Levels	Voice5	11
39	8	0	34	160	Levels	Voice6	11
40	8	0	35	200	DelayTime	Host	9
41	1	0	36	1	DelayTime	Clear	20
42	1			1	<Tempo Flag>		0
43	16	0	37	43690	DelayTime	Voice1	24
44	1			1	<Tempo Flag>		0
45	16	0	38	43690	DelayTime	Voice2	24
46	1			1	<Tempo Flag>		0
47	16	0	39	43690	DelayTime	Voice3	24
48	1			1	<Tempo Flag>		0
49	16	0	40	43690	DelayTime	Voice4	24
50	1			1	<Tempo Flag>		0
51	16	0	41	43690	DelayTime	Voice5	24
52	1			1	<Tempo Flag>		0
53	16	0	42	43690	DelayTime	Voice6	24

54	8	0	43	240	Filters	Mstr HC	41
55	8	0	44	240	Filters	Mstr LC	41
56	7	0	45	121	Filters	V1 HiCut	13
57	7	0	46	121	Filters	V1 LoCut	42
58	7	0	47	121	Filters	V2 HiCut	13
59	7	0	48	121	Filters	V2 LoCut	42
60	7	0	49	121	Filters	V3 HiCut	13
61	7	0	50	121	Filters	V3 LoCut	42
62	7	0	51	121	Filters	V4 HiCut	13
63	7	0	52	121	Filters	V4 LoCut	42
64	7	0	53	121	Filters	V5 HiCut	13
65	7	0	54	121	Filters	V5 LoCut	42
66	7	0	55	121	Filters	V6 HiCut	13
67	7	0	56	121	Filters	V6 LoCut	42
68	7	0	57	100	Feedback	Host	9
69	8	0	58	200	Feedback	Voice1	34
70	8	0	59	200	Feedback	Voice2	34
71	8	0	60	200	Feedback	Voice3	34
72	8	0	61	200	Feedback	Voice4	34
73	8	0	62	200	Feedback	Voice5	34
74	8	0	63	200	Feedback	Voice6	34
75	7	0	64	100	Panning	Host	12
76	7	0	65	100	Panning	Voice1	12
77	7	0	66	100	Panning	Voice2	12
78	7	0	67	100	Panning	Voice3	12
79	7	0	68	100	Panning	Voice4	12
80	7	0	69	100	Panning	Voice5	12
81	7	0	70	100	Panning	Voice6	12
82	1			1	<Tempo Flag>		0
83	12	1	0	2500	MOD:LFO	Rate	35
84	3	1	1	5	MOD:LFO	Shape	36
85	7	1	2	98	MOD:LFO	P Width	37
86	7	1	3	100	MOD:LFO	Depth	9
87	9	1	4	500	MOD:AR	Env Attack	38
88	9	1	5	500	MOD:AR	Env Release	38
89	2	1	6	3	MOD:AR	Env Mode	39
90	9	1	7	500	MOD:Env	L Release	38
91	9	1	8	500	MOD:Env	R Release	38
92	1			1	<Tempo Flag>		0
93	12	1	9	2500	MOD:Sw 1	Rate	35
94	7	1	10	98	MOD:Sw 1	P Width	37
95	2	1	11	2	MOD:Sw 1	Mode	40
96	1			1	<Tempo Flag>		0
97	12	1	12	2500	MOD:Sw 2	Rate	35
98	7	1	13	98	MOD:Sw 2	P Width	37
99	2	1	14	2	MOD:Sw 2	Mode	40

Glide>Hall Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FX ADJUST	10
2	8	0	2	160	Controls	InLvl L	11
3	8	0	3	160	Controls	InLvl R	11
4	7	0	4	100	Controls	InPan L	12
5	7	0	5	100	Controls	InPan R	12
6	7	0	6	100	Controls	Voice Dif	9
7	7	0	7	100	Controls	FX Mix	9
8	10	0	8	720	Controls	FX Width	14
9	4	0	9	9	Rvb Time	Low Rt	15
10	6	0	10	63	Rvb Time	Mid Rt	16
11	6	0	11	60	Rvb Time	Crossover	17
12	6	0	12	48	Rvb Time	Rt HC	18
13	1			1	<Tempo Flag>		0
14	10	0	13	465	Rvb Time	Pre Delay	21
15	4	0	14	15	Rvb Time	RefLvl L	22
16	1			1	<Tempo Flag>		0
17	10	0	15	600	Rvb Time	RefDly L	21
18	4	0	16	15	Rvb Time	RefLvl R	22
19	1			1	<Tempo Flag>		0
20	10	0	17	600	Rvb Time	RefDly R	21

21	9	0	18	304	RvbDesign	Size	26
22	7	0	19	100	RvbDesign	Diffusion	9
23	7	0	20	100	RvbDesign	Def	30
24	4	0	21	15	RvbDesign	Depth	25
25	6	0	22	50	RvbDesign	Spin	28
26	4	0	23	10	RvbDesign	Chorus	31
27	1	0	24	1	RvbDesign	Link	20
28	7	0	25	80	RvbDesign	Rvb In	32
29	4	0	26	15	RvbDesign	Rvb Out	22
30	7	0	27	80	Glide FX	Gld Lvl	32
31	8	0	28	160	Glide FX	A Lvl L	11
32	9	0	29	420	Glide FX	A Dly L	43
33	8	0	30	160	Glide FX	A Lvl R	11
34	9	0	31	420	Glide FX	A Dly R	43
35	8	0	32	160	Glide FX	B Lvl L	11
36	9	0	33	420	Glide FX	B Dly L	43
37	8	0	34	160	Glide FX	B Lvl R	11
38	9	0	35	420	Glide FX	B Dly R	43
39	8	0	36	200	Glide FX	Fbk L	34
40	8	0	37	200	Glide FX	Fbk R	34
41	8	0	38	200	Glide FX	X-Fbk L	34
42	8	0	39	200	Glide FX	X-Fbk R	34
43	7	0	40	80	Levels	Host	33
44	8	0	41	160	Levels	Voice1	11
45	8	0	42	160	Levels	Voice2	11
46	8	0	43	160	Levels	Voice3	11
47	8	0	44	160	Levels	Voice4	11
48	8	0	45	160	Levels	Voice5	11
49	8	0	46	160	Levels	Voice6	11
50	8	0	47	200	DelayTime	Host	9
51	1	0	48	1	DelayTime	Clear	20
52	1			1	<Tempo Flag>		0
53	16	0	49	42325	DelayTime	Voice1	24
54	1			1	<Tempo Flag>		0
55	16	0	50	42325	DelayTime	Voice2	24
56	1			1	<Tempo Flag>		0
57	16	0	51	42325	DelayTime	Voice3	24
58	1			1	<Tempo Flag>		0
59	16	0	52	42325	DelayTime	Voice4	24
60	1			1	<Tempo Flag>		0
61	16	0	53	42325	DelayTime	Voice5	24
62	1			1	<Tempo Flag>		0
63	16	0	54	42325	DelayTime	Voice6	24
64	7	0	55	100	Feedback	Mstr Fbk	9
65	7	0	56	100	Feedback	Mstr XFbk	9
66	8	0	57	200	Feedback	V1 Fbk	34
67	8	0	58	200	Feedback	V1 X-Fbk	34
68	8	0	59	200	Feedback	V2 Fbk	34
69	8	0	60	200	Feedback	V2 X-Fbk	34
70	8	0	61	200	Feedback	V3 Fbk	34
71	8	0	62	200	Feedback	V3 X-Fbk	34
72	8	0	63	200	Feedback	V4 Fbk	34
73	8	0	64	200	Feedback	V4 X-Fbk	34
74	8	0	65	200	Feedback	V5 Fbk	34
75	8	0	66	200	Feedback	V5 X-Fbk	34
76	8	0	67	200	Feedback	V6 Fbk	34
77	8	0	68	200	Feedback	V6 X-Fbk	34
78	7	0	69	100	Panning	Host	12
79	7	0	70	100	Panning	Voice1	12
80	7	0	71	100	Panning	Voice2	12
81	7	0	72	100	Panning	Voice3	12
82	7	0	73	100	Panning	Voice4	12
83	7	0	74	100	Panning	Voice5	12
84	7	0	75	100	Panning	Voice6	12
85	1			1	<Tempo Flag>		0
86	12	1	0	2500	MOD:LFO	Rate	35
87	3	1	1	5	MOD:LFO	Shape	36
88	7	1	2	98	MOD:LFO	P Width	37
89	7	1	3	100	MOD:LFO	Depth	9
90	9	1	4	500	MOD:AR	Env Attack	38
91	9	1	5	500	MOD:AR	Env Release	38
92	2	1	6	3	MOD:AR	Env Mode	39
93	9	1	7	500	MOD:Env	L Release	38
94	9	1	8	500	MOD:Env	R Release	38
95	1			1	<Tempo Flag>		0
96	12	1	9	2500	MOD:Sw 1	Rate	35
97	7	1	10	98	MOD:Sw 1	P Width	37
98	2	1	11	2	MOD:Sw 1	Mode	40

99	1			1	<Tempo Flag>		0
100	12	1	12	2500	MOD:Sw 2	Rate	35
101	7	1	13	98	MOD:Sw 2	P Width	37
102	2	1	14	2	MOD:Sw	2 Mode	40

Chorus+Rvb Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FX ADJUST	10
2	8	0	2	160	Controls	InLvl L	11
3	8	0	3	160	Controls	InLvl R	11
4	7	0	4	100	Controls	InPan L	12
5	7	0	5	100	Controls	InPan R	12
6	7	0	6	121	Controls	High Cut	13
7	7	0	7	100	Controls	FX Mix	9
8	10	0	8	720	Controls	FX Width	14
9	4	0	9	9	Rvb Time	Low Rt	15
10	6	0	10	63	Rvb Time	Mid Rt	16
11	6	0	11	60	Rvb Time	Crossover	17
12	6	0	12	48	Rvb Time	Rt HC	18
13	1			1	<Tempo Flag>		0
14	10	0	13	465	Rvb Time	Pre Delay	21
15	4	0	14	15	Rvb Time	RefLvl L	22
16	1			1	<Tempo Flag>		0
17	10	0	15	600	Rvb Time	RefDly L	21
18	4	0	16	15	Rvb Time	RefLvl R	22
19	1			1	<Tempo Flag>		0
20	10	0	17	600	Rvb Time	RefDly R	21
21	5	0	18	30	Rvb Time	EkoFbk L	23
22	1			1	<Tempo Flag>		0
23	10	0	19	600	Rvb Time	EkoDly L	21
24	5	0	20	30	Rvb Time	EkoFbk R	23
25	1			1	<Tempo Flag>		0
26	10	0	21	600	Rvb Time	EkoDly R	21
27	8	0	22	144	RvbDesign	Size	26
28	7	0	23	100	RvbDesign	Diffusion	9
29	7	0	24	100	RvbDesign	Attack	25
30	6	0	25	50	RvbDesign	Spin	28
31	1	0	26	1	RvbDesign	Link	20
32	4	0	27	15	RvbDesign	Rvb Out	22
33	7	0	28	80	Levels	Host	33
34	8	0	29	160	Levels	Voice1	11
35	8	0	30	160	Levels	Voice2	11
36	8	0	31	160	Levels	Voice3	11
37	8	0	32	160	Levels	Voice4	11
38	8	0	33	160	Levels	Voice5	11
39	8	0	34	160	Levels	Voice6	11
40	8	0	35	200	DelayTime	Host	9
41	7	0	36	100	DelayTime	GldResp	25
42	11	0	37	1365	DelayTime	GldRange	24
43	1	0	38	1	DelayTime	Clear	20
44	1			1	<Tempo Flag>		0
45	11	0	39	1365	DelayTime	Voice1	24
46	1			1	<Tempo Flag>		0
47	11	0	40	1365	DelayTime	Voice2	24
48	1			1	<Tempo Flag>		0
49	11	0	41	1365	DelayTime	Voice3	24
50	1			1	<Tempo Flag>		0
51	11	0	42	1365	DelayTime	Voice4	24
52	1			1	<Tempo Flag>		0
53	11	0	43	1365	DelayTime	Voice5	24
54	1			1	<Tempo Flag>		0
55	11	0	44	1365	DelayTime	Voice6	24
56	8	0	45	200	Chorus	MstDepth	9
57	8	0	46	200	Chorus	MstRate	9
58	9	0	47	16000	Chorus	V1 Depth	24
59	7	0	48	100	Chorus	V1 Rate	44
60	9	0	49	16000	Chorus	V2 Depth	24
61	7	0	50	100	Chorus	V2 Rate	44

62	9	0	51	16000	Chorus	V3 Depth	24
63	7	0	52	100	Chorus	V3 Rate	44
64	9	0	53	16000	Chorus	V4 Depth	24
65	7	0	54	100	Chorus	V4 Rate	44
66	9	0	55	16000	Chorus	V5 Depth	24
67	7	0	56	100	Chorus	V5 Rate	44
68	9	0	57	16000	Chorus	V6 Depth	24
69	7	0	58	100	Chorus	V6 Rate	44
70	7	0	59	100	Feedback	Host	9
71	8	0	60	200	Feedback	Voice1	34
72	8	0	61	200	Feedback	Voice2	34
73	8	0	62	200	Feedback	Voice3	34
74	8	0	63	200	Feedback	Voice4	34
75	8	0	64	200	Feedback	Voice5	34
76	8	0	65	200	Feedback	Voice6	34
77	7	0	66	100	Panning	Host	12
78	7	0	67	100	Panning	Voice1	12
79	7	0	68	100	Panning	Voice2	12
80	7	0	69	100	Panning	Voice3	12
81	7	0	70	100	Panning	Voice4	12
82	7	0	71	100	Panning	Voice5	12
83	7	0	72	100	Panning	Voice6	12
84	1			1	<Tempo Flag>		0
85	12	1	0	2500	MOD:LFO	Rate	35
86	3	1	1	5	MOD:LFO	Shape	36
87	7	1	2	98	MOD:LFO	P Width	37
88	7	1	3	100	MOD:LFO	Depth	9
89	9	1	4	500	MOD:AR Env	Attack	38
90	9	1	5	500	MOD:AR Env	Release	38
91	2	1	6	3	MOD:AR Env	Mode	39
92	9	1	7	500	MOD:Env L	Release	38
93	9	1	8	500	MOD:Env R	Release	38
94	1			1	<Tempo Flag>		0
95	12	1	9	2500	MOD:Sw 1	Rate	35
96	7	1	10	98	MOD:Sw 1	P Width	37
97	2	1	11	2	MOD:Sw 1	Mode	40
98	1			1	<Tempo Flag>		0
99	12	1	12	2500	MOD:Sw 2	Rate	35
100	7	1	13	98	MOD:Sw 2	P Width	37
101	2	1	14	2	MOD:Sw 2	Mode	40

Res1>Plate Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FX ADJUST	10
2	8	0	2	160	Controls	InLvl L	11
3	8	0	3	160	Controls	InLvl R	11
4	7	0	4	100	Controls	InPan L	12
5	7	0	5	100	Controls	InPan R	12
6	7	0	6	100	Controls	FX Mix	9
7	10	0	7	720	Controls	FX Width	14
8	4	0	8	9	Rvb Time	Low Rt	15
9	6	0	9	63	Rvb Time	Mid Rt	16
10	6	0	10	60	Rvb Time	Crossover	17
11	6	0	11	48	Rvb Time	Rt HC	18
12	1			1	<Tempo Flag>		0
13	10	0	12	465	Rvb Time	Pre Delay	21
14	4	0	13	15	Rvb Time	RefLvl L	22
15	1			1	<Tempo Flag>		0
16	10	0	14	600	Rvb Time	RefDly L	21
17	4	0	15	15	Rvb Time	RefLvl R	22
18	1			1	<Tempo Flag>		0
19	10	0	16	600	Rvb Time	RefDly R	21
20	5	0	17	30	Rvb Time	EkoFbk L	23
21	1			1	<Tempo Flag>		0
22	10	0	18	600	Rvb Time	EkoDly L	21
23	5	0	19	30	Rvb Time	EkoFbk R	23
24	1			1	<Tempo Flag>		0
25	10	0	20	600	Rvb Time	EkoDly R	21

26	8	0	21	144	RvbDesign	Size	26
27	7	0	22	100	RvbDesign	Diffusion	9
28	7	0	23	100	RvbDesign	Attack	25
29	6	0	24	50	RvbDesign	Spin	28
30	1	0	25	1	RvbDesign	Link	20
31	7	0	26	80	RvbDesign	Rvb In	32
32	4	0	27	15	RvbDesign	Rvb Out	22
33	7	0	28	80	Levels	Mstr Lvl	33
34	7	0	29	100	Levels	Mstr Fbk	9
35	8	0	30	160	Levels	V1 Lvl	11
36	8	0	31	200	Levels	V1 Fbk	34
37	8	0	32	160	Levels	V2 Lvl	11
38	8	0	33	200	Levels	V2 Fbk	34
39	8	0	34	160	Levels	V3 Lvl	11
40	8	0	35	200	Levels	V3 Fbk	34
41	8	0	36	160	Levels	V4 Lvl	11
42	8	0	37	200	Levels	V4 Fbk	34
43	8	0	38	160	Levels	V5 Lvl	11
44	8	0	39	200	Levels	V5 Fbk	34
45	8	0	40	160	Levels	V6 Lvl	11
46	8	0	41	200	Levels	V6 Fbk	34
47	8	0	42	200	DelayTime	Host	9
48	1	0	43	1	DelayTime	Clear	20
49	1			1	<Tempo Flag>		0
50	16	0	44	38229	DelayTime	Voice1	24
51	1			1	<Tempo Flag>		0
52	16	0	45	38229	DelayTime	Voice2	24
53	1			1	<Tempo Flag>		0
54	16	0	46	38229	DelayTime	Voice3	24
55	1			1	<Tempo Flag>		0
56	16	0	47	38229	DelayTime	Voice4	24
57	1			1	<Tempo Flag>		0
58	16	0	48	38229	DelayTime	Voice5	24
59	1			1	<Tempo Flag>		0
60	16	0	49	38229	DelayTime	Voice6	24
61	7	0	50	100	Resonance	Mstr Res	9
62	8	0	51	240	Resonance	Mstr HC	41
63	8	0	52	200	Resonance	V1 Res	34
64	7	0	53	121	Resonance	V1 HiCut	13
65	8	0	54	200	Resonance	V2 Res	34
66	7	0	55	121	Resonance	V2 HiCut	13
67	8	0	56	200	Resonance	V3 Res	34
68	7	0	57	121	Resonance	V3 HiCut	13
69	8	0	58	200	Resonance	V4 Res	34
70	7	0	59	121	Resonance	V4 HiCut	13
71	8	0	60	200	Resonance	V5 Res	34
72	7	0	61	121	Resonance	V5 HiCut	13
73	8	0	62	200	Resonance	V6 Res	34
74	7	0	63	121	Resonance	V6 HiCut	13
75	7	0	64	127	Pitch	Assign	45
76	8	0	65	200	Pitch	Tuning	46
77	3	0	66	6	Pitch	Active	25
78	1	0	67	1	Pitch	Unison	20
79	7	0	68	100	Panning	Host	12
80	7	0	69	100	Panning	Voice1	12
81	7	0	70	100	Panning	Voice2	12
82	7	0	71	100	Panning	Voice3	12
83	7	0	72	100	Panning	Voice4	12
84	7	0	73	100	Panning	Voice5	12
85	7	0	74	100	Panning	Voice6	12
86	1			1	<Tempo Flag>		0
87	12	1	0	2500	MOD:LFO	Rate	35
88	3	1	1	5	MOD:LFO	Shape	36
89	7	1	2	98	MOD:LFO	P Width	37
90	7	1	3	100	MOD:LFO	Depth	9
91	9	1	4	500	MOD:AR	Env Attack	38
92	9	1	5	500	MOD:AR	Env Release	38
93	2	1	6	3	MOD:AR	Env Mode	39
94	9	1	7	500	MOD:Env	L Release	38
95	9	1	8	500	MOD:Env	R Release	38
96	1			1	<Tempo Flag>		0
97	12	1	9	2500	MOD:Sw 1	Rate	35
98	7	1	10	98	MOD:Sw 1	P Width	37
99	2	1	11	2	MOD:Sw 1	Mode	40
100	1			1	<Tempo Flag>		0
101	12	1	12	2500	MOD:Sw 2	Rate	35
102	7	1	13	98	MOD:Sw 2	P Width	37
103	2	1	14	2	MOD:Sw 2	Mode	40

Res2>Plate Algorithm Patchable Parameter Bitpack Information

Seq	Bits	Dest List ID	Dest Number	Range	Field		Range Decode
0	7	0	0	100	Controls	Mix	9
1	7	0	1	80	Controls	FX ADJUST	10
2	8	0	2	160	Controls	InLvl L	11
3	8	0	3	160	Controls	InLvl R	11
4	7	0	4	100	Controls	InPan L	12
5	7	0	5	100	Controls	InPan R	12
6	7	0	6	100	Controls	FX Mix	9
7	10	0	7	720	Controls	FX Width	14
8	4	0	8	9	Rvb Time	Low Rt	15
9	6	0	9	63	Rvb Time	Mid Rt	16
10	6	0	10	60	Rvb Time	Crossover	17
11	6	0	11	48	Rvb Time Rt	HC	18
12	1			1	<Tempo Flag>		0
13	10	0	12	465	Rvb Time	Pre Delay	21
14	4	0	13	15	Rvb Time	RefLvl L	22
15	1			1	<Tempo Flag>		0
16	10	0	14	600	Rvb Time	RefDly L	21
17	4	0	15	15	Rvb Time	RefLvl R	22
18	1			1	<Tempo Flag>		0
19	10	0	16	600	Rvb Time	RefDly R	21
20	5	0	17	30	Rvb Time	EkoFbk L	23
21	1			1	<Tempo Flag>		0
22	10	0	18	600	Rvb Time	EkoDly L	21
23	5	0	19	30	Rvb Time	EkoFbk R	23
24	1			1	<Tempo Flag>		0
25	10	0	20	600	Rvb Time	EkoDly R	21
26	8	0	21	144	RvbDesign	Size	26
27	7	0	22	100	RvbDesign	Diffusion	9
28	7	0	23	100	RvbDesign	Attack	25
29	6	0	24	50	RvbDesign	Spin	28
30	1	0	25	1	RvbDesign	Link	20
31	7	0	26	80	RvbDesign	Rvb In	32
32	4	0	27	15	RvbDesign	Rvb Out	22
33	7	0	28	80	Levels	Mstr Lvl	33
34	7	0	29	100	Levels	Mstr Fbk	9
35	8	0	30	160	Levels	V1 Lvl	11
36	8	0	31	200	Levels	V1 Fbk	34
37	8	0	32	160	Levels	V2 Lvl	11
38	8	0	33	200	Levels	V2 Fbk	34
39	8	0	34	160	Levels	V3 Lvl	11
40	8	0	35	200	Levels	V3 Fbk	34
41	8	0	36	160	Levels	V4 Lvl	11
42	8	0	37	200	Levels	V4 Fbk	34
43	8	0	38	160	Levels	V5 Lvl	11
44	8	0	39	200	Levels	V5 Fbk	34
45	8	0	40	160	Levels	V6 Lvl	11
46	8	0	41	200	Levels	V6 Fbk	34
47	8	0	42	200	DelayTime	Host	9
48	1	0	43	1	DelayTime	Clear	20
49	1			1	<Tempo Flag>		0
50	16	0	44	38229	DelayTime	Voice1	24
51	1			1	<Tempo Flag>		0
52	16	0	45	38229	DelayTime	Voice2	24
53	1			1	<Tempo Flag>		0
54	16	0	46	38229	DelayTime	Voice3	24
55	1			1	<Tempo Flag>		0
56	16	0	47	38229	DelayTime	Voice4	24
57	1			1	<Tempo Flag>		0
58	16	0	48	38229	DelayTime	Voice5	24
59	1			1	<Tempo Flag>		0
60	16	0	49	38229	DelayTime	Voice6	24
61	7	0	50	100	Resonance	Mstr Res	9
62	8	0	51	240	Resonance	Mstr HC	41
63	8	0	52	200	Resonance	V1 Res	34
64	7	0	53	121	Resonance	V1 HiCut	13
65	8	0	54	200	Resonance	V2 Res	34
66	7	0	55	121	Resonance	V2 HiCut	13
67	8	0	56	200	Resonance	V3 Res	34
68	7	0	57	121	Resonance	V3 HiCut	13
69	8	0	58	200	Resonance	V4 Res	34
70	7	0	59	121	Resonance	V4 HiCut	13
71	8	0	60	200	Resonance	V5 Res	34

72	7	0	61	121	Resonance	V5 HiCut	13
73	8	0	62	200	Resonance	V6 Res	34
74	7	0	63	121	Resonance	V6 HiCut	13
75	7	0	64	127	Pitch	Assign	45
76	8	0	65	200	Pitch	Tuning	46
77	3	0	66	6	Pitch	Active	25
78	4	0	67	11	Pitch	Key	47
79	1	0	68	1	Pitch	Scale	48
80	3	0	69	6	Pitch	Root	49
81	2	0	70	3	Pitch	Rule	50
82	7	0	71	70	Pitch	Voice1	51
83	7	0	72	70	Pitch	Voice2	51
84	7	0	73	70	Pitch	Voice3	51
85	7	0	74	70	Pitch	Voice4	51
86	7	0	75	70	Pitch	Voice5	51
87	7	0	76	70	Pitch	Voice6	51
88	7	0	77	100	Panning	Host	12
89	7	0	78	100	Panning	Voice1	12
90	7	0	79	100	Panning	Voice2	12
91	7	0	80	100	Panning	Voice3	12
92	7	0	81	100	Panning	Voice4	12
93	7	0	82	100	Panning	Voice5	12
94	7	0	83	100	Panning	Voice6	12
95	1			1	<Tempo Flag>		0
96	12	1	0	2500	MOD:LFO	Rate	35
97	3	1	1	5	MOD:LFO	Shape	36
98	7	1	2	98	MOD:LFO	P Width	37
99	7	1	3	100	MOD:LFO	Depth	9
100	9	1	4	500	MOD:AR Env	Attack	38
101	9	1	5	500	MOD:AR Env	Release	38
102	2	1	6	3	MOD:AR Env Mode	39	
103	9	1	7	500	MOD:Env L	Release	38
104	9	1	8	500	MOD:Env R	Release	38
105	1			1	<Tempo Flag>		0
106	12	1	9	2500	MOD:Sw 1	Rate	35
107	7	1	10	98	MOD:Sw 1	P Width	37
108	2	1	11	2	MOD:Sw 1	Mode	40
109	1			1	<Tempo Flag>		0
110	12	1	12	2500	MOD:Sw 2	Rate	35
111	7	1	13	98	MOD:Sw 2	P Width	37
112	2	1	14	2	MOD:Sw 2	Mode	40

Unpatchable and Patchable Parameter Range Decode

To elliminate excessive repetition unpatchable and patchable parameters are given “range decode” numbers. These numbers can be used to reference this list for the key to decoding the parameter in its useful range. For example, in the Plate Algorithm Patchable Parameters, the Feedback Voice1 (seq 61) has a Range Decode of 34. Looking through this section you will find that 34 indicates that this always refers to a range 200 parameter and that the values 0-200 translate to -100% to 0% to 100%, inclusive, for a total of 201 values.

Range Decode 0
Null. This is a catchall for parameter fields that have no display, or for which a range decode is meaningless. All Tempo Flags are given this designation.

Range Decode 1
Tempo. The value in the parameter represents a tempo. Add 40 to the value toget the tempo in BPM.

Range Decode 2
Threshold. The value will be displayed numerically, with the word “Threshold” preceding it.

Range Decode 3
Patch Source. The value is used to look up the name of the Patch Source. See Patch Source List.

Range Decode 4
Tap Duration. The value is used as a lookup to the following list of tap durations.
1/8, 1/7, 1/6, 1/5, 1/4, 1/3, 1/2, 1, 2, 3, 4, 5, 6, 7, 8

Range Decode 5
BeatValue. The value is used as a lookup to the following list of beat values.
Eighth, Dotted Eighth, Quarter, Dotted Quarter, Half, Dotted Half, Whole

Range Decode 6
Tap average. The value is used as a lookup to the following valid tap average values.
2, 3, 4, 5, 6, 7, 8

Range Decode 7
ADJUST low limit. Displays the value as Low Limit: value.

Range Decode 8
ADJUST high limit. Displays the value as High Limit: value.

Range Decode 9
Percent. The value is displayed as a percent. Zero percent is displayed as “0%”

Range Decode 10
FX ADJUST values. The value is used as a lookup to the following 81 valid FX ADJUST assignments.

Off, -73db, -69db, -67db, -65db, -63db, -62db, -61db, -60db, -59db, -58db, -57db, -56db, -55db, -54db, -53db, -52db, -51db, -50db, -49db, -48db, -47db, -46db, -45db, -44db, -43db, -42db, -41db, -40db, -39db, -38db, -37db, -36db, -35db, -34db, -33db, -32db, -31db, -30db, -29db, -28db, -27db, -26db, -25db, -24db, -23db, -22db, -21db, -20db, -19db, -18db, -17db, -16db, -15db, -14db, -13db, -12db, -11db, -10db, -9db, -8db, -7db, -6db, -5db, -4db, -3db, -2db, -1db, +0db, +1db, +2db, +3db, +4db, +5db, +6db, +7db, +8db, +9db, +10db, +11db, +12db

Range Decode 11

Full range and phase level gain control. The value is used as a lookup to the following 161 level and phase assignments.

Phase Inverted (80 values) +0db -1db, -2db, -3db, -4db, -5db, -6db, -7db, -8db, -9db, -10db, -db, -12db, -13db, -14db, -15db, -16db, -17db, -18db, -19db, -20db, -21db, -22db, -23db, -24db, -25db, -26db, -27db, -28db, -29db, -30db, -31db, -32db, -33db, -34db, -35db, -36db, -37db, -38db, -39db, -40db, -41db, -42db, -43db, -44db, -45db, -46db, -47db, -48db, -49db, -50db, -51db, -52db, -53db, -54db, -55db, -56db, -57db, -58db, -59db, -60db, -61db, -62db, -63db, -64db, -65db, -66db, -67db, -68db, -69db, -70db, -71db, -72db, -73db, -74db, -75db, -77db, -79db, -81db, -85db,

Off

Phase Normal (80 values) -85db, -81db, -79db, -77db, -75db, -74db, -73db, -72db, -71db, -70db, -69db, -68db, -67db, -66db, -65db, -64db, -63db, -62db, -61db, -60db, -59db, -58db, -57db, -56db, -55db, -54db, -53db, -52db, -51db, -50db, -49db, -48db, -47db, -46db, -45db, -44db, -43db, -42db, -41db, -40db, -39db, -38db, -37db, -36db, -35db, -34db, -33db, -32db, -31db, -30db, -29db, -28db, -27db, -26db, -25db, -24db, -23db, -22db, -21db, -20db, -19db, -18db, -17db, -16db, -15db, -14db, -13db, -12db, -11db, -10db, -9db, -8db, -7db, -6db, -5db, -4db, -3db, -2db, -1db, +0db

Range Decode 12

Pan positions. Values 0-49 display as L50-L1. The value 50 displays as “C”. Values 51-100 display as R1-R50.

Range Decode 13

High cut filter positions. The value is used as a lookup to the following list of valid filter crossover frequencies.

20, 21, 22, 23, 25, 26, 27, 28, 31, 32, 35, 37, 40, 42, 45, 47, 50, 52, 56, 58, 62, 66, 70, 74, 80, 84, 90, 94, 100, 105, 110, 115, 125, 130, 140, 150, 160, 170, 180, 190, 200, 210, 225, 235, 250, 265, 285, 300, 320, 340, 360, 380, 400, 425, 450, 475, 500, 525, 550, 600, 625, 675, 700, 750, 800, 850, 900, 950, 1000, 1050, 1100, 1200, 1250, 1350, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2150, 2250, 2400, 2550, 2700, 2850, 3000, 3200, 3400, 3600, 3800, 4050, 4300, 4550, 4800, 5000, 5250, 5750, 6000, 6250, 6750, 7000, 7500, 8000, 8500, 9000, 9500, 10000, 10500, 11500, 12000, 12500, 13500, 14000, 15000, 16000, 17000, 18000, 19000, 20000, Off

Range Decode 14

Width. The range (which is always 720) is display as integer values from -360 through 0 to +360 with the following additional annotation at the given display value points.

Display Value	Annotation
-360, 0, 360	MONO
-315 and 45	STEREO
-270 and 90	L-R, R-L
-225 and 135	R, L INV
-180 and 180	MONO INV
-135 and 225	STEREO INV
-90 and 270	R-L, L-R
-45 and 315	R, L

Range Decode 15

Low Rt. The value is used as a lookup to the valid low reverb time multiplier.

0.2X, 0.4X, 0.6X, 0.8X, 1.0X, 1.2X, 1.5X, 2.0X, 3.0X, 4.0X

Range Decode 16
Mid Rt. The value to display translation for Range Decode 16 Mid Rt (and for Range Decode 29 Spread) is not straightforward because it is dependent on the values of the RvbDesign Link and RvbDesign Size parameters.

First, Mid Rt always has a range of 0-63. The value is used as a lookup to the following table of millisecond assignments:

242, 291, 329, 363, 395, 425, 454, 483, 512, 541, 570, 600, 629, 660, 691, 723, 755, 789, 824, 860, 897, 935, 975, 1017, 1061, 1106, 1154, 1203, 1256, 1311, 1369, 1430, 1495, 1564, 1637, 1715, 1799, 1888, 1984, 2088, 2200, 2321, 2453, 2598, 2757, 2932, 3126, 3344, 3588, 3864, 4179, 4543, 4967, 5468, 6069, 6802, 7719, 8897, 10468, 12666, 15963, 21456, 32441, 65393

If the value of the RvbDesign Link parameter is Off, then the displayed Mid Rt is that millisecond value rounded up by 50 milliseconds. For example: 3588 will display as 3.63 seconds. If the RvbDesign Link parameter is On, then the Mid Rt value is scaled by the following integer math formula:

(((RvbDesign Size value + 16)/16) * Mid Rt milliseconds)/10
(Round up by 50 ms as before).

Example: With the Plate reverb loaded (from Plate, Chorus+Rvb, Res1>Plate, or Res2>Plate) and RvbDesign Link is assigned to On. RvbDesign Size parameter has a value of 0 (which is 4.0 meters) and RvbTime Mid Rt is has a value of 63 which looks up as 65393 milliseconds. Scaled Mid Rt = (((0 + 16)/16) * 65393)/10 = 6539 milliseconds. Displayed Mid Rt = 6.58 seconds.

A few more brief examples:

Plate	RvbDesign Size value 90 (49.0 meters) RvbTime Mid Rt value 43 (2598 msecs) (((90 + 16)/16) * 2598)/10 = 1558 msecs Display 1.60 seconds
Concert Hall	RvbDesign Size value 269 (138.5 meters) RvbTime Mid Rt value 62 (32441 msecs) (((269 + 16)/16) * 32441)/10 = 55149 msecs Display 55.1 seconds

Range Decode 17
The value is used as a lookup to the following valid filter crossover assignments.

30, 60, 90, 120, 151, 181, 212, 243, 273, 336, 398, 461, 525, 589, 654, 818, 986, 1158, 1333, 1513, 1697, 1886, 2079, 2278, 2481, 2691, 2906, 3127, 3355, 3591, 3833, 4084, 4343, 461, 4888, 5177, 5476, 5788, 6113, 6453, 6808, 7181, 7573, 7986, 8423, 8886, 9379, 9906, 10472, 11084, 11748, 12476, 13281, 14181, 15201, 16379, 17772, 19476, 21674, 24772, Off

Range Decode 18
The value is used as a lookup to the following valid filter crossover assignments.

525, 589, 654, 818, 986, 1158, 1333, 1513, 1697, 1886, 2079, 2278, 2481, 2691, 2906, 3127, 3355, 3591, 3833, 4084, 4343, 4611, 4888, 5177, 5476, 5788, 6113, 6453, 6808, 7181, 7573, 7986, 8423, 8886, 9379, 9906, 10472, 11084, 11748, 12476, 13281, 14181, 15201, 16379, 17772, 19476, 21674, 24772, Off

Range Decode 19
Rvb Time Inverse algorithm slopes. The parameter is always range 32 and the values 0-32 translate to the display -64% through 0% to +64% in increments of 4%.

Range Decode 20
Off/On. The values 0 and 1 are displayed as “Off” and “On” respectively.

Range Decode 21
The value represents time in increments of 2 milliseconds.

Range Decode 22
The value is used as a lookup to the following valid gain assignments.

Off, -24.0db, -18.0db, -14.5db, -12.0db, -10.1db, -8.5db, -7.2db, -6.0db, -5.0db, -4.0db, -3.3db, -2.5db, -1.8db, -1.0db, Full

Range Decode 23
The value is used as a lookup to the following percent assignments.

-100, -93, -87, -80, -73, -67, -60, -53, -47, -40, -33, -27, -20, -13, -7, +0, +7, +13, +20, +27, +33, +40, +47, +53, +60, +67, +73, +80, +87, +93, +100

Range Decode 24
The value represents time in increments of 1 millisecond.

Range Decode 25
Simple. The value is displayed without units, displacement or multiplier.

Range Decode 26
Room Size. The value represents a reverberation room size. 0 indicates the smallest room size which is 4.0 meters. Each successive value is an increment of 0.5 meters.

Range Decode 27
Duration. The value represents a time starting at 140 milliseconds with increments of 5 milliseconds.

Range Decode 28
The value represents a percent value in increments of 2%.

Range Decode 29
Spread. The value to display translation for Spread is not straightforward because it is dependent on the values of the RvbDesign Link and RvbDesign Size parameters. (Spread is only found in the Chamber and Infinite reverbs, therefore in the three algorithms: Chamber, Infinite and M-Band+Rvb).

Spread always has a range of 0-255. The value is used directly. If the value of the RvbDesign Link parameter is Off, then the displayed Spread is the value 0-255. If the RvbDesign Link parameter is On, then the Spread value is scaled by the following integer math formula:

((RvbDesign Size value + 16) * RvbDesign Spread value)/160

Example: RvbDesign Size value 103 (55.5 meters)
RvbDesign Spread value 147
((103 + 16) * 147)/160 = 109

Range Decode 30
Percent. Similar to range decode 9, the value is displayed as a percent. Zero percent is displayed as “Off”.

Range Decode 31
Similar to Range Decode 26. The value is displayed without units, displacement or multiplier. A value of 0, however, is displayed as “Off”.

Range Decode 32
The value is used as a lookup to the following 81 level gain assignments.

-85db, -81db, -79db, -77db, -75db, -74db, -73db, -72db, -71db, -70db, -69db, -68db, -67db, -66db, -65db, -64db, -63db, -62db, -61db, -60db, -59db, -58db, -57db, -56db, -55db, -54db, -53db, -52db, -51db, -50db, -49db, -48db, -47db, -46db, -45db, -44db, -43db, -42db, -41db, -40db, -39db, -38db, -37db, -36db, -35db, -34db, -33db, -32db, -31db, -30db, -29db, -28db, -27db, -26db, -25db, -24db, -23db, -22db, -21db, -20db, -19db, -18db, -17db, -16db, -15db, -14db, -13db, -12db, -11db, -10db, -9db, -8db, -7db, -6db, -5db, -4db, -3db, -2db, -1db, +0db

Range Decode 33
Host level. The parameter always has a range of 80. The values display as -40db through +0db to +40db in 1db increments.

Range Decode 34
Bipolar percent. The parameter always has a range of 200 which maps to the display values -100% through 0% to 100%.

Range Decode 35
Rate in Hertz. The value represents a frequency in Hertz in increments of 0.01 Hz.

Range Decode 36
The value is used as a lookup to the following LFO shape assignments:
Sine, Cosine, Square, Saw, Pulse, Triangle

Range Decode 37
The value represents the assignments of a percent from 1% to 99% for a total of 98 values.

Range Decode 38
The value represents a time starting at zero with increments of 20 milliseconds.

Range Decode 39
The value is used as a lookup to the following envelope mode assignments:
Off, One Shot, Retrigger, Repeat

Range Decode 40
The value is used as a lookup to the following switch mode assignments:
Off, Switch, Ramp

Range Decode 41
The parameter always has a range of 240 and the displayed value goes from -121 through 0 to +119.

Range Decode 42
Low cut filter positions. The value is used as a lookup to the following list of valid filter crossover frequencies.

Off, 20, 21, 22, 23, 25, 26, 27, 28, 31, 32, 35, 37, 40, 42, 45, 47, 50, 52, 56, 58, 62, 66, 70, 74, 80, 84, 90, 94, 100, 105, 110, 115, 125, 130, 140, 150, 160, 170, 180, 190, 200, 210, 225, 235, 250, 265, 285, 300, 320, 340, 360, 380, 400, 425, 450, 475, 500, 525, 550, 600, 625, 675, 700, 750, 800, 850, 900, 950, 1000, 1050, 1100, 1200, 1250, 1350, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2150, 2250, 2400, 2550, 2700, 2850, 3000, 3200, 3400, 3600, 3800, 4050, 4300, 4550, 4800, 5000, 5250, 5750, 6000, 6250, 6750, 7000, 7500, 8000, 8500, 9000, 9500, 10000, 10500, 11500, 12000, 12500, 13500, 14000, 15000, 16000, 17000, 18000, 19000, 20000

Range Decode 43
The value represents a time starting at zero with increments of 0.1 milliseconds.

Range Decode 44
Chorus rate frequencies. The value is used as a lookup to the following list of chorus rate frequencies in Hertz.

0.00, 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.10, 0.11, 0.12, 0.13, 0.14, 0.15, 0.16, 0.17, 0.18, 0.19, 0.20, 0.22, 0.24, 0.26, 0.28, 0.30, 0.32, 0.34, 0.36, 0.38, 0.40, 0.42, 0.44, 0.46, 0.48, 0.50, 0.52, 0.54, 0.56, 0.58, 0.60, 0.62, 0.64, 0.66, 0.68, 0.70, 0.72, 0.74, 0.76, 0.78, 0.80, 0.84, 0.88, 0.92, 0.96, 1.00, 1.05, 1.10, 1.15, 1.20, 1.25, 1.30, 1.35, 1.40, 1.45, 1.50, 1.55, 1.60, 1.65, 1.70, 1.75, 1.80, 1.85, 1.90, 1.95, 2.00, 2.05, 2.10, 2.15, 2.20, 2.25, 2.30, 2.35, 2.40, 2.45, 2.50, 2.55, 2.60, 2.65, 2.70, 2.75, 2.80, 2.85, 2.90, 2.95, 3.00, 3.10, 3.20, 3.30, 3.40, 3.50

Range Decode 45
Pitch assignement. The parameter is always 0-127, and maps to note assignments C0-G10.

Range Decode 46
Pitch tuning. The parameter always has a range of 200 and maps to the A440 tuning frequencies 430.0-450.0 Hz in 0.1 Hz increments.

Range Decode 47
Pitch Key. The parameter always has a range 0-11 which map to a key based on the 12 diatonic notes starting at C, C#/Db, etc. up to B.

Range Decode 48
Pitch scale. The value is used as a lookup to the following scale assignments:

Major, Harmonic

Range Decode 49
Pitch root. The parameter always has a range of 0 through 6 and is displayed as 1 through 7.

Range Decode 50
Pitch rule. The value is used as a lookup to the following harmonization rule assignments:

Round Down, Round Up, Shift Down, Shift Up

Range Decode 51
Pitch intervals. The parameter always has a range of 0-70. The values map to intervals from 5 octaves down to 5 octaves up (7 notes/octave plus unison = 71 values). Without listing the precise text for all 71 positions, the form of the display can be derived from the following examples:

Value	Display
00	-5 Oct
01	-4 Oct -7th
02	-4 Oct -6th
03	-4 Oct -5th
32	-4th
33	-3rd
34	-2nd
35	Unison
36	+2nd
37	+3rd
69	+4 Oct +7th
70	+5 Oct

Annotated dump of selected presets

Annotated dump of FSw2 Elevate

Algorithm : Plate
Register name : FSw2 Elevate
Knob name: Feedback
Edit position : Soft Row, Slot 0

Soft Row 0.0 0.3 0.4 0.5 0.6 4.0 5.0 6.1 6.3 7.1

Tempo	Rate		75 BPM
AR Env	T Lvl	Threshold	1
Sw 1	T Lvl	Threshold	1
Sw 2	T Lvl	Threshold	0
Latch	Low	Threshold	0
Latch	High	Threshold	0
AR Env	T Src	Int	Foot Sw 2
Sw 1	T Src	Int	Foot Sw 1
Sw 2	T Src	Int	Off
Latch	Src	Int	Off
Tap	Duration	1 beat	
Tempo	BeatValue		Quarter
Tap	Average		2 taps
Controls	ADJUST	Low Limit:	0
Controls	ADJUST	High Limit:	99

ADJUST initial value is 45

Controls	Mix	100% Wet
Controls	FX ADJUST	+3 dB
Controls	nLvl L	-6 dB
Controls	nLvl R	-6 dB
Controls	InPan L	50 L
Controls	InPan R	50 R
Controls	High Cut	8.00 kHz
Controls	Voice Dif	Full
Controls	FX Mix	0% Reverb
Controls	FX Width	+45 STEREO
Rvb Time	Low Rt	1.5X
Rvb Time	Mid Rt	0.59 sec
Rvb Time	Crossover	986 Hz
Rvb Time	Rt HC	8.42 kHz
Rvb Time	Pre Delay	0 ms
Rvb Time	RefLvl L	Full
Rvb Time	RefDly L	0 ms
Rvb Time	RefLvl R	Full
Rvb Time	RefDly R	0 ms
Rvb Time	EkoFbk L	+0%
Rvb Time	EkoDly L	0 ms
Rvb Time	EkoFbk R	+0%
Rvb Time	EkoDly R	0 ms
Rvb Time	PstMix	50% Delay
Rvb Time	PstDly L	0 ms
Rvb Time	PstDly R	0 ms
Rvb Time	GldResp	100
Rvb Time	GldRange	12 ms
RvbDesign	Size	60.5 Meters
RvbDesign	Diffusion	93%
RvbDesign	Attack	18
RvbDesign	Spin	30%
RvbDesign	Link	Off
RvbDesign	Rvb Width	+45 STEREO
RvbDesign	Rvb In	Full
RvbDesign	Rvb Out	Full
Levels	Host	+0 dB
Levels	Voice1	Full
Levels	Voice2	Off
Levels	Voice3	Full
Levels	Voice4	-85 dB
DelayTime	Host	100%
DelayTime	GldResp	50
DelayTime	GldRange	30 ms
DelayTime	Clear	Off
DelayTime	Voice1	2: 1 Echo:Beat
DelayTime	Voice2	0 ms
DelayTime	Voice3	1: 1 Echo:Beat
DelayTime	Voice4	0 ms

Feedback	Host	63%
Feedback	Voice1	-90%
Feedback	Voice2	+0%
Feedback	Voice3	-90%
Feedback	Voice4	+0%
Panning	Host	C
Panning	Voice1	50 L
Panning	Voice2	50 L
Panning	Voice3	50 R
Panning	Voice4	50 R
MOD:LFO	Rate	0.10 Hz
MOD:LFO	Shape	Sine
MOD:LFO	P Width	50%
MOD:LFO	Depth	100%
MOD:AR Env	Attack	1.280 sec
MOD:AR Env	Release	1.220 sec
MOD:AR Env	Mode	Retrigger
MOD:Env L	Release	0 ms
MOD:Env R	Release	0 ms
MOD:Sw 1	Rate	0.47 Hz
MOD:Sw 1	P Width	50%
MOD:Sw 1	Mode	Ramp
MOD:Sw 2	Rate	0.00 Hz
MOD:Sw 2	P Width	50%
MOD:Sw 2	Mode	Off

Patch 0	Source Int ADJUST		Dest Feedback Host to
	0	0%	
	99	to	99%
Patch 1	Source Int AR Env		Dest Controls InLvl L
	0	to	-6 dB
	127	to	-12 dB
Patch 2	Source Int LFO		Dest DelayTime Host to
	0	100%	
	127	to	107%
Patch 3	Source Int LFO		Dest Rvb Time PstDly L
	0	to	46 ms
	127	to	0 ms
Patch 4	Source Int LFO		Dest Rvb Time PstDly R
	0	to	0 ms
	127	to	46 ms
Patch 5	Source Int AR Env		Dest DelayTime Voice1
	0	to	1: 1 Echo:Beat
	127	to	12: 1 Echo:Beat
Patch 6	Source Int AR Env		Dest DelayTime Voice3
	0	to	1: 1 Echo:Beat
	127	to	12: 1 Echo:Beat
Patch 7	Source Int AR Env		Dest Feedback Host to
	0	0%	
	127	to	80%
Patch 8	Source Int AR Env		Dest Controls FX Width
	0	to	+45 STEREO
	127	to	-45 R, L
Patch 9	Source Int AR Env		Dest Controls InLvl R
	0	to	-6 dB
	127	to	-12 dB

Annotated dump of RandomImages

Effect Algorithm: Chorus+Rvb
Register name : RandomImages
Knob name : ImageKnob
Edit position : Soft Row, Slot 0

Soft Row 0.0 6.0 0.4 2.0 4.0 Unassigned 5 slots

Tempo	**Rate**	**120 BPM**	
AR Env	T Lvl	Threshold	0
Sw 1	T Lvl	Threshold	0
Sw 2	T Lvl	Threshold	0
Latch	Low	Threshold	0
Latch	High	Threshold	0
AR Env	T Src	Int	Off
Sw 1	T Src	Int	Off
Sw 2	T Src	Int	Off
Latch	Src	Int	Off
Tap	Duration	1 beat	
Tempo	BeatValue	Quarter	
Tap	Average	2 taps	
Controls	ADJUST	Low Limit:	0
Controls	ADJUST	High Limit:	127

ADJUST initial value is 14

Controls	Mix	100% Wet
Controls	FX ADJUST	+2 dB
Controls	InLvl L	Full
Controls	InLvl R	Full
Controls	InPan L	50 L
Controls	InPan R	50 R
Controls	High Cut	Off
Controls	FX Mix	18% Reverb
Controls	FX Width	+60
Rvb Time	Low Rt	0.8X
Rvb Time	Mid Rt	1.72 sec
Rvb Time	Crossover	60 Hz
Rvb Time	Rt HC	6.81 kHz
Rvb Time	Pre Delay	0 ms
Rvb Time	RefLvl L	Full
Rvb Time	RefDly L	30 ms
Rvb Time	RefLvl R	Full
Rvb Time	RefDly R	32 ms
Rvb Time	EkoFbk L	+7%
Rvb Time	EkoDly L	1: 4 Echo:Beat
Rvb Time	EkoFbk R	+7%
Rvb Time	EkoDly R	1: 2 Echo:Beat
RvbDesign	Size	37.5 Meters
RvbDesign	Diffusion	69%
RvbDesign	Attack	91
RvbDesign	Spin	36%
RvbDesign	Link	On
RvbDesign	Rvb Out	Full
Levels	Host	+0 dB
Levels	Voice1	Full
Levels	Voice2	-24 dB inv
Levels	Voice3	-18 dB
Levels	Voice4	-2 dB inv
Levels	Voice5	-24 dB
Levels	Voice6	-15 dB inv
DelayTime	Host	10%
DelayTime	GldResp	2
DelayTime	GldRange	1.080 sec
DelayTime	Clear	Off
DelayTime	Voice1	40 ms
DelayTime	Voice2	103 ms
DelayTime	Voice3	1: 2 Echo:Beat
DelayTime	Voice4	52 ms
DelayTime	Voice5	20 ms
DelayTime	Voice6	1: 4 Echo:Beat
Chorus	MstDepth	200%
Chorus	MstRate	100%
Chorus	V1 Depth	32 ms
Chorus	V1 Rate	0.22 Hz
Chorus	V2 Depth	24 ms
Chorus	V2 Rate	0.44 Hz
Chorus	V3 Depth	26 ms
Chorus	V3 Rate	0.50 Hz

Chorus	V4 Depth	28 ms
Chorus	V4 Rate	0.60 Hz
Chorus	V5 Depth	38 ms
Chorus	V5 Rate	0.64 Hz
Chorus	V6 Depth	26 ms
Chorus	V6 Rate	0.74 Hz
Feedback	Host	60%
Feedback	Voice1	+0%
Feedback	Voice2	+0%
Feedback	Voice3	+76%
Feedback	Voice4	+0%
Feedback	Voice5	+0%
Feedback	Voice6	-90%
Panning	Host	C
Panning	Voice1	C
Panning	Voice2	22 L
Panning	Voice3	30 L
Panning	Voice4	C
Panning	Voice5	15 R
Panning	Voice6	30 R
MOD:LFO	Rate	0.36 Hz
MOD:LFO	Shape	Sine
MOD:LFO	P Width	99%
MOD:LFO	Depth	100%
MOD:AR Env	Attack	0 ms
MOD:AR Env	Release	0 ms
MOD:AR Env	Mode	Retrigger
MOD:Env L	Release	0 ms
MOD:Env R	Release	0 ms
MOD:Sw 1	Rate	0.00 Hz
MOD:Sw 1	P Width	50%
MOD:Sw 1	Mode	Off
MOD:Sw 2	Rate	0.00 Hz
MOD:Sw 2	P Width	50%
MOD:Sw 2	Mode	Off

Patch 0	Source Int Mono Lvl		Dest MOD:LFO Rate
	0	to	2.17 Hz
	1	to	0.63 Hz
	2	to	0.01 Hz
	30	to	0.01 Hz
	60	to	0.00 Hz
	100	to	0.03 Hz
	127	to	0.05 Hz
Patch 1	Source Int LFO		Dest Panning Voice1
	0	to	40 L
	127	to	40 R
Patch 2	Source Int LFO		Dest Panning Voice3
	0	to	30 L
	127	to	50 L
Patch 3	Source Int ADJUST		Dest Feedback Voice6
	0	to	-4%
	127	to	-71%
Patch 4	Source Int LFO		Dest Panning Voice4
	0	to	50 L
	127	to	50 R
Patch 5	Source Int LFO		Dest Panning Voice6
	0	to	50 R
	127	to	30 R
Patch 6	Source Int ADJUST		Dest Feedback Voice3
	0	to	+5%
	127	to	+80%
Patch 7	Source Int ADJUST		Dest Levels Host to
	0	+0 dB	
	18	to	+12 dB
	36	to	+18 dB
	54	to	+18 dB
	72	to	+12 dB
	90	to	+6 dB
	108	to	+12 dB
	127	to	+24 dB
Patch 8	Source Int ADJUST		Dest Chorus MstDepth
	0	to	0%
	54	to	0%
	72	to	25%
	90	to	100%
	108	to	166%
	127	to	80%

Patch 9	Source Int ADJUST		Dest DelayTime Host to
	0	10%	
	18	to	25%
	36	to	25%
	54	to	75%
	72	to	75%
	90	to	25%
	108	to	0%
	127	to	200%

Annotated dump of Super Ball!

Effect Algorithm : Glide>Hall
Register name : Super Ball!
Knob name: Bounce It
Edit position : Soft Row, Slot 0

Soft Row 0.0 0.1 0.4 1.1 1.5 2.0 5.1 5.4 8.1 Unassigned

Tempo	**Rate**		**111 BPM**
AR Env	T Lvl	Threshold	1
Sw 1	T Lvl	Threshold	0
Sw 2	T Lvl	Threshold	0
Latch	Low	Threshold	0
Latch	High	Threshold	100
AR Env	T Src	Int	ADJUST
Sw 1	T Src	Int	Off
Sw 2	T Src	Int	Off
Latch	Src	Int	Foot Sw 1
Tap	Duration		1 beat
Tempo	BeatValue		Quarter
Tap	Average		2 taps
Controls	ADJUST	Low Limit:	0
Controls	ADJUST	High Limit:	1

ADJUST initial value is 0

Controls	Mix	100% Wet
Controls	FX ADJUST	+4 dB
Controls	InLvl L	Full
Controls	InLvl R	Full
Controls	InPan L	50 L
Controls	InPan R	50 R
Controls	Voice Dif	Off
Controls	FX Mix	32% Reverb
Controls	FX Width	+45 STEREO
Rvb Time	Low Rt	1.2X
Rvb Time	Mid Rt	1.54 sec
Rvb Time	Crossover	1.70 kHz
Rvb Time	Rt HC	7.57 kHz
Rvb Time	Pre Delay	8 ms
Rvb Time	RefLvl L	-3.3 dB
Rvb Time	RefDly L	22 ms
Rvb Time	RefLvl R	-3.3 dB
Rvb Time	RefDly R	4 ms
RvbDesign	Size	78.0 Meters
RvbDesign	Diffusion	Full
RvbDesign	Def	Full
RvbDesign	Depth	15
RvbDesign	Spin	Full
RvbDesign	Chorus	10
RvbDesign	Link	On
RvbDesign	Rvb In	Full
RvbDesign	Rvb Out	Full
Glide FX	Gld Lvl	Full
Glide FX	A Lvl L	Full
Glide FX	A Dly L	0.0 ms
Glide FX	A Lvl R	Full
Glide FX	A Dly R	0.0 ms
Glide FX	B Lvl L	Off
Glide FX	B Dly L	0.0 ms
Glide FX	B Lvl R	Off
Glide FX	B Dly R	0.0 ms
Glide FX	Fbk L	Off
Glide FX	Fbk R	Off
Glide FX	X-Fbk L	Off

Glide FX	X-Fbk R	Off
Levels	Host	+0 dB
Levels	Voice1	Full
Levels	Voice2	Off
Levels	Voice3	Off
Levels	Voice4	Full
Levels	Voice5	Off
Levels	Voice6	Off
DelayTime	Host	100%
DelayTime	Clear	Off
DelayTime	Voice1	2: 1 Echo:Beat
DelayTime	oice2	0 ms
DelayTime	oice3	0 ms
DelayTime	Voice4	2: 6 Echo:Beat
DelayTime	Voice5	0 ms
DelayTime	Voice6	0 ms
Feedback	Mstr Fbk	100%
Feedback	Mstr XFbk	100%
Feedback	V1 Fbk	+0%
Feedback	V1 X-Fbk	+0%
Feedback	V2 Fbk	+0%
Feedback	V2 X-Fbk	+0%
Feedback	V3 Fbk	+0%
Feedback	V3 X-Fbk	+0%
Feedback	V4 Fbk	+0%
Feedback	V4 X-Fbk	+0%
Feedback	V5 Fbk	+0%
Feedback	V5 X-Fbk	+0%
Feedback	V6 Fbk	+0%
Feedback	V6 X-Fbk	+0%
Panning	Host	C
Panning	Voice1	50 L
Panning	Voice2	C
Panning	Voice3	C
Panning	Voice4	50 R
Panning	Voice5	C
Panning	Voice6	C
MOD:LFO	Rate	0.29 Hz
MOD:LFO	Shape	Triangle
MOD:LFO	P Width	15%
MOD:LFO	Depth	100%
MOD:AR Env	Attack	7.800 sec
MOD:AR Env	Release	0 ms
MOD:AR Env	Mode	OneShot
MOD:Env L	Release	0 ms
MOD:Env R	Release	0 ms
MOD:Sw 1	Rate	1: 1 Cycl:Beat
MOD:Sw 1	P Width	33%
MOD:Sw 1	Mode	Ramp
MOD:Sw 2	Rate	0.00 Hz
MOD:Sw 2	P Width	33%
MOD:Sw 2	Mode	Ramp

Patch 0	Source Int AR Env		Dest	Glide FX Gld Lvl
	0	to	Full	
	1	to	Off	
Patch 1	Source Int AR Env		Dest	DelayTime Host
	0	to	200%	
	64	to	37%	
	127	to	4%	
Patch 2	Source Int AR Env		Dest	DelayTime Clear
	0	to	Off	
	126	to	Off	
	127	to	On	
Patch 3	Source Int AR Env		Dest	Feedback V1 Fbk
	0	to	+0%	
	1	to	-100%	
	64	to	-100%	
	127	to	-90%	
Patch 4	Source Int AR Env		Dest	Feedback V4 Fbk
	0	to	+0%	
	1	to	-100%	
	64	to	-100%	
	127	to	-90%	

MIDI Implementation Chart

Lexicon PCM 80
Digital Effects System

Function		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 1-16	1 1-16	
Mode	Default Messages Altered	X X	Mode 1, 3 X X	
Note Number		X	0-127	Last Note, Low Note, High Note used as controllers
Velocity	Note ON Note OFF	X	O 9n v = 1-127	used as controller
After Touch	Keys Channel	X X	X O	
Pitch Bend		X	O	
Control Change	1-119	OX	OX	ADJUST, Footpedal, Footswitch 1, and Footswitch 2 can be assigned controllers 1-119 for MIDI transmit
Program Change	True #	X	0-127	See Implementation Details
System Exclusive	Lexicon Real-time non Real-time	OX X X	OX X OX	product ID=6 device ID
System Common	:Song Pos :Song Sel :Tune	X X X	X X X	
System Real Time	:Clock :Commands	OX X	OX OX*	START, STOP and CONTINUE are patchable as a switch: START/CONTINUE=127; STOP=0
Aux Messages	:Local ON/OFF :All Notes OFF :Active Sense :Reset All Controllers	X X X OX	X O X OX	
Notes				

Mode 1: OMNI ON, POLY Mode 2: OMNI ON, MONO **O : Yes** **OX: Selectable**
Mode 3: OMNI OFF, POLY Mode 4: OMNI OFF, MONO **X : No**

Lexicon, Inc.
3 Oak Park
Bedford, MA 01730
Tel 781-280-0300
Fax 781-280-0490
www.lexicon.com

Lexicon Part No. 070-10820

Printed in U.S.A.