PCM 90

MIDI Implementation Details

Lexicon

Contents

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- Select "section seven: Lexicon"
- Enter the Lexicon library

Overview

The Lexicon PCM 90 is a complex device with an involved System Exclusive implementation. This document assumes familiarity with the functions and operations of the PCM 90.

Autoconfiguration

To aid development of editors and librarians which will remain useful throughout the lifetime of the PCM 90, regardless of the addition of new algorithms, we have provided a number of new System Exclusive messages that allow a librarian to autoconfigure when it encounters new algorithms. Messages which are particularly useful in autoconfiguration are:

> System Configuration Response
> Parameter Specific Response
> Parameter Display Response
> Effect Information Response
> Patch Display Response
> Matrix Mapping Response
> Soft Row Display Response
> Data Request

Types of System Exclusive Messages

There are several types of System Exclusive messages: Data Requests, Responses and Data Dumps.

Data Requests	A request is initiated by a remote host (never by a PCM 90). A request usually results in a dump. A request for data causes no change in the state of the PCM 90.
Messages	A message is sent by a remote device to a PCM 90. It is a command for which there is no response, such as a knob message. It may cause a change in the state of the PCM 90.
Responses	A response is a data packet that is sent from the PCM 90 to the another device, always as the result of a request by that device. A response is never sent to the PCM 90. (It may be harmlessly transmitted to a PCM 90, but results in no change in the PCM 90.)
Data Dumps	A dump contains information about some aspect of the PCM 90's internal state. A dump is transmitted by a PCM 90, either on request to another device, or to another PCM 90 (via front panel dump commands SysEx Automation). When a dump is transmitted to a PCM 90, it will normally cause a change in the internal state of the PCM 90. A dump may be purely informational, containing version information, etc. This sort of dump may be received by a PCM 90 but results in no change. It is initiated only as the result of an external request and may be considered as uni-directional.

Enabling System Exclusive Messages
The PCM 90 must be enabled via the front panel controls for receipt of System Exclusive messages. If System Exclusive message receipt is not enabled, all System Exclusive messages are ignored. The status of both the PCM 90 Memory Protect function and PCM 90 Pro and Go Edit modes are ignored when System Exclusive messages are being received.

ASCII Character Data
Many of the System Exclusive messages include ASCII character data. This refers to the values between 0x20 (space) and 0x7F (delete). No other values should be used. Character fields should be padded with spaces — the C NULL-terminator should not be used. When the PCM 90 receives an out-of-range value, it will convert that value to a space. The small block character on the PCM 90 display (used to indicate patch source/destination) is transmitted as a tilde. It is not possible to transmit this character to the PCM 90 via System Exclusive messages. The ASCII delete character (0x7F) maps to the large solid block on the PCM 90 display. (This can be used in ADJUST and Custom Control strings, but not in effect names.) The ASCII backslash character (0x5c) maps to the yen character (¥)on the PCM 90's display.

Numeric Values
Any numeric values greater than one byte are transmitted from least-significant to most-significant.

Nibble-ized Data
Some data (most importantly effect data) is transmitted in a nibble-ized format, i.e. each byte of data is transmitted as a pair of bytes, with 4 bits of data in each byte. As in all other cases in the PCM 90, the less-significant portion of the byte is transmitted first.

Data Errors
The PCM 90 will display System Exclusive errors when it encounters any of a number of problems, including checksum errors and early termination of a System Exclusive message (too few characters). It will also report back to the sender of a System Exclusive message if it cannot fulfill a legally formatted request. This covers situation such as bank-not-present, etc.

Timing Considerations
As some messages require significant time to process, System Exclusive information should not be sent to the PCM 90 in bursts of more than 3 messages every 20ms. The individual message descriptions presented later in this document note any specific timeout requirements.

SysEx Automation
SysEx Automation is intended primarily for use by facilities using multiple PCM 90s in identical modes of operation. This mode, which is enabled from the PCM 90 front panel, assumes that al units have the same effects in the same locations and the same algorithm cards loaded, and that asingle master unit front panel is controlling all slaved units. (Only front panel operations are transmitted as SysEx automation commands.) Ideally, the master's Target ID (Control 3.4) should be set to All. The MIDI inputs of all slave units must be connected directly to the master MIDI OUT. This requires a MIDI THRU box if there is more than one slave. This is not an appropriate mode for effect editing.

The displays of the slaves do not necessarily track the display of the master, although the internal states do. Although knob turns and button pushes are not transmitted, the actual parameter values are. This guarantees that the slave units will be locked directly to the master values. The only exceptions to this are the Tap, Compare and Bypass buttons, whose states are transmitted to the slaves because they change the internal state of the device. The others are visual only.

Not all of system parameters are transmitted by SysEx Automation. Those which are transmitted are listed in Appedix F.

Other MIDI Implementation Notes
MIDI Controller 32 is used for Bank Select. MIDI Controller 0 (normally the most-significant bits of Bank Select) is ignored.

Program Change messages may be lost if they are sent to the PCM 90 before previous Program Change messages are completed.

Controller Data may be sent at full MIDI speed, with no loss of data.

If a MIDI controller is mapped to drive an internal controller (ADJUST, Custom, Foot Pedal, Footswitch), its value will be 'pegged' at the min/max values assigned in each preset. For example, if ADJUST is mapped to Controller 1 and its minimum value is set to 10, any incoming controller value of 10 or below will be treated as if a 10 had been received.

System Exclusive Message Descriptions

System Exlusive Message Header Block
All SysEx messages are preceded by the standard header.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	Values 0-126 are defined as specific addresses. Any message sent to device 127 will be received by any PCM 90 on the cable as long as it is enabled to receive System Exclusive messages.
5	0iii iiii	SysEx Identifier	Identifies the type of message. All System Exclusive messages in this document are described by this identifier. Identifiers which are not used should be considered as reserved and should not be used.
6-(n-1)		Message-specific bytes	See individual descriptions
n	F7	EOX	End of exclusive

Table of SysEx Identifiers
The following table provides a quick reference for the System Exclusive messages which are described in detail in the following pages.

Identifier (Hex)	Name of SysEx
0x00	System Configuration Response
0x01	Bank Dump
0x02	Single Effect Dump
0x03	Table Dump
0x04	Table Element Dump
0x05	Chain Bulk Dump
0x06	Single Chain Dump
0x07	Chain Element Dump
0x08	Display Dump
0x09-0x0B	reserved
0x0B	Parameter Dump
0x0C	Button Dump
0x11	Card Name Message
0x12	Soft Row Assignment Dump
0x13	Patch Assignment Dump
0x14	Knob Message
0x15	Program Change Dump
0x16	Parameter Specific Response
0x17	Parameter Display Response
0x18	System Setup Dump
0x19	Save Current Edit Buffer Message
0x1A	Effect Information Response
0x1B	Bank Label Dump
0x1C	Custom Control Name Dump
0x1D	KeyWord Dump
0x1E	Verbose Dump Message
0x1F	LED Response
0x20	Meter Response
0x21	Patch Display Response)
0x22	Matrix Mapping Response
0x23	Custom Control Value Message
0x24	Soft Row Display Response
0x25- 0x7B	reserved
0x7C	Failure Response)
0x7D- 0x7E	reserved
0x7F	Data Request

0x00   System Configuration Response

This response is transmitted by the PCM 90 to a remote host when requested. It is ignored by the PCM 90. Note that this is not a setup dump — it is purely informational.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x0	Config Data	
6	0iii iiii	Major Version #	This is the version number that appears to the left of the decimal point on the integer portion of the powerup display.
7	0iii iiii	Minor Version #	This is the version number that appears to the right of the decimal point on the fractional portion of the powerup display. On the front panel this may be displayed as a 2-character value with a leading zero. For example, a minor revison of 1 will appear as x.01. A minor revision of 10 will appear as x.10
8-15	0iii iiii	8 Byte Time string	Time of the code build in the ASCII format xx:yy:zz (Hour:Minutes:Seconds)
16-26	0iii iiii	11 Byte Date string	Date of the code build in the ASCII format: xxx yy zzzz (Month:Date:Year)
27-90	0iii iiii	64 Byte Bank information (Space for 32 banks)	Indexed by bank, 2 characters for each bank. First character=bank size. (0=bank not present.) A non-zero in the second byte indicates that the bank is a non-writeable preset bank.
91	0n	Card Present	non-zero if present
92	0n	Card Write Protect	non-zero if protected
93	0iii iiii	Card Version	Indicates the version of the card directory structure. This should be ignored if the Card Present bit is not set.
94	0iii iiii	Card Type	Types are: 0x00=ROM (holds algorithms or presets) 0x01=RAM (holds additional user effects, maps, setups and chains) 0x80=Bootable Diagnostics card. This should be ignored if the Card Present bit is not set.
95-104	0iii iiii	10 Byte Name string for card	This should be ignored if the Card Present bit is not set.
105	0iii iiii	Page count	Indicates the amount of memory available on the card. 1 page=64K. For example, 0x10 indicates 1 megabyte. This should be ignored if the Card Present bit is not set.
106	0iii iiii	Count of algorithms online	Number of valid algorithm IDs in the array beginning at byte 107. These are the algorithms currently available to the system and include internal algorithms plus any algorithms loaded from card. Algorithms for any card not loaded into the system will not appear here.
107-170	0iii iiii	64 Byte List of algorithm IDs	Only 'count' from byte 106 is valid.
171	0iii iiii	Current User Interface Mode	0=Control; 1=Tempo; 2=Edit; 3=Program; 4=Register. Mode and submode are purely informational and do not affect PCM 90 ability to respond to MIDI.
172	0iii iiii	User interface in a Submode	0=False; 1=True. A submode is defined as a state of the machine that is different from that caused by pressing Control, Tempo, Edit, Program Banks or Register Banks. This includes any of the dialog modes such as naming Custom Controls, saving an Effect, etc).
173	0iii iiii	Compare mode	0=Off, 1=On
174	0iii iiii	Bypass	0=Off, 1=On
175	0xF7	End of SysEx	

0x01   Bank Dump
This is a bidirectional dump of an entire bank of effects. It is initiated from the front panel as a Bank Dump.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1	Effect bulk Data	
6	0iii iiii	Bank #	Source bank if sent by PCM 90; target bank if received by PCM 90. See appendix for indices of banks.
7- 13	0iii iiii	7 Byte ASCII Bank Label	
14- 24	0iii iiii	11 Byte ASCII Row Label 0	
25- 35	....	11 Byte Row label 1	
36- 46	....	11 Byte Row label 2	
47-57	....	11 Byte Row label 3	
58-68	....	11 Byte Row label 4	
69-116918	xxxxxxxx	50 Single effect data packets with checksums after each	See Description of Nibble-ized Effet Data.
116919	0xF7	End of SysEx	

Note that it is possible for a bank to be sparsely populated (for example when a user has only a small number of effects saved in bank 4 or 5). It is important to check the validity bit in the Flags byte for each effect. (See Single Effect Data for a description of the validity bit.)

Note that after a bank is received, a period of approximately 2 seconds is required for the PCM 90 to sort and merge the banks.

Note also that for any effect to be successfully transmitted or received by the PCM 90, the supporting algorithm must be present (not necessarily running) in the unit. Internal algorithms are always present, whereas Card algorithms are only present if the card has been loaded. If an effects packet is transmitted without the algorithm present, an error message is displayed. Such cases also cause special formatting of the effects packet. See Single Effect Data for details. If an effects packet is received without the algorithm present, an error message is displayed and the destination remains unchanged.

0x02   Single Effect Dump
This is a bidirectional dump initiated from the front panel as a Current Effect Dump. All numeric values appear LSB first.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x02	Single Effect Data	
6	0iii iiii	Bank #	If both the Bank and Program values are set to 0x7F, the dump is that of the current edit buffer. If the dump is received by a PCM 90, the incoming data will go into the edit buffer (loading the new preset) but the dump is not stored anywhere else in the target system
7		0iii iiii Program #	
8- 2343	....	Nibble-ized effect data	See next section for description
2344	....	Checksum	This 7-bit value is a simple additive checksum that starts at the beginning of nibble-ized data.
2345	0xF7	End of SysEx	

When receiving single effects, the PCM 90 resorts the target bank so that KeyWord view works correctly. This happens for each effect received as the system does not know if it is receiving multiple effects. In the worst case, this sort takes approximately 210ms. While a certain amount of the sorting can be taking place during the receipt of the next effect, we recommend a 200ms pause be inserted between effects. Note that this only applies to single effect transfers. In a full Bank Dump, the sort is deferred until the entire bank is received.

The algorithm used by the effect must be present (not necessarily loaded) in the receiving unit for this message to be received. If the algorithm is not present, an error message will be displayed.

Nibble-izing takes place in least-significant order. All parameters here are described as after nibble-izing has been undone. As any of these structures may appear in a number of locations, offsets are listed as relative offsets.

Single Effect Data

Byte #	Byte Value	Description	Notes
0	16-bit (LSB first)	Byte Count	Effect size — should be 1168.
2	8-bit	Algorithm ID	The algorithm must be present in the unit for this packet to be transmitted or received. This packet has a special format if the algorithm was not present when the packet was transmitted. In place of the Algorithm ID is a value of 0x7F. The actual algorithm ID is placed in the Edit Matrix Position. The Effect Name is properly transmitted, but the remainder of the packet is 0
3	8-bit	Edit Matrix Position	Position in edit matrix that is entered when Edit is pressed: Upper nibble represents Column; lower nibble represents Row. If the column position is 0xF, then the row position indicates the Soft Row. See previous note in the case of algorithm not present.
4	8-bit	Flags	Bit 0=1 if this is a valid effect; Bit 7=1 if this effect is compressed. Effects are stored internally in a compressed format. This bit should always be clear. Lexicon does not publish the internal compression format.
5	12 Bytes	Effect Name	Name of effect. See ASCII Character Data.
17	4 Bytes	KeyWord Indices	Indices of the 4 applicable KeyWords for this effect. See Appendix B.
21	10 Bytes	Soft Row assignments	See MIDI messages for Soft Rows.
31	16-bit (LSB first) Multiple values.		This field is an indexed array of values for all (32) Type 2 parameters. See Appendix H.
95	Set of 86 3-Byte values		This field is an indexed array of values for all (86) Type 1 parameters.
			1 Byte=Tempo Flag (1 if Tempo Mode); 2 Bytes=Value. If Tempo Mode=0, this is a 16-bit value (LSB first). If Tempo Mode=1, 1st byte is numerator and 2nd byte is denominator. The first 22 parameters are the same for all algorithms. The remaining parameters are unique to each algorithm. See Appendix G for listing of Type 1 parameters.
353	31 Bytes	Patch Structure 0	This structure describes a single patch. Its fields are described in the Patch Save Data Table.
384	"	Patch Structure 1	"
415	"	Patch Structure 2	"
446	"	Patch Structure 3	"
477	"	Patch Structure 4	"
508	"	Patch Structure 5	"
539	"	Patch Structure 6	"
570	"	Patch Structure 7	"
601	"	Patch Structure 8	"
632	"	Patch Structure 9	"
663	101 Bytes	Custom Controller 1	This structure describes a single custom controller. Its fields are described in the Custom Save Data Table.
764	"	Custom Controller 2	"
865	"	Custom Controller 3	"
966	"	Custom Controller 4	"
1067	"	Adjust Knob	Identical to custom controller.
1168	End of Data	End of Data	End of Data

Patch Save Data

Byte #	Byte Value	Description	Notes
0	8-bit	Valid Flag	0=patch not connected. Ignore following data.
			1=patch connected. Following data valid.
1	8-bit	Tempo Mode	0=target parameter is not in tempo mode.
			1=target parameter is in tempo mode.
			This must match the tempo flag field for the Type 1 parameter that is the target of the patch.
2	1 Byte	Patch Source	Index of the source on the Patch Source List. See Appendix A.
3	1 Byte	Destination List ID	The value for the Destination List ID is returned by the Parameter Specific Response (0x16).
4	2 Bytes (LSB first)	Destination List Index	The value for the DestListIndex is returned by the Parameter Specific Response (0x16).
6	1 Byte	Point Count	0-8. The number of points in the patch. A value of 0 is also interpreted in the same way as a Valid Flag of 0.
7	Set of 8 3-byte values	Patch Point Values	Values for each of the 8 possible pivot points. Fields are interpreted as: 1 Byte=Position (0-127) =. These should be in ascending order. 2 Bytes=Value of target parameter at the pivot point. Only the first 'Point Count' of these values is meaningful. The remainder should be transmitted as 0's.
31	End of Data	End of Data	End of Data

Custom Save Data

Byte #	Byte Value	Description	Notes
0	8-bit	Last Value	Saved position of the custom controller. The effect will load with the custom controller in this position.
1	20 Bytes	Control Name	ASCII name of the custom controller
21	16 Bytes	HighLabel	ASCII label displayed when the controller is at its maximum bound.
37	16 Bytes	LowLabel	ASCII label displayed when the controller is at its minimum bound.
53	16 Bytes	MidLabel	ASCII label displayed when the controller is at its midpoint.
69	16 Bytes	HighRange Label	ASCII label displayed when the controller is between its midpoint and maximum bound.
85	16 Bytes	LowRange Label	ASCII label displayed when the controller is between its midpoint and minimum bound.
101	End of Data	End of Data	End of Data

0x03   Table Dump
This is a bidirectional dump (initiated from the front panel as a Map Dump) which describes a complete program table (map).

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x3	Table Data	
6	0iii iiii	Table (map) #	Unlike some other objects, there is no "current" table, so the 0x7F value has no function in this case. There are normally 2 tables in the box (0 and 1). If a RAM card is in place,there are two additional tables (2 and 3).
7	0iii iiii	Bank for table position 0	Any legitimate Bank. See Appendix C: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
8	0iii iiii	Offset for table position 0	0- 49
9-262	....		Bank/offset for positions 1-127
263	0xF7	End of SysEx	

0x04   Table Element Dump
This is a bidirectional dump which describes a single position in a program table (map).

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x4	Table Element Data	
6	0iii iiii	Table (map) #	
7	0iii iiii	Offset in table	0- 127
8	0iii iiii	Bank	Any legitimate Bank. index. See Appendix C: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
9	0iii iiii	Offset	0 - 49
10	0xF7	End of SysEx	

0x05   Chain Bulk Dump

This is a bidirectional dump, initiated from the front panel as a Chain Bulk Dump, which describes a set of program chains (either the internal set of 10 or the card set of 10).

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x5	Chain bulk	
6	0000 000i	Internal/Card	0=Internal; 1=Card
7- 26	0iii iiii	Data for chain 0 (or 10 if card)	See following description for Single Chain Dump
27- 206	....	Data for chains 1-9 (11-19 if card)	
207	0xF7	End of SysEx	

0x06   Single Chain Dump

This is a bidirectional dump, initiated from the front panel as a Chain Dump, which describes a complete program chain.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x6	Chain Data	
6	0iii iiii	Chain #	Unlike some other objects, there is no "current" chain, so the value 0x7F has no effect here. Normally there are 10 chains available (0-9). If a RAM card is in place (see the configuration message), then an additional 10 chains (10-19) are available.
7	0iii iiii	Bank for chain position 0	Any legitimate Bank index. See the Appendix C: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
8	0iii iiii	Offset for chain position	0 49
9-26	....	Bank/offset for positions 1-9	
27	0xF7	End of SysEx	

0x07   Chain Element Dump
This is a bidirectional dump which describes a single position in a program chain.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x7	Chain Element Data	
6	0iii iiii	Chain #	
7	0iii iiii	Offset in chain	0- 9
8	0iii iiii	Bank	Any legitimate Bank index. See Appendix C: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
9	0iii iiii	Offset	0 - 49
10	0xF7	End of SysEx	

0x08   Display Dump
When sent from the PCM 90, this bidirectional dump holds the current display information, whatever it is. When sent to the PCM 90, this text is displayed for 2 seconds.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x08	Display message	
6-25	0iii iiii	Top line of display	20-byte copy of upper display line.
26-45	0iii iiii	Bottom line of display	20-byte copy of lower display line.
46	0xF7	End of SysEx	

0x0B   Parameter Dump
This is a bidirectional message used when a PCM 90 is transmitting SysEx Automation data. It may be transmitted or received by a PCM 90

Type 0 System Parameters: Parameters such as MIDI Channel, Edit Mode (Pro or Go), Mix Mode, etc. which are not saved with an effect, but are part of the system setup.

Type 1 Patchable Parameters: Includes all parameters that can e patch destinations. These are saved with an effect.

Type 2 NonPatchable Parameters: Parameters such as envelope threshold which are saved with the effect but are not patch destinations.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0B	Parameter Value	
6	0x	Parameter Type	0=system; 1=patchable; 2=nonpatchable
7	0iiiiiii	Parameter Offset	See appendix according to type.
8	0000 000i	Tempo Mode Flag	0=Absolute mode; 1=Tempo Mode. This flag defines the following value field as being an absolute 16-bit value (Flag = 0) or a ratio value split into bytes (Flag=1). It also forces the parameter into the appropriate mode. This flag should be 0 except for those parameters that support tempo mode. See the flags field for the appropriate parameters in the algorithm descriptions or use the Parameter Specific Response.
9	0000iiii	Least-significant nibble of absolute value or numerator byte.	Out-of-range values transmitted to PCM 90 will be adjusted to legal values.
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	

0x0C   Button Dump
This is bidirectional. Those buttons which are transmitted in SysEx Automation are: Compare, Tap and Bypass.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0xC	Button message	
6	0iii iiii	Button #	0=Up 1=Down 2=Program Banks 3=Load 4=Register Banks 5=Store 6=Edit 7=Compare 8=Control 9=Bypass 10=Tempo 11=Tap 12=Reserved 13=Footswitch 1 14=Reserved 15=Footswitch 2
7	0xF7	End of SysEx	

Button SysExes may be sent in quick succession (faster than 40ms) to mimic holds. For example, sending Proram Banks every 20ms for a period of 1 second will cause the Help message for the key to be displayed, just as if the key on the front panel had been held down. Multiple key combinations can also be sent by sending button messages in quick succession. For example, sending an Up message immediately followed by a Down message causes the user interface to go to the 0.0 position in the current matrix, just as if those two buttons were pressed simultaneously.

0x11   Card Name Message
This message which can be sent only via MIDI to the PCM 90 allows a card to be renamed. The name of any currently-loaded card may be learned using the Configuration Response.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06		Lexicon ID
3	08		PCM 90 ID
4	0iii iiii		Device ID
5	0x11		Card Name
6-15	0iii iiii		New name of card (10 Bytes). See ASCII Character Data.
16	0xF7	End of SysEx	

0x12   Soft Row Assignment Dump
Bidirectional. Assigns a Pro mode slot or a Custom Control to a Go mode soft slot.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x12	SoftRowAssign	
6	0n	Soft Row Slot (0-9)	
7	0n	Substitute Row (0-9)	This is the Row/Column that will appear in the soft row slot. If the substitute row value is set to 0x0E, then a custom controller is attached to this position (the column value determines which one). A soft row position may be de-assigned if Row and Column are both set to 0x0F. The number of rows and columns is dependent on the current algorithm.
8	0n	Substitute Column (0-9)	If the substitute row value is 0x0E (custom controller), then this field may go from 0-3.
9	0xF7	End of SysEx	

0x13   Patch Assignment Dump

This bidirectional dump contains the state of a particular patch in the currently running effect.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x13	PatchAssign	
6	0n	PatchID (0-9)	
7-8	0000 iiii	Patch Source. Nibble-ized with less significant part first.	See Appendix A: Patch Sources by Index.
9	0iii iiii	Patch Destination.	The patchable parameter offset. A value of 0x7F indicates that the patch is to be disconnected. All other values in the packet remain valid.
10	0n	Point Count (0-8).	Only the 'n' following point values is meaningful. Remainder should be set to 0. A point count of 0 is an alternate way to indicate a disconnected path.
Patch Point Packet: This point packet is repeated 8 times...			
11	0iii iiii	Point Position (0-127)	Positions should be in ascending order and may not be duplicated.
12	0000 iiii	Point Value LS nibble.	The point value is independent of the specific parameter range. The range of point value is from 0 (minimum) to 0x0400 (maximum). This format is used so that a new patch destination can be selected while maintaining the contour of the patch table. Any values above 0x0400 will be clipped to 0x0400.
13	0000 iiii	Point Value next nibble	
14	0000 iiii	Point Value next nibble	
15	0000 iiii	Point Value MS nibble.	
16	000i iiii	Tempo value Numerator (1-24)	Out-of-range values will be clipped and will cause a message to be printed on the front panel.
17	000i iiii	Tempo value Denominator (1-24)	Out-of-range values will be clipped.
7 more 7-byte point packets...			
67	0xF7	End of SysEx	

If this message is improperly built, for example, if points are out of range or are not defined in ascending order, the PCM 90 will attempt to correct the data. The message: "Bad patch data was corrected" will be displayed

0x14   Knob Message
Host to PCM 90 only. (In SysEx Automation mode, the PCM 90 sends parameter values, not knob messages.) Knobs operate within the current context of the user interface. For example, in REG mode, the Adjust Knob is a soft knob. In Edit mode, it adjusts the onscreen parameter. This message is only useful for a remote controller.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
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)	For example: 0xffff=-1 (counterclockwise); 0x0001=+1 (clock-wise)
8	0n	Next nibble	
9	0n	Next nibble	
10	0n	Most-significant nibble	
11	0xF7	End of SysEx	

0x15   Program Change Dump
Bidirectional. This is the method used in SysEx Automation to send Program Change messages. It may be used in other cases, although the number of bytes is larger than a standard MIDI Program Change message. The current MIDI Program Change mode selection (mapped, chained, off, etc) is ignored.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x15	Prog Change Code	
6	0iii iiii	Bank	
7	0iii iiii	Program	0- 49
8	0xF7	End of SysEx	

0x16   Parameter Specific Response
PCM 90 to host only. This dump returns information about a specific parameter. It is useful for an editing program that doesn't know the count, range or name of a parameter.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x16	Param Spec Data	
6	0n	Type	0=System; 1=Patchable; 2=Non-patchable
7	0n	Offset	
8	0iii iiii	Flags	There are currently 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	12-byte row name	See Overview for information on strings.
21-32	0xxx xxxx	12-byte parameter	
		name	See Overview for information on strings.
33	0n	Least-significant nibble of the maximum parameter value (16-bit unsigned)	In some cases, algorithms have internal parameters which are not controllable from MIDI or from the front panel. In those cases, the maximum value will be 0.
34	0n	Next nibble	
35	0n	Next nibble	
36	0n	Most-significant nibble	
37	0xxx xxxx	Destination List ID	This is of interest only when an external editing program is directly editing the Effect SysEx packet 0-02, which requires the Destination List ID and Destination List index. The values obtained here should be plugged into that packet where they determine the display position of the parameter in the edit matrix. If the parameter is not patchable, this field will be set to 0x7F.
38	0xxx xxx	Destination List Index	See above note for Destination List ID.
39	0xF7	End of SysEx	

0x17   Parameter Display Response
PCM 90 to host only. This dump returns the current display for a specific parameter. It should be useful for an editing program that doesn't know the display specifics for a parameter.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x17	Parameter display data	
6	0n	Parameter Type	See the description of Parameter Spcific Response (0x16).
7	0n	Parameter Number.	Some parameter numbers are dependent on the algorithm. See the appropriate algorithm description.
8-27	0iii iiii	20-char display string	
28	0xF7	End of SysEx	

0x18   System Setup Dump

This dump, which is both transmitted and received by the PCM 90, contains all system parameters (those parameters that are not part of a preset).

Note that when the PCM 90 receives a current setup (0x7F) it ignores parameter #10 (device ID) and parameter #11 (SysEx enable). Those values can only be changed from the front panel or by restoring a setup from internal memory or card.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x18	Setup Data	
6	0iii iiii	Setup ID	0x7F=Current; 0-4=Internal; 5-9=RAM Card. A RAM card may be detected using the Configuration Response.
7-15	0iii iiii	Setup name	See Overview for information on ASCII characters.
16-19	0n	Nibble-ized unsigned short param value (LS first) for first param	These parameters correspond by index with Type 0 System parameters. The SysEx packet is sized to hold 50 such parameters. The actual count of system parameters is 43, so the remaining parameter slots should be regarded as reserved and set to zero. The ranges for the parameters are listed in Appendix F: System (Type 0) Parameters.
20-215	0n	Remaining params	
	216	0xF7	End of SysEx

0x19   Save Current Edit Buffer Message

Host to PCM 90 only. The current edit buffer is named and saved with this message.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x19	Save Code	
6	0iii iiii	Destination Bank	Must be a writeable register or card bank. If a card bank, the write-protect tab must be off. See Appendix C: MIDI Bank Assignments.
7	0iii iiii	Destination Program	0 - 49
8-19	0iii iiii	12-character program name	See Overview for information on ASCII characters.
20	0xF7	End of SysEx	

0x1A   Effect Information Response

PCM 90 to host only. This dump allows a remote master to get information about any of the effects in the box.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1A	Effect Information	
6	0iii iiii	Bank #	A bank # of 0x7F AND prog # of 0x7F indicates the current program.
7	0iii iiii	Program #	
8-23	0iii iiii	Algorithm Name	16 Byte string
24-35	0iii iiii	Program Name	12 Byte string
36	0xF7	End of SysEx	

0x1B   Bank Label Dump

This is a bidirectional dump which sets/gets bank and row labels.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1B	Bank labels	
6	0iii iiii	Bank	Source bank if sent by PCM 90. Target bank if received by PCM 90. Appendix C: MIDI Bank Assignments.
7- 13	0iii iiii	ASCII Bank Label	7 Byte string
14- 24	0iii iiii	ASCII Row Label 0	11 Byte string
25- 35	....	Row label 1	11 Byte string
36- 46	....	Row label 2	11 Byte string
47- 57	....	Row label 3	11 Byte string
58- 68	....	Row label 4	11 Byte string
69	0xF7	End of SysEx	

0x1C   Custom Control Name Dump

This dump, which is both transmitted and received by the PCM 90, contains all of the name strings for a single custom controller. Only strings which will actually be displayed are meaningful. If the settings of the controller max, min and mid points do not provide for the display of a label (such as Hi label), only a dummy string will be transmitted by the PCM 90. If such a string is sent to the PCM 90, it will not be saved with the effect.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1C	Custom Names	
6	0000 0iii	Control ID	0-3=Custom Controls; 4=Adjust Knob
7- 26	0iii iiii	ASCII Name of controller	20 byte string
27- 42	0iii iiii	ASCII label for values between mid and max (HighRange)	16 byte string
43- 58	0iii iiii	ASCII label for values between min and mid (LowRange)	16 byte string
59- 74	0iii iiii	ASCII label for max value (HighLabel)	16 byte string
75- 90	0iii iiii	ASCII label for midpoint value (MidLabel)	16 byte string
91- 106	0iii iiii	ASCII label for min value (LowLabel)	16 byte string
107	0xF7	End of SysEx	

0x1D   KeyWord Dump

This dump, which is both transmitted and received by the PCM 90, contains all of the KeyWord indices for the current effect.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1D	KeyWords	
6- 9	0iii iiii	KeyWord indices	See Appendix B: KeyWords.
10	0xF7	End of SysEx	

0x1E   Verbose Dump Message

This dump is only received by the PCM 90. It is provided for use with remote editors to enable and disable the flashing of MIDI transmission messages during PCM 90 SysEx dumps. This message can also set an automatic mode wherein a display message is transmitted whenever the display changes (to support a remote control). Verbose state is NOT remembered by PCM 90 over a reboot cycle. The PCM 90 always returns to normal mode (Mode 1).

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1E	Verbose message	
6	0000 00xx		2 (Automatic mode) Do not flash messages on screen. In addition, automatically send the display SysEx whenever the display changes. This mode can cause a tremendous amount of data to be output by the PCM 90, and some computers may have trouble keeping up.
			1 (normal mode) Flash messages on screen. Transmit display only when requested.
			0 (quiet mode) Do not flash messages on screen. Transmit display only when requested. In mode 0 and 2, no MIDI dump status messages are displayed.
7	0xF7	End of SysEx	

0x1F   LED response

When the automatic verbose mode is selected, this dump is trnasmitted by the PCM 90 whenever any of the LEDs change. The meter values are also included, since it is likely that they have also changed. When this message is sent, no meter message is sent for the same time period. This is done in order to lower the data traffic.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x1F	LED message	
6	0iii iiii	LED bitmask	Bits are: Bit 0=Program Banks; Bit 1=Load; Bit 2=Register Banks; Bit 3=Store; Bit 4=Edit; Bit 5=Compare; Bit 6=Control
7	0iii iiii	LED bitmask.	Bits are: Bit 0=Bypass; Bit 1=Tempo; Bits 2-6=reserved
8	000i iiii	Left Meter bitmask	These bits match the front panel meters in the following manner: Bit 0=24dB (green); Bit 1=18dB (green); Bit 2=12dB (green); Bit 3=6dB (amber); Bit 4=0dB (red)
9	000i iiii	Right Meter bitmask	""
10	0xF7	End of SysEx	

0x20   Meter response
This dump is only transmitted by the PCM 90 when the automatic verbose mode is selected. It is transmitted whenever the meter values change. For data reduction purposes, there is no LED change.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x20	Meter message	
6	000i iiii	Left Meter bitmask	Same as the LED message description.
7	000i iiii	Right Meter bitmask	
8	0xF7	End of SysEx	

0x21   Patch Display Response
PCM 90 to host only. This dump returns the current display for a specified patch at a specified input value. It is useful for an editing program that doesn't know the display specifics for a parameter.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x21	Patch display data	
6	0n	Patch (0-9)	
7	0n	Pivot point (0-127)	This should be an assigned point.
8-22	0iii iiii	15-char display string	See Overview for information on ASCII characters.
23	0xF7	End of SysEx	

0x22   Matrix Mapping Response
PCM 90 to host only. This dump is a response to a request for information. The request holds DestinationList ID and Destination List Index. This message returns the parameter that is mapped to that location in the edit matrix. These are required when translating to and from the stored effect format.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x22	matrix mapping data	
6	0iii iiii	Dest List ID	These two fields are used in the Single Effect packet.
7	0iii iiii	Dest List Index	
8	0iii iiii	See Parameter Dump.	
9	0iii iiii	Parameter offset	Dependent on parameter type and algorithm.
10	0xF7	End of SysEx	

0x23   Custom Control Value Message

This dump is only received by the PCM 90. It allows the custom controllers to be operated remotely. When the Adjust knob value is transmitted, the temporary Adjust knob screen does not appear on the PCM 90 display.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x23	Custom Value	
6	0000 0iii	Control ID	0-3=Custom Controls; 4 =Adjust Knob
7	0iii iiii	Value for the controller	Values above the max or below the min will be clipped
8	0xF7	End of SysEx	

0x24   Soft Row Display Response

This dump is only transmitted by the PCM 90 as the result of an inquiry. It is a support function for the Soft Row Assignment Dump. It returns substitute row and column values (used as bytes 7 and 8 in the Soft Row Assigment message) along with the text name of the parameter block to be placed there. The displays apply only to the currently loaded algorithm.

In many cases, related parameters, such as Master parameters for displays, are stacked up onto a single matrix slot. A descriptive slot name for the entire parameter group is used in soft row assignments. This message allows a program to determine the name.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x24	Soft Row Display Message	
6	0iii iiii	Algorithm iD	
7	0iii iiii	Number of value soft row assignments for the current algorithm	Only this many of the following descriptors should be used. The message reserves room for up to 64 descriptors
8-29	0iii iiii	22-Byte Descriptor for the soft row assigment.	1 byte=Substitute row. Plug this into byte 7 of the Soft Row assignment message.
			1 byte=Substitute column. Plug this into byte 8.
			20 bytes=Display string. A text descriptor of the parameter block to be assigned to the soft row. This is the same string that appears when editing the soft row from the front panel. In some cases, multiple parameters may be grouped into a single location on the matrix
30-1415	0iii iiii	Remaining descriptors	
1416	0xF7	End of SysEx	

0x7C   Failure Response

PCM 90 to host only. This tells the host that the PCM 90 was unable to service a particular request, for example a request for an effect that is not present. Note that the failure response is only returned when the host has transmitted a properly formatted request. Any partial or corrupted request receives no response.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
5	0x7C	Failure	
6	0xF7	End of SysEx	

0x7F   Data Request
Host to PCM 90 only. The host may request that a message be sent by the PCM 90.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	08	PCM 90 ID	
4	0iii iiii	Device ID	
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 the table below.
7-11	....	parameters for	
		request	These depend on the type of message requested. Any unused parameters should be set to 0. See the table below
12	0xF7	End of SysEx	

Request	Request Byte	Parameter bytes	Notes
System Config	0x00	none	
Effect Bulk	0x01	Bank	See Appendix C: MIDI Bank Assignments.
Effect Single	0x02	Bank, Offset	0x7F returns dump of currently-running effect, including any unsaved edits.
Table	0x03	TableID	
Table element	0x04	TableID, Offset	
Chain Bulk	0x05	Chain Group	0=Internal; 1=External (card)
Chain	0x06	ChainID	
Chain element	0x07	ChainID, Offset	
Display	0x08	none	Return dump of current display.
Param	0x0B	Type, Offset	Dependent on type and algorithm.
Soft Row	0x12	Offset (0-9)	Return matrix positions mapped to specified soft row offset.
Patch	0x13	PatchID (0-9)	
Param spec	0x16	Type, Offset	
Param display	0x17	Type, Offset	
System setup	0x18	ID of setup	
Effect Info	0x1A	Bank, Offset	Offset must be 0- 49.
Bank Labels	0x1B	Bank	
Custom Control Name	0x1C		
KeyWords	0x1D	none	
Patch Display	0x21	Patch#, Pivot Point	
Matrix Mapping	0x22	Destination List ID, DestListIndex	
Soft Row Display	0x24	AlgID	0x7F for currently running algorithm.

PCM 90 Algorithms

Algorithm 0: Random Hall

Param # (Hex)	Flags	Row Name	Param Name	Max Value	Dest List ID	Dest List Index(Hex)
00	00	Controls	Mix	100	00	00
01	01	LFO1	Rate		01	00
02	00	LFO1	Shape	6	01	01
03	00	LFO1	P Width	98	01	02
04	00	LFO1	Depth	100	01	03
05	01	LFO2	Rate	1000	01	04
06	00	LFO2	Shape	6	01	05
07	00	LFO2	P Width	98	01	06
08	00	LFO2	Depth	100	01	07
09	00	Follow	Env L	500	01	0B
0A	00	Follow	Env R	500	01	0C
0B	00	Follow	Env L+R	500	01	0D
0C	00	AR Env	Attack	500	01	08
0D	00	AR Env	Release	500	01	09
0E	00	AR Env	Mode	3	01	0A
0F	00	Sw 1	Mode	2	01	10
10	01	Sw 1	Rate	1000	01	0E
11	00	Sw 1	P Width	98	01	0F
12	00	Sw 2	Mode	2	01	13
13	01	Sw 2	Rate	1000	01	11
14	00	Sw 2	P Width	98	01	12
15	01	Delay	DlyTime	250	01	14
16	00	?	Not active	0	7F	7F
17	00	?	Not active	0	7F	7F
18	00	Controls	In Lvl	15	00	01
19	00	Controls	RvbOutLvl	15	00	02
1A	00	Controls	Out Width	720	00	03
1B	00	Design	Diffusion	100	00	0B
1C	00	Design	Link	1	00	10
1D	00	Time	Low Rt	9	00	04
1E	00	Time	Crossover	62	00	06
1F	00	Design	Spread	255	00	0D
20	00	Design	Size	63	00	0A
21	00	Time	Mid Rt	63	00	05
22	01	Time	Pre Delay	500	00	08
23	08	?	Not active	0	7F	7F
24	00	Design	High Cut	63	00	11
25	00	Time	Rt HC	15	00	07
26	00	Design	Spin	48	00	0E
27	00	Design	Wander	255	00	0F
28	00	Design	Shape	255	00	0C
29	00	Time	Shelf	25	00	09
2A	01	Reflect	Dly L	625	00	14
2B	00	Reflect	Lvl L	80	00	15
2C	01	Reflect	Dly R	625	00	16
2D	00	Reflect	Lvl R	80	00	17
2E	01	Delay	Dly L	975	00	1B
2F	00	Delay	Lvl L	9-	00	1C
30	00	Delay	Fbk L	200	00	1D
31	01	Delay	Dly R	975	00	1E
32	00	Delay	Lvl R	80	00	1F
33	00	Delay	Fbk R	200	00	20
34	00	Delay	Mstr Lvl	100	00	19
35	00	Delay	Mstr Dly	200	00	18
36	00	Delay	Mstr Fbk	100	00	1A
37	00	Reflect	Mstr Lvl	100	00	13
38	00	Reflect	Mstr Dly	200	00	12

Algorithm 1: Ambience

Param # (Hex)	Flags	Row Name	Param Name	Max Value	Dest List ID	Dest List Index(Hex)
00	00	Controls	Mix	100	00	00
01	01	LFO1	Rate	1000	01	00
02	00	LFO1	Shape	6	01	01
03	00	LFO1	P Width	98	01	02
04	00	LFO1	Depth	100	01	03
05	01	LFO2	Rate	1000	01	04
06	00	LFO2	Shape	6	01	05
07	00	LFO2	P Width	98	01	06
08	00	LFO2	Depth	100	01	07
09	00	Follow	Env L	500	01	0B
0A	00	Follow	Env R	500	01	0C
0B	00	Follow	Env L+R	500	01	0D
0C	00	AR Env	Attack	500	01	08
0D	00	AR Env	Release	500	01	09
0E	00	AR Env	Mode	3	01	0A
0F	00	Sw 1	Mode	2	01	10
10	01	Sw 1	Rate	1000	01	0E
11	00	Sw 1	P Width	98	01	0F
12	00	Sw 2	Mode	2	01	13
13	01	Sw 2	Rate	1000	01	11
14	00	Sw 2	P Width	98	01	12
15	01	Delay	DlyTime	250	01	14
16	00	?	Not active	0	7F	7F
17	00	?	Not active	0	7F	7F
18	00	Controls	In Lvl	15	00	01
19	00	Controls	RvbOutLvl	15	00	03
1A	00	Controls	Out Width	720	00	04
1B	00	Design	Diffusion	100	00	0B
1C	00	Design	Size	63	00	0A
1D	00	Time	Decay	34	00	05
1E	00	Time	Pre Delay	100	00	07
1F	00	Design	High Cut	15	00	0E
20	00	Time	Decay Lvl	25	00	06
21	00	Time	DryDly	100	00	08
22	00	Design	Spin	50	00	0C
23	00	Design	Wander	255	00	0D
24	08	?	Not active	0	7F	7F
25	00	Time	DryDlyMix	100	00	09
26	00	Controls	In Width	720	00	02

Algorithm 2: Plate

Param # (Hex)	Flags	Row Name	Param Name	Max Value	Dest List ID	Dest List Index(Hex)
00	00	Controls	Mix	100	00	00
01	01	LFO1	Rate	1000	01	00
02	00	LFO1	Shape	6	01	01
03	00	LFO1	P Width	98	01	02
04	00	LFO1	Depth	100	01	03
05	01	LFO2	Rate	1000	01	04
06	00	LFO2	Shape	6	01	05
07	00	LFO2	P Width	98	01	06
08	00	LFO2	Depth	100	01	07
09	00	Follow	Env L	500	01	0B
0A	00	Follow	Env R	500	01	0C
0B	00	Follow	Env L+R	500	01	0D
0C	00	AR Env	Attack	500	01	08
0D	00	AR Env	Release	500	01	09
0E	00	AR Env	Mode	3	01	0A
0F	00	Sw 1	Mode	2	01	10
10	01	Sw 1	Rate	01	0E	
11	00	Sw 1	P Width	98	01	0F
12	00	Sw 2	Mode	2	01	13
13	01	Sw 2	Rate	01	11	
14	00	Sw 2	P Width	98	01	12
15	01	Delay	DlyTime	250	01	14
16	00	?	Not active	0	7F	7F
17	00	?	Not active	0	7F	7F
18	00	Controls	In Lvl	15	00	01
19	00	Controls	RvbOutLvl	15	00	03
1A	00	Controls	Out Width	720	00	04
1B	00	Design	Diffusion	100	00	0B
1C	00	Design	Link	1	00	0F
1D	00	Time	Low Rt	9	00	05
1E	00	Time	Crossover	62	00	07
1F	00	Design	Spread	255	00	0D
20	00	Design	Size	63	00	0A
21	00	Time	Mid Rt	63	00	06
22	01	Time	Pre Delay	500	00	09
23	08	?	Not active	0	7F	7F
24	00	Design	High Cut	63	00	10
25	00	Time	Rt HC	15	00	08
26	00	Design	Attack	255	00	0C
27	00	Design	Spin	100	00	0E
28	01	Echo	Dly L	625	00	19
29	00	Echo	Fbk L	200	00	1A
2A	01	Echo	Dly R	625	00	1B
2B	00	Echo	Fbk R	200	00	1C
2C	01	Reflect	Dly L	625	00	13
2D	00	Reflect	Lvl L	80	00	14
2E	01	Reflect	Dly R	625	00	15
2F	00	Reflect	Lvl R	80	00	16
30	01	Delay	Dly L	975	00	20
31	00	Delay	Lvl L	80	00	21
32	00	Delay	Fbk L	200	00	22
33	01	Delay	Dly R	975	00	23
34	00	Delay	Lvl R	80	00	24
35	00	Delay	Fbk R	200	00	25
36	00	Controls	In Width	720	00	02
37	00	Delay	Mstr Lvl	100	00	1E
38	00	Delay	Mstr Dly	200	00	1D
39	00	Delay	Mstr Fbk	100	00	1F
3A	00	Echo	Mstr Dly	200	00	17
3B	00	Echo	Mstr Fbk	100	00	18
3C	00	Reflect	Mstr Lvl	100	00	12
3D	00	Reflect	Mstr Dly	200	00	11

Algorithm 3: Concert Hall

Param # (Hex)	Flags	Row Name	Param Name	Max Value	Dest List ID	Dest List Index(Hex)
00	00	Controls	Mix	100	00	00
01	01	LFO1	Rate	1000	01	00
02	00	LFO1	Shape	6	01	01
03	00	LFO1	P Width	98	01	02
04	00	LFO1	Depth	100	01	03
05	01	LFO2	Rate	1000	01	04
06	00	LFO2	Shape	6	01	05
07	00	LFO2	P Width	98	01	06
08	00	LFO2	Depth	100	01	07
09	00	Follow	Env L	500	01	0B
0A	00	Follow	Env R	500	01	0C
0B	00	Follow	Env L+R	500	01	0D
0C	00	AR Env	Attack	500	01	08
0D	00	AR Env	Release	500	01	09
0E	00	AR Env	Mode	3	01	0A
0F	00	Sw 1	Mode	2	01	10
10	01	Sw 1	Rate	1000	01	0E
11	00	Sw 1	P Width	98	01	0F
12	00	Sw 2	Mode	2	01	13
13	01	Sw 2	Rate	1000	01	11
14	00	Sw 2	P Width	98	01	12
15	01	Delay	DlyTime	250	01	14
16	00	?	Not active	0	7F	7F
17	00	?	Not active	0	7F	7F
18	00	Controls	In Lvl	15	00	01
19	00	Controls	RvbOutLvl	15	00	03
1A	00	Controls	Out Width	720	00	04
1B	00	Design	Diffusion	100	00	0B
1C	00	Design	Link	1	00	12
1D	00	Time	Low Rt	9	00	05
1E	00	Time	Crossover	62	00	07
1F	00	Design	Spread	255	00	0D
20	00	Design	Size	304	00	0A
21	00	Time	Mid Rt	63	00	06
22	01	Time	Pre Delay	465	00	09
23	00	Design	Def	100	00	0E
24	00	Design	Depth	15	00	0F
25	01	Reflect	Dly L	600	00	16
26	01	Reflect	Dly R	600	00	18
27	00	Reflect	Lvl L	80	00	17
28	00	Reflect	Lvl R	80	00	19
29	00	Design	Shape	255	00	0C
2A	00	Time	Rt HC	48	00	08
2B	00	Design	Spin	50	00	10
2C	00	Design	Chorus	10	00	11
2D	00	Compress	LookAhead	24	00	1D
2E	00	Compress	Ratio	99	00	1A
2F	00	Expand	Ratio	99	00	20
30	00	Compress	Attack	7	00	1E
31	00	Compress	Release	22	00	1F
32	00	Compress	Threshold	40	00	1B
33	00	Compress	Gain	24	00	1C
34	00	Expand	Threshold	70	00	21
35	00	Expand	Gain	24	00	22
36	00	SpatialEQ	Crossover	60	00	24
37	00	SpatialEQ	Bass Boost	220	00	26
38	00	SpatialEQ	Gain	220	00	25
39	00	SpatialEQ	Premix	100	00	23
3A	00	Controls	In Width	720	00	02
3B	08	?	Not active	0	7F	7F
3C	00	Design	High Cut	16	00	13
3D	00	Reflect	Mstr Lvl	100	00	15
3E	00	Reflect	Mstr Dly	200	00	14

Algorithm 4: Chamber/Room

Param # (Hex)	Flags	Row Name	Param Name	Max Value	Dest List ID	Dest List Index(Hex)
00	00	Controls	Mix	100	00	00
01	01	LFO1	Rate	1000	01	00
02	00	LFO1	Shape	6	01	01
03	00	LFO1	P Width	98	01	02
04	00	LFO1	Depth	100	01	03
05	01	LFO2	Rate	1000	01	04
06	00	LFO2	Shape	6	01	05
07	00	LFO2	P Width	98	01	06
08	00	LFO2	Depth	100	01	07
09	00	Follow	Env L	500	01	0B
0A	00	Follow	Env R	500	01	0C
0B	00	Follow	Env L+R	500	01	0D
0C	00	AR Env	Attack	500	01	08
0D	00	AR Env	Release	500	01	09
0E	00	AR Env	Mode	3	01	0A
0F	00	Sw 1	Mode	2	01	10
10	01	Sw 1	Rate	1000	01	0E
11	00	Sw 1	P Width	98	01	0F
12	00	Sw 2	Mode	2	01	13
13	01	Sw 2	Rate	1000	01	11
14	00	Sw 2	P Width	98	01	12
15	01	Delay	DlyTime	250	01	14
16	00	?	Not active	0	7F	7F
17	00	?	Not active	0	7F	7F
18	00	Controls	A OutLvl	15	00	03
19	00	Controls	B OutLvl	15	00	05
1A	00	Controls	InRouting	2	00	01
1B	00	Design:A	High Cut	15	00	11
1C	00	Design:B	High Cut	15	00	2B
1D	00	Design:A	Size	144	00	0B
1E	00	Design:A	Spin	50	00	0F
1F	00	Time:A	Rt HC	48	00	09
20	00	Time:A	Low Rt	9	00	06
21	00	Time:A	Crossover	60	00	08
22	00	Time:A	Mid Rt	63	00	07
23	00	Design:A	Diffusion	100	00	0C
24	01	Time:A	Pre Delay	465	00	0A
25	00	Design:A	Spread	255	00	0E
26	00	Design:A	Shape	255	00	0D
27	00	Design:A	Link	1	00	10
28	00	Design:A	RvbOut	15	00	12
29	01	Echo:A	Dly L	600	00	1B
2A	01	Echo:A	Dly R	600	00	1D
2B	00	Echo:A	Fbk L	30	00	1C
2C	00	Echo:A	Fbk R	30	00	1E
2D	01	Reflect:A	Dly L	600	00	15
2E	01	Reflect:A	Dly R	600	00	17
2F	00	Reflect:A	Lvl L	15	00	16
30	00	Reflect:A	Lvl R	15	00	18
31	00	Controls	A InLvl	15	00	02
32	00	Echo:A	Mstr Dly	200	00	19
33	00	Echo:A	Mstr Fbk	100	00	1A
34	00	Reflect:A	Mstr Lvl	100	00	14
35	00	Reflect:A	Mstr Dly	200	00	13
36	00	Design:B	Spin	50	00	29
37	00	Design:B	Size	144	00	25
38	00	Design:B	Range	31	00	2C
39	00	Design:B	Rate	5	00	2D
3A	00	Time:B	Rt HC	48	00	22
3B	00	Time:B	Low Rt	9	00	1F
3C	00	Time:B	Crossover	60	00	21
3D	00	Time:B	Mid Rt	63	00	20
3E	00	Design:B	Diffusion	100	00	26

3F	01	Time:B	Pre Delay	465	00	23
40	00	Design:B	Spread	255	00	28
41	00	Design:B	Shape	255	00	27
42	00	Design:B	Link	1	00	2A
43	01	Echo:B	Dly L	600	00	30
44	01	Echo:B	Dly R	600	00	32
45	00	Echo:B	Fbk L	30	00	31
46	00	Echo:B	Fbk R	30	00	33
47	00	Time:B	Infinite	1	00	24
48	00	Controls	B InLvl	15	00	04
49	00	Echo:B	Mstr Dly	200	00	2E
4A	00	Echo:B	Mstr Fbk	100	00	2F

Appendix A: Patch Sources by Index

Remapping of MIDI Controllers

In the MIDI spec, two continuous controllers are reserved for Bank change. Those controllers are #0 and #32. Those controllers are not available as patch sources in the PCM 90, as their use would possibly cause unwanted effects. Therefore, controller IDs are remapped in the patch source list. Controllers 0 and 32 are excluded. This means that you must subtract 1 from any MIDI Controller# below #33 and you must subtract 2 from Controller #33 on up. For example:

Controller #	Patch Source Index
0	Not available
1- 31	0- 30
32	Not available
33- 119	31-117

MIDI controls above 119 are reserved for other messages and are not available as controllers. They are also excluded from the patch source table.

Patch Source Table

All patch sources have outputs in the range of 0-127. See the preceding table for exclusions.

Source Index	Controller
0-117	MIDI controllers 0 - 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	LFO1 (selectable output)
126	LFO1 Sine
127	LFO1 Cosine
128	LFO1 Square
129	LFO1 Sawtooth
130	LFO1 Pulse
131	LFO1 Triangle
132	LFO1 Random
133	LFO2 (selectable output)
134	LFO2 Sine
135	LFO2 Cosine
136	LFO2 Square
137	LFO2 Sawtooth
138	LFO2 Pulse
139	LFO2 Triangle
140	LFO2 Random

Source Index	Controller
141	Left Envelope follower
142	Right Envelope follower
143	Mono Envelope follower
144	AR envelope generator
145	Latch
146	Timeswitch 1
147	Timeswitch 2
148	Composite Timeswitch
149	Control Delay Output
150	Sample & Hold Output
151	Mono input level
152	Left input level
153	Right input level
154	Continuous foot pedal
155	Footswitch 1
156	Footswitch 2
157	ADJUST knob
158	Custom Control 1
159	Custom Control 2
160	Custom Control 3
161	Custom Control 4
162	Tempo
163-253	Reserved — Do not use these values.
254	Always on (127)
255	Always off (0)

Appendix B: KeyWords

As many as four KeyWords may be assigned to an effect. The KeyWords are represented as indices into a fixed list.

KeyWord Index	KeyWord
0	(No KeyWord Assigned)
1	Acoustic
2	Ambience
3	Ballad
4	Bright
5	Broadcast
6	Cascade
7	Chamber
8	Classical
9	Cncrt Hall
10	Custom
11	Dark
12	Dialog
13	Drums/Perc
14	Dynamic
15	Echo
16	Film-ADR
17	Gated
18	Guitar
19	Indoor
20	Instrument
21	Keyboard
22	Large
23	Live PA
24	Long
25	Mastering
26	Medium
27	MIDI
28	Mono
29	Natural
30	Orchestral
31	Outdoor
32	Plate
33	RandomHall
34	Room
35	Short
36	Slap FX
37	Small
38	Spatial
39	Special FX
40	Split RVB
41	Stereo
42	Surround
43	Tempo
44	Unnatural
45	Vocal
46	User 1
47	User 2
48	User 3
49	User 4

Appendix C: MIDI Bank Assignments

Effects in the PCM 90 are accessed by Bank and Program numbers. Banks are assigned as follows:

Bank 0 - 4	Internal presets (Displayed as P0-P4)
Bank 5 - 6	User generated effects (Displayed as R0-R1)
Bank 7 - 11	Extension presets. Presets are loaded into these banks from algorithm cards. (Displayed as X0-X4)
Bank 12 - up	Card banks, either user generated or preset, depending on card type. Displayed as C0 and up. Bank numbers above 9 are displayed alphabetically, beginning with CA

Program numbers range from 0-49. Numbers greater than 49 are ignored. The exception is mapped mode in which a program number (0-127) is used to look up a bank/program combination from a table.

Appendix D: MIDI Inquiry Message

The MIDI specification defines a global message that allows a host device to determine what sorts of devices are connected. This message is interpreted by the PCM 90 as follows:

Inquiry message from host to PCM 90:

Byte #	Byte Value	Description	Notes
1	0xf0	SysEx ID	
2	0x7e	Universal non-realtime header	
3	0iii iiii	Channel	Treated as the SysEx device ID assigned to the PCM 90
4	0x06	General information	
5	0x01	Device inquiry	
6	0xF7	EOX	

Response from PCM 90:

Byte #	Byte Value	Description	Notes
1	0xf0	SysEx IDr	
2	0x7e	Universal non-realtime header	
3	0iii iiii	Channel. SysEx device ID assigned to the PCM 90.	
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	0x08	Family member code LSB	This is the PCM 90 SysEx product code (byte 3 of a standard SysEx message)
10	0x00	Family member code MSB	
11	0iii iiii	Major software revision #	See System Configuration Response.
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	

Appendix E: Error Messages

These messages are displayed on the PCM 90 when MIDI or other errors occur.

MIDI reset complete   Displayed after a MIDI reset has been received or transmitted.

**Receiving SysEx
data...**   Displayed whenever SysEx data is being received by the PCM 90.
                                 Received data must match the ID specified in the PCM 90's MIDI row
                                 or the ID must be 127 (broadcast).

**Transmitting MIDI
bulk data...**   Dump is progressing. May not appear for dumps of very small data sets.
                                 Does not appear if verbose mode is off.

**MIDI data dump
is complete**   Dump is over. Does not appear if verbose mode is off.

SysEx checksum error   Checksum error in incoming data.

SysEx data overrun   SysEx data has been transmitted to the PCM 90 faster than it can be
                                 processed.

SysEx data error...   Indicates some sort of corruption in the SysEx data.

**Cannot store data
as requested**   Usually indicates invalid Bank/offset specification. Bank may not be
                                 writeable, or may not be present, or offset may be >49.

Operation failed   Catchall error message. In some store operations, may indicate that a
                                 card is write-protected

Can't dump register
                                 Displayed when a bank or register which requires a card-based algo-
                                 rithm is being dumped.

**Effect unchanged
No data in dump**   The dump just received was originally transmitted without an algorithm
                                 card and, therefore, does not contain all necessary data. The destina-
                                 tion of the dump is not overwritten.

**Effect unchanged
Need algorithm card**   The incoming dump requires an algorithm card to be decoded. The
                                 destination of the dump is not overwritten.

**Bad patch data
was corrected**   A program load failed because of corrupt patch data, probably the result
                                 of bad data in a MIDI transfer of effect data. The effect should be
                                 carefully screened and may not be usable.

Appendix F: System (Type 0) Parameters

These parameters are global (not part of a preset). The automation column indicates transmission via SysEx automation.

Param# Dec	Hex	Description	Max Value	Auto-mation?	Notes
0	00	Audio source	2	n	0=Digital; 1=Analog 48kHz; 2=Analog 44.1kHz
1	01	MIDI Receive	17	n	0=Off; 1-16=MIDI channels; 17=Omni
2	02	MIDI transmit on/off/channel	16	n	0=Off; 1-16=Channel for transmission of controller data
3	03	External tap source	patch source list	y	
4	04	External tap threshold	127	y	
5	05	MIDI controller ID for continuous pedal	118	y	
6	06	MIDI controller ID for footswitch 1	118	y	
7	07	MIDI controller ID for ADJUST knob	118	n	
8	08	MIDI SysEx device ID	126	n	This parameter is not controllable from MIDI, but is returned by a request for the parameter value.
9	09	MIDI SysEx enable	1	n	This parameter is not controllable from MIDI, but is returned by a request for the parameter value.
10	0A	Memory protect	1	n	0=Off; 1=On
11	0B	Pro Mode/Go Mode	1	y	0=Go; 1=Pro
12	0C	Mix Prg/Global	1	y	0 =Prog; 1=Global
13	0D	Tempo Prg/Global	1	y	0=Prog; 1=Global
14	0E	Autoload	1	y	0=Off; 1=On
15	0F	Bypass Mode	3	y	0=All Mute; 1=Input Mute; 2=Output Mute; 3=Bypass
16	10	MIDI controller ID for footswitch 2	118	y	
17	11	Patch update mode	1	y	0=Immediate; 1=Delayed
18	12	MIDI program change mode	3	n	0=On; 1=Off; 2=Mapped; 3=Chained
19	13	Map select	127	y	Actual number of valid maps depends on presence and type of card. The parameter specific message for this parameter will always return the maximum possible range. The actual useful values should be determined from the Configuration Response.
20	14	Chain select	127	y	Actual number of valid chains depends on presence and type of card. The parameter specific message for this parameter will always return the maximum possible range. The actual useful values should be determined from the Configuration Response.
21	15	Prg+ source	120	y	0=No Assigment; 1-118 indicate MIDI controllers; 119=Foot Sw 1 ; 120=Foot Sw 2.
22	16	Prg- source	120	y	0=No Assigment; 1-118 indicate MIDI controllers; 119=Foot Sw 1; 120=Foot Sw 2.
23	17	Program change bypass mode	1	y	0=Mute; 1=Bypass
24	18	Global Mix value	100	y	0 =Dry; 100 =Wet
25	19	Transmit MIDI clock	1	n	0 =Do not transmit clock; 1=Transmit clock
26	1A	Dump speed	2	n	0=Slow; 1=Medium; 2=Fast. Note: This causes brief timeouts to be inserted between individual effects In a bank dump. There is no other effect from this param-eter. This is helpful for slow or memory-bound devices which may have difficulty digesting the large amount of

					data in a bank dump. Packets are sent as follows:
					Header and label information (68 byte); Pause; 1st effect (2334 byte); Pause; 2nd-50th effects with pauses. Final effect data includes EOX
27	1B	MIDI automation mode	1	n	0 =Off; 1=On
28	1C	transmitted device ID for automation	127	n	0 - 126 are specific target ID's; 127 is a broadcast.
29	1D	Tempo blink	1	y	0=On; 1=Off
30	1E	Global tempo value	360	y	40-400 BPM in 1 beat increments.
31	1F	Dig In status	0	n	No effect when transmitted.
32	20	Selects display of digital error	5	n	0=Validity; 1=Confidence; 2=Slip Sample; 3=CRC; 4=Parity
33	21	Transmitted SCMS selection	2	n	0=No Copy; 1=Single Copy; 2=Multi Copy
34	22	Transmitted emphasis selection	2	n	0=No Emphasis; 1=Emphasis; 2=Pass Thru
35	23	Tempo source	1	y	0=Internal; 1=MIDI
36	24	Analog output level	1	n	0=-10 dBu; 1=+4 dBu
37	25	Bypass controller assign	120	y	0=No Assigment; 1-118=MIDI controllers; 119=Foot Sw 1; 120=Foot Sw 2.
38	26	Custom 1 controller assign	118	n	
39	27	Custom 2 controller assign	118	n	
40	28	Custom 3 controller assign	118	n	
41	29	Custom 4 controller assign	118	n	
42	2a	Keyview Enable	1	y	
43	2b	KeyWord ID	0	n	No effect.

Appendix G: Patchable (Type 1) Parameters

These are the patchable parameters that are the same (both offset and range) for all algorithms. DSP-specific parameters are not listed.

Param# Dec	Hex	Description	Max Value	Notes
0	00	Mix	100	Only when Pgm is selected as Mix mode.
1	01	LFO1 rate	1000	0-10Hz in .01Hz increments
2	02	LFO1 shape	6	0=Sine; 1=Cosine; 2=Square; 3=Sawtooth; 4=Pulse; 5=Triangle; 6=Random
3	03	LFO1 pulsewidth	98	1- 99 %
4	04	LFO1 depth	100	0- 100%
5	05	LFO2 rate	1000	0-10Hz in .01 Hz increments
6	06	LFO2 shape	6	0=Sine; 1=Cosine; 2=Square; 3=Sawtooth; 4=Pulse; 5=Triangle; 6=Random
7	07	LFO2 pulsewidth	98	1- 99 %
8	08	LFO2 depth	100	0- 100%
9	09	Follow ENV L	500	0- 10 Seconds in 20ms increments.
10	0A	Follow ENV R	500	0- 10 Seconds in 20ms increments.
11	0B	Follow ENV L+R	500	0- 10 Seconds in 20ms increments.
12	0C	AR envelope attack	500	0- 10 Seconds in 20ms increments.
13	0D	AR envelope release	500	0 - 10 Seconds in 20ms increments.
14	0E	AR envelope generator mode	3	0=Off; 1=One Shot; 2=Retrigger; 3=Repeat
15	0F	Timeswitch 1 mode	2	0=Off; 1=Switch; 2=Ramp
16	10	Timeswitch 1 rate	1000	0- 10Hz in .01Hz increments.
17	11	Timeswitch 1 pulsewidth	98	1- 99 %
18	12	Timeswitch 2 mode	2	0=Off; 1=Switch; 2=Ramp
19	13	Timeswitch 2 rate	1000	0- 10Hz in .01Hz increments.
20	14	Timeswitch 2 pulsewidth	98	1- 99 %
21	15	Delay Time	250	0- 5 Seconds in 20ms increments.

Appendix H: Non-patchable (Type 2) Parameters.
These are the non patchable parameters that are the same for all algorithms.

Param#			Max	
Dec	Hex	Description	Value	Notes
0	00	Tempo (Rate) when mode is Pgm	360	Add 40 to parameter value to derive BPM, ie Parameter Value of 80=120 BPM
1	01	AR threshold (AR ENV TLVL)	127	
2	02	Switch 1 threshold (SW 1 TLVL)	127	
3	03	Switch 2 threshold (SW2 TLVL)	127	
4	04	Latch Low Threshold	127	
5	05	Latch High Threshold	127	
6	06	AR Env Source	255	
7	07	Switch 1 source (Sw1 TSRC)	255	
8	08	Switch 2 source (Sw2 TSRC)	255	
9	09	Latch source	255	
10	0A	Tap duration	14	0=1/8 beat 1=1/7 beat 2=1/6 beat 3=1/5 beat 4 =1/4 beat 5=1/3 beat 6=1/2 beat 7=1 beat 8=2 beats 9=3 beats 10=4 beats 11=5 beats 12=6 beats 13=7 beats 14=8 beats
11	0B	Tempo beat value	6	0=Eighth Note 1=Dotted Eighth 2=Quarter Note 3=Dotted Quarter 4=Half Note 5=Dotted Half 6=Whole Note
12	0C	Tap average (tap window)	6	2 Taps to 8 Taps
13	0D	Adjust knob lower limit	127	
14	0E	Adjust knob upper limit	127	
15	0F	Adjust Knob Mid Point	127	
16	10	Custom Control 1 Lower Limit	127	
17	11	Custom Control 1 Upper Limit	127	
18	12	Custom Control 1 Mid Point	127	
19	13	Custom Control 2 Lower Limit	127	
20	14	Custom Control 2 Upper Limit	127	
21	15	Custom Control 2 Mid Point	127	

22	16	Custom Control 3 Lower Limit	127
23	17	Custom Control 3 Upper Limit	127
24	18	Custom Control 3 Mid Point	127
25	19	Custom Control 4 Lower Limit	127
26	1A	Custom Control 4 Upper Limit	127
27	1B	Custom Control 4 Mid Point	127
28	1C	Delay Source	255
29	1D	S & Hold Src	255
30	1E	S & Hold Trigger	255
31	1F	S & Hold Tlvl	127

MIDI Implementation Chart

Lexicon PCM 90
Digital Reverberator

Function		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 1-16	1 1-16	
Mode	Default Messages Altered	X 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 2, and Custom 1-4 can be assigned controllers 1-119 for MIDI transmit; 32 reserved for bank select
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 CON- TINUE are patchable as a switch: START/CON TINUE=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

■ A Harman International Company

3 Oak Park
Bedford, MA 01730 USA
Tel 781-280-0300
Fax 781-280-0490
Customer Service Fax 781-280-0499
www.lexicon.com

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