

# PCM 80 Version 1.10

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MIDI Implementation Details

**lexicon**

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# PCM 80

## Version 1.10 MIDI Implementation Details

An ASCII text version of this document is available on CompuServe under section seven of the MIDI B forum. To access these documents:

- Enter CompuServe, type GO MIDIBVEN
- Select "section seven: Lexicon"
- Enter the Lexicon library

### Overview

The Lexicon PCM 80 is a complex device with an involved MIDI System Exclusive implementation. This document describes the Version 1.10 PCM 80 MIDI implementation, and assumes familiarity with the functions and operations of the PCM 80. MIDI Implementation information relevant to PCM 80 algorithm cards, or to Version 1.00 software, is available in separate documents

The most substantial changes to MIDI implementation between Versions 1.00 and 1.10 are in the area of effects and bank dumps. Although the data compression used in Version 1.00 has been eliminated, Version 1.10 will accept dumps in that format. The software version of any PCM 80 can be determined using the MIDI Inquiry Message, described in Appendix C of this document.

### Autoconfiguration

To aid development of editors and librarians which will remain useful through the lifetime of the PCM 80, 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
- Direction of Data Transfer

### Types of System Exclusive Messages

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

- Data Requests** A request is initiated by a remote device (never by a PCM 80). A request usually results in a dump. A request for data causes no change in the state of the PCM 80.
- Messages** A message is sent by a remote device to a PCM 80. 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 80.
- Responses** A response is a data packet that is sent from the PCM 80 to another device, always as the result of a request by that device. A response is never sent to the PCM 80 (It may be harmlessly transmitted to a PCM 80, but results in no change in the PCM 80).

**Data Dumps** A dump contains information about some aspect of the PCM 80's internal state. A dump is transmitted by a PCM 80, either on request to another device, or to another PCM 80 (via front panel dump commands or SysEx Automation). When a dump is transmitted to a PCM 80, it will normally cause a change in the internal state of the PCM 80. A dump can also be purely informational, containing version information, etc. This sort of dump may be received by a PCM 80 but results in no change. It is initiated only as the result of an external request and may be considered as unidirectional.

### **Enabling System Exclusive Messages**

The PCM 80 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 80 Memory Protect function and PCM 80 Pro and Go Edit modes are ignored when System Exclusive is enabled.

### **ASCII Character Data**

Many of the System Exclusive messages include ASCII character data. This refers to the values between 0x20 (space) and 0x7E (tilde). No other values should be used. Character fields should be padded with spaces — the C NULL-terminator should not be used. When the PCM 80 receives an out-of-range value, it will convert that value to a space. The small block character on the PCM 80 display (used to indicate patch source/destination) is transmitted as a tilde. It is not possible to transmit this character to the PCM 80 via System Exclusive messages. The ASCII backslash character (0x5c) maps to the yen character (¥) on the PCM 80 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 80, the less-significant portion of the byte is transmitted first.

### **Data Errors**

The PCM 80 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 situations 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 80 in bursts of more than 3 messages every 20ms. The individual message descriptions presented later in this document note any specific time out requirements.



## System Exclusive Message Descriptions

### System Exclusive 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	07	PCM 80 ID	
4	0iii iii	Device ID	Values 0-126 are defined as specific addresses. Any message sent to device 127 will be received by any PCM 80 on the cable as long as it is enabled to receive System Exclusive messages.
5	0iii iii	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 Message
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
0x09-0x0A	reserved
0x0B	Parameter Dump
0x0C	Button Dump
0x0D-0x11	reserved
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 Info Response
0x1B	reserved
0x1C	Adjust Knob Name Dump
0x1D	reserved
0x1E	Verbose Dump Message
0x1F	LED Response
0x20	Meter Response
0x21	Patch Display Response
0x22	Matrix Mapping Response
0x23	Adjust Knob Value Dump
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 80 to a remote device when requested. It is ignored by the PCM 80. 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x0	Configuration Data	
6	0iii iiiii	Major Version #	This is the version number that appears to the left of the decimal point on the the integer portion of the power up display.
7	0iii iiiii	Minor Version #	This is the version number that appears to the right of the decimal point on the fractional portion of the power up display. On the front panel this may be displayed as a 2-character value with a leading zero. For example, a minor revision of 1 will appear as x.01. A minor revision of 10 will appear as x.10
8-15	0iii iiiii	8 Byte Time string	Time of the code build in ASCII format xx:yy:zz (Hours:Minutes:Seconds)
16-26	0iii iiiii	11 Byte Date string	Date of the code build in ASCII format: xxx:yy:zzzz (Month:Day:Year)
27-34	0000 iiiii	56000 memory page count 4-byte value (nibble-ized)	Number of pages (64K words/page) of memory available to the Motorola 56002 processor. The number of pages in a standard PCM 80 is 4. Memory can be expanded using SIMM memory.
35-148	0iii iiiii	114 Byte Bank information (Space for 57 banks)	Indexed by bank, 2 characters/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.
149	0n	Card Present	non-zero if present
150	0n	Card Write Protect	non-zero if protected
151	0iii iiiii	Card Version	Indicates the version of the card directory structure. This should be ignored if the Card Present bit is not set.
152	0iii iiiii	Card Type	Types are: 0x00=ROM (holds algorithms or presets) 0x01=RAM (holds user effects, maps, setups and chains) 0x80=Bootable Diagnostics card. This should be ignored if the Card Present bit is not set.
153-162	0iii iiiii	10 Byte Name string for card	This should be ignored if the Card Present bit is not set.
163	0iii iiiii	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.
164	0iii iiiii	Count of algorithms online	Number of valid algorithm IDs in the array beginning at byte 165. 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.
165-228	0iii iiiii	64 Byte List of algorithm IDs	Only count from byte 164 is valid.
229	0iii iiiii	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 80 ability to respond to MIDI.
230	0iii iiiii	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 saving an Effect, etc.
231	0iii iiiii	Compare mode	0=Off, 1=On
232	0iii iiiii	Bypass	0=Off, 1=On
233	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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x1	Effect bulk Data	
6	0iii iiiii	Bank #	Source bank if sent by PCM 80; target bank if received by PCM 80. See appendix for indices of banks.
7-70656	xxxxxxx	50 Single effect data packets, with checksums after each	See Description of Nibble-ized Effect Data.
70657	0xF7	End of SysEx	

Note that as 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 Flags byte for each effect. (See Single Effect Data for a description of the Flags byte.)

Note also that for any effect to be successfully transmitted or received by the PCM 80, 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 on the screen. Such cases also cause special formatting of the effects packet. See Single Effect Data for details. When 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x02	Single Effect Data	
6	0iii iiiii	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 80, 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 iiiii Program #	
8 - 1419		Nibbleized effect data	See next section for description.
1420		Checksum	This 7-bit value is a simple additive checksum that starts at the beginning of nibble-ized data.
1421	0xF7	End of SysEx	

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 is 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 Offset	Size	Description	Notes
0	16-bit (LSB first)	Flags	0xffff=Valid Effect; 0xfffe=Blank effect slot. This is only sent during a bank dump when certain positions in the bank are empty. Any other value indicates that the effect was originally dumped from a Version 1.00 ROM. The internals of the dump differ from what is described here. Note that the version 1.10 ROM will accept effect dumps from Version 1.00 — the version 1.00 ROM will NOT accept dumps from V1.10.
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 is not present when the packet is transmitted. The value 0x7F replaces the Algorithm ID which 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 when Edit is pressed. Upper nibble represents column; lower nibble represents row. See previous note in the case of algorithm not present.
4-15	12 Bytes	Effect Name	Name of effect. See notes on ASCII Character Data in the Overview.
16-24	9 Bytes	Knob Name	Name of Soft Knob. See notes on ASCII Character Data in the Overview.
25	1 Byte	Adjust Knob Value	Stored value for the Soft Knob.
26-35	10 Bytes	Soft row assignments	See Soft Row Assignment Dumps.
36-65	16-bit (LSB first) Type 2 Parameter Values	Multiple values (15)	This field is an indexed array of values for all Type 2 parameters. See Appendix G: Non-Patchable (Type 2) Parameters.
66-395	Set of 110 3-Byte values	Type 1 values (110)	This field is an indexed array of values for all Type 1 parameters. 1 Byte=Tempo Flag (1 if Tempo Mode); 2 Bytes=Value. If Tempo Mod=0, then this is a 16-bit value (LSB first). If Tempo Mode=1, then 1st byte is numerator and 2nd byte is denominator. The first 22 parameters are the same for all algorithms. The remaining are unique for each algorithm. See Appendix F: Patchable (Type 1) Parameters.
396	31 Bytes	Patch Structure 0	This structure describes a single patch. Its fields are described in the Patch Save Data table following this section.
427	31 Bytes	Patch Structure 1	
458	31 Bytes	Patch Structure 2	
489	31 Bytes	Patch Structure 3	
520	31 Bytes	Patch Structure 4	
551	31 Bytes	Patch Structure 5	
582	31 Bytes	Patch Structure 6	
613	31 Bytes	Patch Structure 7	
644	31 Bytes	Patch Structure 8	
675	31 Bytes	Patch Structure 9	
706	End of Data	End of Data	End of Data

**Patch Save Data**

Byte Offset	Size	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 not in Tempo Mode; 1=Target parameter 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	See the Patch Source Table in 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 Destination List Index is returned by the Parameter Specific Response (0x16).
6	1 Byte	Point Count	0-8=number of points in the patch. 0 is interpreted in the same way as a Valid Flag of 0.
7	8 3-byte values	Patch Point Values	Values for each of 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

**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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x3	Table Data	
6	0iii iiiii	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 iiiii	Bank for table position 0	Any legitimate bank. See Appendix B: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
8	0iii iiiii	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	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0x4	Table Element Data	
6	0iii iii	Table (map) #	
7	0iii iii	Offset in table	0-127
8	0iii iii	Bank	Any legitimate Bank index. See Appendix B: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
9	0iii iii	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 a card set of 10).

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0x5	Chain bulk	
6	0000 000i	Internal/Card	0=Internal; 1=Card
7-26	0iii iii	Data for chain 0 (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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x6	Chain Data	
6	0iii iiiii	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, an additional 10 chains (10-19) are available.
7	0iii iiiii	Bank for chain position 0	Any legitimate Bank index. See Appendix B: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
8	0iii iiiii	Chain position offset	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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x7	Chain Element Data	
6	0iii iiiii	Chain #	
7	0iii iiiii	Offset in chain	0-9
8	0iii iiiii	Bank	Any legitimate Bank index. See Appendix B: MIDI Bank Assignments. If nothing is assigned to this position in the table, a value of 0x7F is returned.
9	0iii iiiii	Offset	0-49
10	0xF7	End of SysEx	

**0x08 Display Dump**

When sent from the PCM 80, this bidirectional dump holds the current display information, whatever it is. When sent to the PCM 80, this text is displayed for 2 seconds.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x08	Display message	
6-25	0iii iiiii	Top line of display	20-byte copy of upper display line.
26-45	0iii iiiii	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 80 is transmitting SysEx Automation data. It may be transmitted or received by a PCM 80. Parameter types include:

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 be patch destinations These are saved with an effect.

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

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0B	Parameter Value	
6	0x	Parameter Type	0=system; 1=patchable; 2=nonpatchable
7	0iiiiii	Parameter Offset	See appendix according to type.
8	0000000i	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 appendices describing the algorithms or use the Parameter Specific Response.
9	0000iiii	Least-significant nibble of absolute value or numerator byte	Out-of-range values transmitted to PCM 80 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 mode are: Compare, Tap and Bypass.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0xC	Button message	
6	0iii iiiii	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 messages may be sent in quick succession (faster than 40ms) to mimic holds. For example, sending Program Banks every 20ms for 1 second will cause the Help message for the key to be displayed, just as if the key on the front panel were 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 position 0.0 in the current matrix, just as if the two buttons were pressed simultaneously.

**0x12 Soft Row Assignment Dump**

Bidirectional. Assigns a Pro mode slot to a Go mode soft slot.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x12	Soft Row Assign	
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. 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)	
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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x13	PatchAssign	
6	0n	PatchID (0-9)	
7-8	0000 iiiii	Patch Source Nibble-ized with less significant part first	See Appendix A: Patch Sources by Index.
9	0iii iiiii	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. The remainder should be set to 0. A point count of 0 is an alternate way to indicate a disconnected path.
Patch Point Packet — repeated 8 times...			
11	0iii iiiii	Point Position (0-127)	Positions should be in ascending order and may not be duplicated. The point value is independent of the specific parameter range. The range of point value is from 0 (minimum) to 0xffff (maximum). This format is used so that a new patch destination can be selected while maintaining the contour of the patch table.
13	0000 iiiii	Point Value next nibble	
14	0000 iiiii	Point Value next nibble	
15	0000 iiiii	Point Value MS nibble.	
16	000i iiiii	Tempo value Numerator (1-24).	Out-of-range values will be clipped and will cause an error message to be displayed.
17	000i iiiii	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 80 will attempt to correct the data. The message "Bad patch data was corrected" will be displayed.



**0x14 Knob Message**

Host to PCM 80 only. (In SysEx Automation mode, the PCM 80 sends parameter values, not knob messages.) Knobs operate within the current context of the user interface. For example, in Register Banks mode, the Adjust knob is a soft knob. In Edit mode, it adjusts the displayed parameter. This message is only useful for a remote controller.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	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 (clockwise)
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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x15	Program Change code	
6	0iii iiiii	Bank	See Appendix B: MIDI Bank Assignments.
7	0iii iiiii	Program	0-49
8	0xF7	End of SysEx	

**0x16 Parameter Specific Response**

PCM 80 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	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0x16	Parameter Specific Data	
6	0n	Type	0=System;1=Patchable; 2=Non-patchable
7	0n	Offset	
8	0iii iii	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	2-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, maximum value=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 0x02, which requires this 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 80 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	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0x17	Parameter display data	
6	0n	Parameter type	See Parameter Dump (0x0B).
7	0n	Parameter number	Some parameter numbers are algorithm dependent. See the appropriate algorithm description.
8-27	0iii iii	20-character display string	
28	0xF7	End of SysEx	

**0x18 System Setup Dump**

This dump, which is both transmitted and received by the PCM 80, contains all system parameters (those parameters that are not part of a preset).

Note that when the PCM 80 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x18	Setup Data	
6	0iii iiiii	Setup ID	0x7F=Current; 0-4=Internal; 5-9=RAM Card. A RAM card may be detected using the Configuration Response.
7-15	0iii iiiii	Setup name	9 byte ASCII string
16-19	0n	Nibble-ized unsigned short parameter value (LS first) for first parameter (41 total)	These parameters correspond by index with the system (Type 0) parameters.
20-183	0n	Remaining parameters	
184	0xF7	End of SysEx	

**0x19 Save Current Edit Buffer Message**

Host to PCM 80 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x19	Save Code	
6	0iii iiiii	Destination Bank	Must be a writeable register or card bank. If a card bank, the write protect tab must be off. See Appendix B: MIDI Bank Assignments.
7	0iii iiiii	Destination Program	0-49
8-19	0iii iiiii	12-character program name	See Overview for information on ASCII characters.
20-28	0iii iiiii	9-character knob name	See Overview for information on ASCII characters.
29	0xF7	End of SysEx	

**0x1A Effect Information Response**

PCM 80 to Host only. This dump allows a remote Host 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x1A	Effect Information	
6	0iii iiiii	Bank #	A bank # of 0x7F and program # of 0x7F indicates the current program.
7	0iii iiiii	Program #	
8-23	0iii iiiii	Algorithm Name	16 Byte string
24-35	0iii iiiii	Program Name	12 Byte string
36-44	0iii iiiii	Knob Name	9 Byte string
45	0xF7	End of SysEx	

**0x1C Adjust Knob Name Dump**

Bidirectional. Name string for the Adjust knob in the current effect.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x1C	Adjust knob name	
6-14	0iii iiiii	Knob name String	9 Byte string
15	0xF7	End of SysEx	

**0x1E Verbose Dump Message**

This dump is only received by the PCM 80. It is provided for use with remote editors to enable and disable the flashing of MIDI transmission messages during PCM 80 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 the PCM 80 over a reboot cycle. The PCM 80 always returns to normal mode (Mode 1).

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	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. Note that this mode can cause a tremendous amount of data to be output by the PCM 80, 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 transmitted by the PCM 80 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 to lower the data traffic.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x1F	LED message	
6	0iii iiiii	LED bitmask	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 iiiii	LED bitmask	Bit 0=Bypass; Bit 1=Tempo; Bits 2-6=reserved
8	000i iiiii	Left Meter bitmask	These bits match the front panel meters as follows: Bit 0=24dB (green); Bit 1=18dB (green); Bit 2=2dB (green); Bit 3=6dB (amber); Bit 4=0dB (red)
9	000i iiiii	Right Meter bitmask	same as left meter bitmask
10	0xF7	End of SysEx	

**0x20 Meter response**

When the automatic verbose mode is selected, this dump is transmitted by the PCM 80 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x20	Meter message	
6	000i iiiii	Left Meter bitmask	Same as the LED message description.
7	000i iiiii	Right Meter bitmask	
8	0xF7	End of SysEx	

**0x21 Patch Display Response**

PCM 80 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	07	PCM 80 ID	
4	0iii iiiii	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 iiiii	15-character display string	See Overview for information on ASCII characters.
23	0xF7	End of SysEx	

**0x22 Matrix Mapping Response**

PCM 80 to Host only. This dump is a response to a request for information. The request holds Destination List 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	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x22	matrix mapping data	
6	0iii iiiii	Destination List ID	Used in the single effect packet.
7	0iii iiiii	Destination List Index	Used in the single effect packet.
8	0iii iiiii	Parameter type	See Parameter Dump .
9	0iii iiiii	Parameter offset	Dependent on parameter type and algorithm.
10	0xF7	End of SysEx	

**0x23 Adjust Knob Value Dump**

Bidirectional. This dump allows the Adjust knob value to be transmitted or received.

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x23	Adjust knob value	
6	0iii iiiii	Knob Value	Value within range of 0-127
7	0xF7	End of SysEx	

**0x24 Soft Row Display Response**

This dump is only transmitted by the PCM 80 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 Assignment 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 Host 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	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0x24	Soft Row Display Message	
6	0iii iii	Algorithm iD	
7	0iii iii	Number of value soft row assignments for current algorithm	Only this many of the following descriptors should be used. The message reserves room for up to 64 descriptors
8-29	0iii iii	22-Byte descriptor for soft row assignment	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 iii	Remaining descriptors	
1416	0xF7	End of SysEx	

**0x7C Failure Response**

PCM 80 to Host only. This message tells the host that the PCM 80 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	07	PCM 80 ID	
4	0iii iii	Device ID	
5	0x7C	Failure	
6	0xF7	End of SysEx	

**0x7F Data Request**

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

Byte #	Byte Value	Description	Notes
1	F0	SysEx ID	
2	06	Lexicon ID	
3	07	PCM 80 ID	
4	0iii iiiii	Device ID	
5	0x7F	Data request	
6	0iii iiiii	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	
Effect Single	0x02	Bank, Offset	0x7F returns dump of currently-running effect, including any unsaved edits.
Table	0x03	Table ID	
Table element	0x04	Table ID, Offset	
Chain Bulk	0x05	Chain Group	0=Internal; 1=External (Card)
Chain	0x06	Chain ID	
Chain element	0x07	Chain ID, Offset	
Display	0x08	none	Return dump of current display.
Parameter	0x0B	Type, Offset	Dependent on parameter 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	
Effect Info	0x1A	Bank, Offset	Offset must be 0-49.
	0x1B	Bank	
Adjust Name	0x1C	none	
	0x1D		
Patch Display	0x21	Patch#, Pivot Point	
Matrix Mapping	0x22	Destination List ID, Destination List Index	
Adjust Value	0x23	none	
Soft Row			
Display	0x24	Algorithm ID	0x7F for currently running algorithm



## PCM 80 Algorithms

### Algorithm 0: 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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00	RvbDesign	Size	144	00	1C
11	00	RvbDesign	Spin	50	00	1F
12	00	Rvb Time	Rt HC	48	00	0D
13	00	Rvb Time	Low Rt	9	00	0A
14	00	Rvb Time	Crossover	60	00	0C
15	00	Rvb Time	Mid Rt	63	00	0B
16	00	RvbDesign	Diffusion	100	00	1D
17	01	Rvb Time	Pre Delay	465	00	0E
18	00		Not active	0	7F	7F
19	00	RvbDesign	Attack	100	00	1E
1A	00	RvbDesign	Link	1	00	20
1B	00	RvbDesign	Rvb Out	15	00	23
1C	01	Rvb Time	EkoDly L	600	00	14
1D	01	Rvb Time	EkoDly R	600	00	16
1E	00	Rvb Time	EkoFbk L	30	00	13
1F	00	Rvb Time	EkoFbk R	30	00	15
20	01	Rvb Time	RefDly L	600	00	10
21	01	Rvb Time	RefDly R	600	00	12
22	00	Rvb Time	RefLvl L	15	00	0F
23	00	Rvb Time	RefLvl R	15	00	11
24	00	Controls	InLvl R	160	00	03
25	00	Controls	InLvl L	160	00	02
26	00	Controls	InPan R	100	00	05
27	00	Controls	InPan L	100	00	04
28	00	RvbDesign	Rvb In	80	00	22
29	01	Rvb Time	PstDly L	1365	00	18
2A	01	Rvb Time	PstDly R	1365	00	19
2B	00	DelayTime	Host	200	00	29
2C	01	DelayTime	Voice1	1365	00	2D
2D	01	DelayTime	Voice2	1365	00	2E
2E	01	DelayTime	Voice3	1365	00	2F
2F	01	DelayTime	Voice4	1365	00	30
30	00	DelayTime	Clear	1	00	2C
31	00	Levels	Host	80	00	24
32	00	Levels	Voice1	160	00	25
33	00	Levels	Voice2	160	00	26
34	00	Levels	Voice3	160	00	27
35	00	Levels	Voice4	160	00	28
36	00	Feedback	Host	100	00	31
37	00	Feedback	Voice1	200	00	32
38	00	Feedback	Voice2	200	00	33
39	00	Feedback	Voice3	200	00	34
3A	00	Feedback	Voice4	200	00	35
3B	00	Panning	Host	100	00	36
3C	00	Panning	Voice1	100	00	37

3D	00	Panning	Voice2	100	00	38
3E	00	Panning	Voice3	100	00	39
3F	00	Panning	Voice4	100	00	3A
40	00	Controls	FX Mix	100	00	08
41	00	Controls	FX Adjust	80	00	01
42	00	Rvb Time	PstMix	100	00	17
43	00	RvbDesign	Rvb Width	720	00	21
44	00	Controls	FX Width	720	00	09
45	00	Controls	Voice Dif	100	00	07
46	00	Controls	High Cut	121	00	06
47	00	Rvb Time	GldResp	100	00	1A
48	00	Rvb Time	GldRange	1365	00	1B
49	00	DelayTime	GldResp	100	00	2A
4A	00	DelayTime	GldRange	1365	00	2B

**Algorithm 1: Chamber**

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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00	RvbDesign	Size	144	00	1C
11	00	RvbDesign	Spin	50	00	20
12	00	Rvb Time	Rt HC	48	00	0D
13	00	Rvb Time	Low Rt	9	00	0A
14	00	Rvb Time	Crossover	60	00	0C
15	00	Rvb Time	Mid Rt	63	00	0B
16	00	RvbDesign	Diffusion	100	00	1D
17	01	Rvb Time	Pre Delay	465	00	0E
18	00	RvbDesign	Spread	255	00	1F
19	00	RvbDesign	Shape	255	00	1E
1A	00	RvbDesign	Link	1	00	21
1B	00	RvbDesign	Rvb Out	15	00	24
1C	01	Rvb Time	EkoDly L	600	00	14
1D	01	Rvb Time	EkoDly R	600	00	16
1E	00	Rvb Time	EkoFbk L	30	00	13
1F	00	Rvb Time	EkoFbk R	30	00	15
20	01	Rvb Time	RefDly L	600	00	10
21	01	Rvb Time	RefDly R	600	00	12
22	00	Rvb Time	RefLvl L	15	00	0F
23	00	Rvb Time	RefLvl R	15	00	11
24	00	Controls	InLvl R	160	00	03
25	00	Controls	InLvl L	160	00	02
26	00	Controls	InPan R	100	00	05
27	00	Controls	InPan L	100	00	04
28	00	RvbDesign	Rvb In	80	00	23
29	01	Rvb Time	PstDly L	1365	00	18
2A	01	Rvb Time	PstDly R	1365	00	19
2B	00	DelayTime	Host	200	00	2A
2C	01	DelayTime	Voice1	1365	00	2E
2D	01	DelayTime	Voice2	1365	00	2F
2E	01	DelayTime	Voice3	1365	00	30

2F	01	DelayTime	Voice4	1365	00	31
30	00	DelayTime	Clear	1	00	2D
31	00	Levels	Host	80	00	25
32	00	Levels	Voice1	160	00	26
33	00	Levels	Voice2	160	00	27
34	00	Levels	Voice3	160	00	28
35	00	Levels	Voice4	160	00	29
36	00	Feedback	Host	100	00	32
37	00	Feedback	Voice1	200	00	33
38	00	Feedback	Voice2	200	00	34
39	00	Feedback	Voice3	200	00	35
3A	00	Feedback	Voice4	200	00	36
3B	00	Panning	Host	100	00	37
3C	00	Panning	Voice1	100	00	38
3D	00	Panning	Voice2	100	00	39
3E	00	Panning	Voice3	100	00	3A
3F	00	Panning	Voice4	100	00	3B
40	00	Controls	FX Mix	100	00	08
41	00	Controls	FX Adjust	80	00	01
42	00	Rvb Time	PstMix	100	00	17
43	00	RvbDesign	Rvb Width	720	00	22
44	00	Controls	FX Width	720	00	09
45	00	Controls	Voice Dif	100	00	07
46	00	Controls	High Cut	121	00	06
47	00	Rvb Time	GldResp	100	00	1A
48	00	Rvb Time	GldRange	1365	00	1B
49	00	DelayTime	GldResp	100	00	2B
4A	00	DelayTime	GldRange	1365	00	2C

**Algorithm 2: Infinite**

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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00	RvbDesign	Spin	50	00	21
11	00	RvbDesign	Size	144	00	1D
12	00		Not active	0	7F	7F
13	00		Not active	0	7F	7F
14	00	Rvb Time	Rt HC	48	00	0D
15	00	Rvb Time	Low Rt	9	00	0A
16	00	Rvb Time	Crossover	60	00	0C
17	00	Rvb Time	Mid Rt	63	00	0B
18	00	RvbDesign	Diffusion	100	00	1E
19	01	Rvb Time	Pre Delay	465	00	0E
1A	00	RvbDesign	Spread	255	00	20
1B	00	RvbDesign	Shape	255	00	1F
1C	00	RvbDesign	Link	1	00	22
1D	00	RvbDesign	Rvb Out	15	00	25
1E	01	Rvb Time	EkoDly L	600	00	15
1F	01	Rvb Time	EkoDly R	600	00	17
20	00	Rvb Time	EkoFbk L	30	00	14

21	00	Rvb Time	EkoFbk R	30	00	16
22	01	Rvb Time	RefDly L	600	00	11
23	01	Rvb Time	RefDly R	600	00	13
24	00	Rvb Time	RefLvl L	15	00	10
25	00	Rvb Time	RefLvl R	15	00	12
26	00	Rvb Time	Infinite	1	00	0F
27	00	Controls	InLvl R	160	00	03
28	00	Controls	InLvl L	160	00	02
29	00	Controls	InPan R	100	00	05
2A	00	Controls	InPan L	100	00	04
2B	00	RvbDesign	Rvb In	80	00	24
2C	01	Rvb Time	PstDly L	1365	00	19
2D	01	Rvb Time	PstDly R	1365	00	1A
2E	00	DelayTime	Host	200	00	2B
2F	01	DelayTime	Voice1	1365	00	2F
30	01	DelayTime	Voice2	1365	00	30
31	01	DelayTime	Voice3	1365	00	31
32	01	DelayTime	Voice4	1365	00	32
33	00	DelayTime	Clear	1	00	2E
34	00	Levels	Host	80	00	26
35	00	Levels	Voice1	160	00	27
36	00	Levels	Voice2	160	00	28
37	00	Levels	Voice3	160	00	29
38	00	Levels	Voice4	160	00	2A
39	00	Feedback	Host	100	00	33
3A	00	Feedback	Voice1	200	00	34
3B	00	Feedback	Voice2	200	00	35
3C	00	Feedback	Voice3	200	00	36
3D	00	Feedback	Voice4	200	00	37
3E	00	Panning	Host	100	00	38
3F	00	Panning	Voice1	100	00	39
40	00	Panning	Voice2	100	00	3A
41	00	Panning	Voice3	100	00	3B
42	00	Panning	Voice4	100	00	3C
43	00	Controls	FX Mix	100	00	08
44	00	Controls	FX Adjust	80	00	01
45	00	Rvb Time	PstMix	100	00	18
46	00	RvbDesign	Rvb Width	720	00	23
47	00	Controls	FX Width	720	00	09
48	00	Controls	Voice Dif	100	00	07
49	00	Controls	High Cut	121	00	06
4A	00	Rvb Time	GldResp	100	00	1B
4B	00	Rvb Time	GldRange	1365	00	1C
4C	00	DelayTime	GldResp	100	00	2C
4D	00	DelayTime	GldRange	1365	00	2D

**Algorithm 3: Inverse**

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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00		Not active	0	7F	7F
11	00	RvbDesign	Duration	112	00	18
12	00	Rvb Time	Rt HC	48	00	0D
13	00	Rvb Time	Crossover	60	00	0C
14	00	Rvb Time	Low Slope	32	00	0A
15	00	Rvb Time	Mid Slope	32	00	0B
16	00	RvbDesign	Diffusion	100	00	19
17	01	Rvb Time	Pre Delay	465	00	0E
18	00		Not active	0	7F	7F
19	00	RvbDesign	Shape	255	00	1A
1A	01	Rvb Time	RefDly L	400	00	10
1B	01	Rvb Time	RefDly R	400	00	12
1C	00	Rvb Time	RefLvl L	15	00	0F
1D	00	Rvb Time	RefLvl R	15	00	11
1E	00	Controls	InLvl R	160	00	03
1F	00	Controls	InLvl L	160	00	02
20	00	Controls	InPan R	100	00	05
21	00	Controls	InPan L	100	00	04
22	00	RvbDesign	Rvb In	80	00	1C
23	01	Rvb Time	PstDly L	1365	00	14
24	01	Rvb Time	PstDly R	1365	00	15
25	00	DelayTime	Host	200	00	22
26	01	DelayTime	Voice1	1365	00	26
27	01	DelayTime	Voice2	1365	00	27
28	01	DelayTime	Voice3	1365	00	28
29	01	DelayTime	Voice4	1365	00	29
2A	00	DelayTime	Clear	1	00	25
2B	00	Levels	Host	80	00	1D
2C	00	Levels	Voice1	160	00	1E
2D	00	Levels	Voice2	160	00	1F
2E	00	Levels	Voice3	160	00	20
2F	00	Levels	Voice4	160	00	21
30	00	Feedback	Host	100	00	2A
31	00	Feedback	Voice1	200	00	2B
32	00	Feedback	Voice2	200	00	2C
33	00	Feedback	Voice3	200	00	2D
34	00	Feedback	Voice4	200	00	2E
35	00	Panning	Host	100	00	2F
36	00	Panning	Voice1	100	00	30
37	00	Panning	Voice2	100	00	31
38	00	Panning	Voice3	100	00	32
39	00	Panning	Voice4	100	00	33
3A	00	Controls	FX Mix	100	00	08
3B	00	Controls	FX Adjust	80	00	01
3C	00	Rvb Time	PstMix	100	00	13
3D	00	RvbDesign	Rvb Width	720	00	1B
3E	00	Controls	FX Width	720	00	09
3F	00	Controls	Voice Dif	100	00	07

40	00	Controls	High Cut	121	00	06
41	00	Rvb Time	GldResp	100	00	16
42	00	Rvb Time	GldRange	1365	00	17
43	00	DelayTime	GldResp	100	00	23
44	00	DelayTime	GldRange	1365	00	24

**Algorithm 4: 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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00	RvbDesign	Diffusion	100	00	19
11	00	RvbDesign	Def	100	00	1A
12	00	RvbDesign	Depth	15	00	1B
13	00	RvbDesign	Size	304	00	18
14	00	RvbDesign	Rvb Out	15	00	21
15	01	Rvb Time	RefDly L	600	00	10
16	01	Rvb Time	RefDly R	600	00	12
17	00	Rvb Time	RefLvl L	15	00	0F
18	00	Rvb Time	RefLvl R	15	00	11
19	01	Rvb Time	Pre Delay	465	00	0E
1A	00		Not active	0	7F	7F
1B	00		Not active	0	7F	7F
1C	00	Rvb Time	Rt HC	48	00	0D
1D	00	Rvb Time	Low Rt	9	00	0A
1E	00	Rvb Time	Crossover	60	00	0C
1F	00	Rvb Time	Mid Rt	63	00	0B
20	00	RvbDesign	Link	1	00	1E
21	00	RvbDesign	Spin	50	00	1C
22	00	RvbDesign	Chorus	10	00	1D
23	00	Controls	InLvl R	160	00	03
24	00	Controls	InLvl L	160	00	02
25	00	Controls	InPan R	100	00	05
26	00	Controls	InPan L	100	00	04
27	00	RvbDesign	Rvb In	80	00	20
28	01	Rvb Time	PstDly L	1365	00	14
29	01	Rvb Time	PstDly R	1365	00	15
2A	00	DelayTime	Host	200	00	27
2B	01	DelayTime	Voice1	1365	00	2B
2C	01	DelayTime	Voice2	1365	00	2C
2D	01	DelayTime	Voice3	1365	00	2D
2E	01	DelayTime	Voice4	1365	00	2E
2F	00	DelayTime	Clear	1	00	2A
30	00	Levels	Host	80	00	22
31	00	Levels	Voice1	160	00	23
32	00	Levels	Voice2	160	00	24
33	00	Levels	Voice3	160	00	25
34	00	Levels	Voice4	160	00	26
35	00	Feedback	Host	100	00	2F
36	00	Feedback	Voice1	200	00	30
37	00	Feedback	Voice2	200	00	31

38	00	Feedback	Voice3	200	00	32
39	00	Feedback	Voice4	200	00	33
3A	00	Panning	Host	100	00	34
3B	00	Panning	Voice1	100	00	35
3C	00	Panning	Voice2	100	00	36
3D	00	Panning	Voice3	100	00	37
3E	00	Panning	Voice4	100	00	38
3F	00	Controls	FX Mix	100	00	08
40	00	Controls	FX Adjust	80	00	01
41	00	Rvb Time	PstMix	100	00	13
42	00	RvbDesign	Rvb Width	720	00	1F
43	00	Controls	FX Width	720	00	09
44	00	Controls	Voice Dif	100	00	07
45	00	Controls	High Cut	121	00	06
46	00	Rvb Time	GldResp	100	00	16
47	00	Rvb Time	GldRange	1365	00	17
48	00	DelayTime	GldResp	100	00	28
49	00	DelayTime	GldRange	1365	00	29

**Algorithm 5: M-Band+Rvb**

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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00	Controls	InLvl R	160	00	03
11	00	Controls	InLvl L	160	00	02
12	00	Controls	InPan R	100	00	05
13	00	Controls	InPan L	100	00	04
14	00		Not active	0	7F	7F
15	00	DelayTime	Host	200	00	23
16	01	DelayTime	Voice1	43690	00	25
17	01	DelayTime	Voice2	43690	00	26
18	01	DelayTime	Voice3	43690	00	27
19	01	DelayTime	Voice4	43690	00	28
1A	01	DelayTime	Voice5	43690	00	29
1B	01	DelayTime	Voice6	43690	00	2A
1C	00	DelayTime	Clear	1	00	24
1D	00	Levels	Host	80	00	1C
1E	00	Levels	Voice1	160	00	1D
1F	00	Levels	Voice2	160	00	1E
20	00	Levels	Voice3	160	00	1F
21	00	Levels	Voice4	160	00	20
22	00	Levels	Voice5	160	00	21
23	00	Levels	Voice6	160	00	22
24	00	Feedback	Host	100	00	39
25	00	Feedback	Voice1	200	00	3A
26	00	Feedback	Voice2	200	00	3B
27	00	Feedback	Voice3	200	00	3C
28	00	Feedback	Voice4	200	00	3D
29	00	Feedback	Voice5	200	00	3E
2A	00	Feedback	Voice6	200	00	3F







40	00	Panning	Voice1	100	00	46
41	00	Panning	Voice2	100	00	47
42	00	Panning	Voice3	100	00	48
43	00	Panning	Voice4	100	00	49
44	00	Panning	Voice5	100	00	4A
45	00	Panning	Voice6	100	00	4B
46	00	RvbDesign	Rvb In	80	00	19
47	00	Controls	FX Mix	100	00	07
48	00	Controls	FX Width	720	00	08
49	00	Controls	FX Adjust	80	00	01
4A	00	RvbDesign	Diffusion	100	00	13
4B	00	RvbDesign	Def	100	00	14
4C	00	RvbDesign	Depth	15	00	15
4D	00	RvbDesign	Size	304	00	12
4E	00	RvbDesign	Rvb Out	15	00	1A
4F	01	Rvb Time	RefDly L	600	00	0F
50	01	Rvb Time	RefDly R	600	00	11
51	00	Rvb Time	RefLvl L	15	00	0E
52	00	Rvb Time	RefLvl R	15	00	10
53	01	Rvb Time	Pre Delay	465	00	0D
54	00		Not active	0	7F	7F
55	00		Not active	0	7F	7F
56	00	Rvb Time	Rt HC	48	00	0C
57	00	Rvb Time	Low Rt	9	00	09
58	00	Rvb Time	Crossover	60	00	0B
59	00	Rvb Time	Mid Rt	63	00	0A
5A	00	RvbDesign	Link	1	00	18
5B	00	RvbDesign	Spin	50	00	16
5C	00	RvbDesign	Chorus	10	00	17

**Algorithm 7: Chorus+Rvb**

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	LFO	Rate	2500	01	00
02	00	LFO	Shape	5	01	01
03	00	LFO	P Width	98	01	02
04	00	Env L	Release	500	01	07
05	00	Env R	Release	500	01	08
06	00	AR Env	Attack	500	01	04
07	00	AR Env	Release	500	01	05
08	00	AR Env	Mode	3	01	06
09	00	Sw 1	Mode	2	01	0B
0A	01	Sw 1	Rate	2500	01	09
0B	00	Sw 1	P Width	98	01	0A
0C	00	Sw 2	Mode	2	01	0E
0D	01	Sw 2	Rate	2500	01	0C
0E	00	Sw 2	P Width	98	01	0D
0F	00	LFO	Depth	100	01	03
10	00	Controls	InLvl R	160	00	03
11	00	Controls	InLvl L	160	00	02
12	00	Controls	InPan R	100	00	05
13	00	Controls	InPan L	100	00	04
14	00		Not active	0	7F	7F
15	00	Controls	High Cut	121	00	06
16	00	Controls	FX Width	720	00	08
17	00	DelayTime	Host	200	00	23
18	01	DelayTime	Voice1	1365	00	27
19	01	DelayTime	Voice2	1365	00	28
1A	01	DelayTime	Voice3	1365	00	29
1B	01	DelayTime	Voice4	1365	00	2A
1C	01	DelayTime	Voice5	1365	00	2B
1D	01	DelayTime	Voice6	1365	00	2C
1E	00	DelayTime	Clear	1	00	26
1F	00	DelayTime	GldResp	100	00	24

20	00	DelayTime	GldRange	1365	00	25
21	00	Chorus	MstDepth	200	00	2D
22	00	Chorus	V1 Depth	500	00	2F
23	00	Chorus	V2 Depth	500	00	31
24	00	Chorus	V3 Depth	500	00	33
25	00	Chorus	V4 Depth	500	00	35
26	00	Chorus	V5 Depth	500	00	37
27	00	Chorus	V6 Depth	500	00	39
28	00	Chorus	MstRate	200	00	2E
29	00	Chorus	V1 Rate	100	00	30
2A	00	Chorus	V2 Rate	100	00	32
2B	00	Chorus	V3 Rate	100	00	34
2C	00	Chorus	V4 Rate	100	00	36
2D	00	Chorus	V5 Rate	100	00	38
2E	00	Chorus	V6 Rate	100	00	3A
2F	00	Levels	Host	80	00	1C
30	00	Levels	Voice1	160	00	1D
31	00	Levels	Voice2	160	00	1E
32	00	Levels	Voice3	160	00	1F
33	00	Levels	Voice4	160	00	20
34	00	Levels	Voice5	160	00	21
35	00	Levels	Voice6	160	00	22
36	00	Feedback	Host	100	00	3B
37	00	Feedback	Voice1	200	00	3C
38	00	Feedback	Voice2	200	00	3D
39	00	Feedback	Voice3	200	00	3E
3A	00	Feedback	Voice4	200	00	3F
3B	00	Feedback	Voice5	200	00	40
3C	00	Feedback	Voice6	200	00	41
3D	00	Panning	Host	100	00	42
3E	00	Panning	Voice1	100	00	43
3F	00	Panning	Voice2	100	00	44
40	00	Panning	Voice3	100	00	45
41	00	Panning	Voice4	100	00	46
42	00	Panning	Voice5	100	00	47
43	00	Panning	Voice6	100	00	48
44	00	Controls	FX Mix	100	00	07
45	00	Controls	FX Adjust	80	00	01
46	00	RvbDesign	Size	144	00	16
47	00	RvbDesign	Spin	50	00	19
48	00	Rvb Time	Rt HC	48	00	0C
49	00	Rvb Time	Low Rt	9	00	09
4A	00	Rvb Time	Crossover	60	00	0B
4B	00	Rvb Time	Mid Rt	63	00	0A
4C	00	RvbDesign	Diffusion	100	00	17
4D	01	Rvb Time	Pre Delay	465	00	0D
4E	00		Not active	0	7F	7F
4F	00	RvbDesign	Attack	100	00	18
50	00	RvbDesign	Link	1	00	1A
51	00	RvbDesign	Rvb Out	15	00	1B
52	01	Rvb Time	EkoDly L	600	00	13
53	01	Rvb Time	EkoDly R	600	00	15
54	00	Rvb Time	EkoFbk L	30	00	12
55	00	Rvb Time	EkoFbk R	30	00	14
56	01	Rvb Time	RefDly L	600	00	0F
57	01	Rvb Time	RefDly R	600	00	11
58	00	Rvb Time	RefLvl L	15	00	0E
59	00	Rvb Time	RefLvl R	15	00	10





21	00	Levels	V5 Lvl	160	00	26
22	00	Levels	V6 Lvl	160	00	28
23	00	Levels	host Fbk	100	00	1D
24	00	Levels	V1 Fbk	200	00	1F
25	00	Levels	V2 Fbk	200	00	21
26	00	Levels	V3 Fbk	200	00	23
27	00	Levels	V4 Fbk	200	00	25
28	00	Levels	V5 Fbk	200	00	27
29	00	Levels	V6 Fbk	200	00	29
2A	00	Resonance	host HC	240	00	33
2B	00	Resonance	V1 HiCut	121	00	35
2C	00	Resonance	V2 HiCut	121	00	37
2D	00	Resonance	V3 HiCut	121	00	39
2E	00	Resonance	V4 HiCut	121	00	3B
2F	00	Resonance	V5 HiCut	121	00	3D
30	00	Resonance	V6 HiCut	121	00	3F
31	08	Pitch	Tuning	200	00	41
32	00	Pitch	Active	6	00	42
33	00	Resonance	host Res	100	00	32
34	00	Resonance	V1 Res	200	00	34
35	00	Resonance	V2 Res	200	00	36
36	00	Resonance	V3 Res	200	00	38
37	00	Resonance	V4 Res	200	00	3A
38	00	Resonance	V5 Res	200	00	3C
39	00	Resonance	V6 Res	200	00	3E
3A	00	Panning	Host	100	00	4D
3B	00	Panning	Voice1	100	00	4E
3C	00	Panning	Voice2	100	00	4F
3D	00	Panning	Voice3	100	00	50
3E	00	Panning	Voice4	100	00	51
3F	00	Panning	Voice5	100	00	52
40	00	Panning	Voice6	100	00	53
41	00	RvbDesign	Rvb In	80	00	1A
42	00	Controls	FX Mix	100	00	06
43	00	Controls	FX Width	720	00	07
44	00	Controls	FX Adjust	80	00	01
45	00	Pitch	Assign	127	00	40
46	00	Pitch	Scale	1	00	44
47	00	Pitch	Key	11	00	43
48	00	Pitch	Root	6	00	45
49	00	Pitch	Rule	3	00	46
4A	00	Pitch	Voice1	70	00	47
4B	00	Pitch	Voice2	70	00	48
4C	00	Pitch	Voice3	70	00	49
4D	00	Pitch	Voice4	70	00	4A
4E	00	Pitch	Voice5	70	00	4B
4F	00	Pitch	Voice6	70	00	4C
50	00	RvbDesign	Size	144	00	15
51	00	RvbDesign	Spin	50	00	18
52	00	Rvb Time	Rt HC	48	00	0B
53	00	Rvb Time	Low Rt	9	00	08
54	00	Rvb Time	Crossover	60	00	0A
55	00	Rvb Time	Mid Rt	63	00	09
56	00	RvbDesign	Diffusion	100	00	16
57	01	Rvb Time	Pre Delay	465	00	0C
58	00		Not active	0	7F	7F
59	00	RvbDesign	Attack	100	00	17
5A	00	RvbDesign	Link	1	00	19
5B	00	RvbDesign	Rvb Out	15	00	1B
5C	01	Rvb Time	EkoDly L	600	00	12
5D	01	Rvb Time	EkoDly R	600	00	14
5E	00	Rvb Time	EkoFbk L	30	00	11
5F	00	Rvb Time	EkoFbk R	30	00	13
60	01	Rvb Time	RefDly L	600	00	0E
61	01	Rvb Time	RefDly R	600	00	10
62	00	Rvb Time	RefLvl L	15	00	0D
63	00	Rvb Time	RefLvl R	15	00	0F

## 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 80, as their use could 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	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	Continuous foot pedal
143	Footswitch 1
144	Footswitch 2
145	ADJUST knob
146	Tempo
147-253	Reserved — Do not use these values.
254	Always on (127)
255	Always off (0)

## Appendix B: MIDI Bank assignments

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

Bank 0-3	Internal presets (Displayed as P0-P3)
Bank 4	User generated effects (Displayed as R)
Bank 5-9	Extension presets. Presets are loaded into these banks from algorithm cards. (Displayed as X0-X4)
Bank 10-	Card banks, either user generated or preset, depending on card type. Displayed as C0, C1, etc. 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 C: 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 80 as follows:

Inquiry message from host to PCM 80:

Byte #	ByteValue	Description	Notes
1	0xf0	SysEx ID	
2	0x7e	Universal non-realtime header	
3	0iii iiiii	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 PCM 80:

Byte #	ByteValue	Description	Notes
1	0xf0	SysEx ID	
2	0x7e	Universal non-realtime header	
3	0iii iiiii	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 message.)
10	0x00	Family member code MSB	
11	0iii iiiii	Major software revision #	See System Configuration Response.
12	0iii iiiii	Minor software revision #	See System Configuration Response.
13	0iii iiiii	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 D: List of Error Messages

These messages are displayed on the PCM 80 when MIDI or other errors occur.

<b>MIDI reset complete</b>	Displayed after a MIDI reset has been received or transmitted.
<b>Receiving SysEx data...</b>	Displayed whenever System Exclusive data is being received by the PCM 80. Received data must match the ID specified in the PCM 80 MIDI row or the ID must be 127 (broadcast).
<b>Transmitting MIDI bulk data...</b>	Dump is progressing. May not appear for dumps of very small data sets. Does not appear if verbose mode is off.
<b>MIDI data dump is complete</b>	Dump is over. Does not appear if verbose mode is off.
<b>SysEx checksum error</b>	Checksum error in incoming data.
<b>SysEx data overrun</b>	SysEx data has been transmitted to the PCM 80 faster than it can be processed.
<b>SysEx data error...</b>	Indicates some sort of corruption in the SysEx data.
<b>Cannot store data as requested</b>	Usually indicates invalid Bank/offset specification. Bank may not be writeable, or may not be present, or offset may be >49.
<b>Operation failed</b>	Catchall error message. In some store operations, may indicate that a card is write-protected
<b>Can't dump register Need algorithm card</b>	Displayed when a bank or register which requires a card-based algorithm is being dumped.
<b>Effect unchanged No data in dump</b>	The dump just received was originally transmitted without an algorithm card and, therefore, does not contain all necessary data. The destination of the dump is not overwritten.
<b>Effect unchanged Need algorithm card</b>	The incoming dump requires an algorithm card to be decoded. The destination of the dump is not overwritten.
<b>Bad patch data was corrected</b>	A program load failed because of corrupt patch data, probably bad data in a MIDI transfer of effect data. The effect should be carefully screened and may not be usable.

## Appendix E: 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	Analog Input Level	100	?	Percentage, from 0-100
2		02	Digital Input Level	100	?	Percentage, from 0-100
3		03	MIDI Receive	17	n	0=Off; 1-16=MIDI channels; 17=Omni
4		04	MIDI transmit on/off/channel	16	n	0=Off; 1-16=Channel for transmission of controller data
5		05	External tap source	patch source list	y	
6		06	External tap threshold	127	y	
7		07	MIDI controller ID for continuous pedal	117	y	
8		08	MIDI controller ID for footswitch 1	117	y	
9		09	MIDI controller ID for Adjust knob	117	n	
10		0A	MIDI SysEx device ID	126	n	This parameter is not controllable from MIDI, but is returned by a request for the parameter value.
11		0B	MIDI SysEx enable	1	n	This parameter is not controllable from MIDI, but is returned by a request for the parameter value.
12		0C	Memory protect	1	n	0=Off; 1=On
13		0D	Pro/Go Mode	1	y	0=Go; 1=Pro
14		0E	Mix Pgm/Global	1	y	0=Program; 1=Global
15		0F	Tempo Pgm/Global	1	y	0=Program; 1=Global
16		10	Autoload	1	y	0=Off; 1=On
17		11	Bypass Mode	3	y	0=All Mute; 1=Input Mute; 2=Output Mute; 3=Bypass
18		12	MIDI controller ID for Footswitch 2	117	y	
19		13	Patch update mode	1	y	0=Immediate; 1=Delayed
20		14	MIDI Program Change mode	3	n	0=On; 1=Off; 2=Mapped; 3=Chained
21		15	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 message.
22		16	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 message.
23		17	Pgm+ source	120	y	0=No Assignment; 1-118=MIDI controllers; 119=Foot Sw 1; 120=Foot Sw 2.
24		18	Pgm- source	120	y	0=No Assignment; 1-118=MIDI controllers; 119=Foot Sw 1; 120=Foot Sw 2.
25		19	Program Change bypass mode	1	y	0=Mute; 1=Bypass

26	1A	Global Mix value	100	y	0=Dry; 100=Wet
27	1B	Transmit MIDI clock	1	n	0=Do not transmit clock; 1=Transmit clock
28	1C	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 parameter. 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; Pause; 1st effect; Pause; 2nd-50th effects with pauses. Final effect data includes EOX
29	1D	MIDI automation mode	1	n	0=Off; 1=On
30	1E	Transmitted Device ID for automation	127	n	0-126=specific target ID's; 127=broadcast
31	1F	Tempo blink	1	y	0=On; 1=Off
32	20	Global tempo value	360	y	40-400BPM in 1 beat increments.
33	21	Dig In status	0	n	No effect when transmitted.
34	22	Selects display of digital error	5	n	0=Validity; 1=Confidence; 2=Slip Sample; 3=CRC; 4=Parity
35	23	Autolock enable	1	y	0=disabled; 1=enabled
36	24	Transmitted SCMS selection	2	n	0=No Copy; 1=Single Copy; 2=Multi Copy
37	25	Transmitted emphasis selection	2	n	0=No Emphasis; 1=Emphasis; 2=Pass Thru
38	26	Tempo source	1	y	0=Internal; 1=MIDI
39	27	Analog output level	1	n	0=-10dBu; 1=+4 dBu
40	28	Sample dump output resolution	20	y	Number of valid bits for sample dump. This parameter will only be meaningful for algorithms that support MIDI sample dump.
41	29	Bypass controller assign	120	y	0=No Assignment; 1-118=MIDI controllers; 119=Foot Sw 1; 120=Foot Sw2.

## Appendix F: 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	LFO rate	1000	0-10Hz in .01Hz increments
2		02	LFO shape	6	0=Sine; 1=Cosine; 2=Square; 3=Sawtooth; 4=Pulse; 5=Triangle; 6=Random
3		03	LFO pulsewidth	98	1-99 %
4		04	Follow ENV L	500	0-10 sec in 20ms increments
5		05	Follow ENV R	500	0-10 sec in 20ms increments
6		06	AR envelope attack	500	0-10 sec in 20ms increments
7		07	AR envelope release	500	0-10 sec in 20ms increments
8		08	AR envelope generator mode	3	0=Off; 1=One Shot; 2=Retrigger; 3=Repeat
9		09	Timeswitch 1 mode	2	0=Off; 1=Switch; 2=Ramp
10		0A	Timeswitch 1 rate	1000	0-10Hz in .01Hz increments
11		0B	Timeswitch 1 pulsewidth	98	1-99 %
12		0C	Timeswitch 2 mode	2	0=Off; 1=Switch; 2=Ramp
13		0D	Timeswitch 2 rate	1000	0-10Hz in .01Hz increments
14		0E	Timeswitch 2 pulsewidth	98	1-99 %
15		0F	LFO depth	100	0-100%

## Appendix G: Non-Patchable (Type 2) Parameters

These are the non patchable parameters that are the same for all algorithms.

Param#	Dec	Hex	Description	Max 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	2-8 Taps
13		0D	Adjust knob lower limit	127	
14		0E	Adjust knob upper limit	127	

## 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 3: OMNI OFF, POLY

Mode 2: OMNI ON, MONO  
Mode 4: OMNI OFF, MONO

O : Yes    OX: Selectable  
X : No





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