PROTEUS FAMILY

Proteus 2000, Audity 2000, Proteus 2500, XL-7, MP-7, PX-7, PK-6, MK-6, XK-6, Vintage Keys, Vintage Pro, Halo

System Exclusive Specification

Version 2.2

E-MU SYSTEMS

System Exclusive Specification

MIDI SysEx Specification for the Proteus Family Instruments
Proteus 2000, Audity 2000, Proteus 2500, XL-7, MP-7, PX-7, PK-6, MK-6, XK-6, Vintage Keys, Vintage Pro, Halo

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Focus

The main focus is to provide an easy to use, easy to implement protocol for the specific function of editing Proteus family parameters from a remote system. Typically this would be a computer, with the potential for a large graphical interface, superior to the standard Proteus or Audity front panel display. In this document, the name Proteus, will refer to any instrument in the Proteus family.

The protocol consists of a data format usable over MIDI, as well as any other transfer media. The data format is simple, flexible, and easy to expand while maintaining backwards compatibility.

There are a few basic necessary functions that make up a Remote Preset Editor/Librarian package.

- the ability to select the Preset to edit.
- the ability to select the Layer to edit.
- the ability to send a new individual parameter value to Proteus.
- the ability to request from Proteus the value of an individual parameter.
- the ability to send a dump of parameters to Proteus.
- the ability to request a dump of parameters from Proteus.
- the ability to name a Preset.
- the ability to request the name of a Preset.

Note: Please refer to the official MMA MIDI specification for specific information about MIDI protocol and generic commands.

MIDI Standard Universal System Exclusive Messages

Device Inquiry

Proteus supports the MIDI Standard Non-Real Time System Exclusive General Information Device Inquiry messages (sub-ID#1 = 06).

Format: {F0h, 7Eh, <device ID>, 06h, 01h, F7}

<Header> {F0h,7Eh,<device ID>} = Universal System Exclusive Non-real time header.

06h = General Information (sub-ID#1)

01h = Identity Request (sub-ID#2)

F7h = EOX

Response: {F0h, 7Eh, <device ID>, 06h, 02h, mm, ff, ff, dd, dd, ss, ss, ss, ss, F7}

<Header> {F0h, 7Eh, <device ID>} = Universal System Exclusive Non-real time header.

<device ID>	=	ID the hunk of metal and plastic is set to. 0 - 126 are Unique ID's, 127 is an All Broadcast ID.
06h	=	General Information (sub-ID#1)
02h	=	Identity Reply (sub-ID#2)
mm	=	18h (Manufacturers System Exclusive id code)
ff ff	=	04h, 04h (Device family code, 14 bits, LSB first)
dd dd (Audity)	=	02h, 00h (Device family member code, 14 bits, LSB first)
dd dd (Proteus)	=	03h, 00h (Device family member code, 14 bits, LSB first)
ss ss ss ss	=	Software revision level, 4 ASCII characters. Example: 2 . 5 0 = version 2.50
F7h	=	EOX

Bulk Tuning Dump Request

Format: {F0h, 7Eh, <device ID>, 08h, 00h, tt, F7}

{F0h, 7Eh,<device ID>} =		Universal System Exclusive Non-real time header.
08h	=	MIDI Tuning Standard (sub-ID#1)
00h	=	bulk dump request = 00h (sub-ID#2)
tt	=	tuning program number
F7h	=	EOX

The receiving unit shall respond by sending the bulk tuning dump message described in the following section for the tuning number addressed.

Bulk Tuning Dump Message

A bulk tuning dump comprises frequency data in a 3-byte format (see MMA MIDI Spec) for all 128 MIDI key numbers, in order from note 0 (earliest sent) to note 127 (latest sent), enclosed by a system exclusive header and tail. This message is sent by the receiving instrument in response to a tuning dump request.

Format: {F0h, 7Eh,<device ID>, 08h, 01h, tt, <tuning name>, [xx yy zz] … checksum, F7}

{F0h, 7Eh,<device ID>} =		Universal System Exclusive Non-real time header.
08h	=	MIDI Tuning Standard (sub-ID#1)
01	=	bulk dump reply = 01h (sub-ID#2)
tt	=	tuning program number
<tuning name>	=	16 ASCII characters
[xx yy zz	=	frequency data for one note (repeated 128 times)
chksum	=	checksum (XOR of 7E, <device ID>, nn, tt <388bytes>)
F7h	=	EOX

Single Note Tuning Change

The single note tuning change message (Exclusive Real-Time sub-ID#1 = 08h) permits on-the-fly adjustments to any tuning stored in Proteus. These changes take effect immediately and occur without any audible artifacts if notes are sounding when the message is received.

Format: {F0h, 7Eh, <device ID>, 08h, 02h, tt, ll, [kk xx yy zz], F7}

{F0h, 7Eh,<device ID>} =		Universal System Exclusive Non-real time header.
08h	=	MIDI Tuning Standard (sub-ID#1)
02h	=	note change = 02h (sub-ID#2)
tt	=	tuning program number (0-127)
ll	=	number of changes (1 change = 1 set of [kk xx yy zz])
[kk	=	MIDI key number
xx yy zz]	=	frequency data for that key (repeated 'll' number of times)
F7h	=	EOX

This message permits muliple changes to be embedded in one message for the purpose of maximizing bandwidth. The number of changes following is indicated by the byte 'll': the total length of the message equals 8 + (11 x 4) bytes.

Master Volume

The master volume control on Proteus actually controls a digital attenuator and thus can be controlled via MIDI. A MIDI Master Volume control could be used to simultaneously fade out all channels in the module at once, for example.

Because the Master Volume message addresses the the entire "device" instead of MIDI "channels", it has been defined as a Universal Real Time System Exclusive message (sub ID#1 = 04h).

Format: {F0h, 7Eh,<device ID>, 04h, 01h, vv, vv, F7}

{F0h, 7Eh,<device ID>} =		Universal System Exclusive Non-real time header.
04h	=	Device Control (sub-ID#1)
02h	=	Master Volume = 01h (sub-ID#2)
vv vv	=	Volume (lsb first); 00 00 = volume off
F7h	=	EOX

System Exclusive Messages

Standard Data Format

The transfer of Data is organized in the following ways.

Format

<Header>, <Command>, <Count*>, <Packet1>, <Packet2>, ..., <Checksum*>, <EOX>.

Header

F0h	=	SysEx message
18h	=	EMU ID
0Fh	=	Proteus ID
xx	=	Device ID 00h - 7Eh are Unique, 7Fh is an All Broadcast,
55h	=	Special Editor designator byte

Command

Determines what function to perform, such as:

- Parameter Edit/Request
- Preset Name/Request
- Dump/Request

Count

Gives the number of bytes in a message, such as Parameter Edits of multiple parameters. *Only used in variable sized messages.

Packets

Take several forms, depending on the command. Some commands may not require a packet at all.

Checksum

1 Byte XOR(1's complement) of the sum of the DATA bytes in the message.

*Only used in certain messages. A checksum value of 7Fh means "ignore checksum".

EOX

F7	=	end of SYSEX.

Note: When information requested, it is returned in the Update format, suitable for use in sending back to the machine to Update it, or return it to that state.

Parameter Edit/Request Commands

00h	Reserved. If received, the following 2 MIDI bytes form a 14 bit command.

Parameter Value Edit

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 01h, 02h, <xx, xx, yy, yy>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
01h	=	Command::Parameter Value Edit
02h	=	Byte count(number of Byte pairs)
{xx, xx}	=	Parameter ID (LSB first)
{yy, yy}	=	Parameter Data
F7h	=	EOX

This command is used to change the value of one or more parameters. See the "Parameters" section for a list of of Parameter ID's and descriptions. Please try to avoid sending messages with more than 244 Data Bytes, or 41 Parameter Edits.

Parameter Value Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 02h, 01h, xx, xx, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
02h	=	Command::Parameter Value Request
01h	=	Byte count(number of Byte pairs)
{xx, xx}	=	Parameter ID (LSB first)
F7h	=	EOX

This command is used to request the current value of one or more parameters. See the "Parameters" section for a list of of Parameter ID's and descriptions. The response is a complete Parameter Value Edit SYSEX message for each parameter. Please try to avoid sending messages with more than 246 Data Bytes, or 123 Parameter IDs.

Parameter Min/Max /Default Value

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 03h, xx, xh, yy, yy, zz, zz, qq, qq, rr, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
03h	=	Command::Parameter Min/Max/Default
xx, xx	=	the Parameter ID
yy, yy	=	Parameter minimum value
zz, zz	=	Parameter maximum value
qq, qq	=	Parameter default value
rr	=	Read Only (0 = Read/Write, 1 = Read Only, values above 1 reserved)
F7h	=	EOX

This command conveys the parameter's minimum, maximum and default value. It is sent in response to command 04. Sending this command to an Audity or Proteus has no effect.

Parameter Min/Max /Default Value Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 04h, xx, xx, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
04h	=	Command::Parameter Min/Max/Default Value Request
xx, xx	=	The Parameter ID
F7h	=	EOX

This command requests the minimum, maximum, and default values of a parameter. The data is returned via command 03.

Configuration Commands

Hardware Configuration

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 09h, xx, <xx Bytes>, yy, zz, <yy*zz Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
09h	=	Command::Configuration Response
xx	=	Number of General Information Bytes
(General Information Bytes)		
{		
aa, aa	=	Number of User Presets
}		
yy	=	Number of Simms installed
zz	=	Number of Information Bytes per Simm
(Information Bytes Repeated for Number of Simms)		
{		
aa, aa	=	Simm ID
bb, bb	=	Number of Simm Presets
cc, cc	=	Number of Simm Instruments
}		
F7h	=	EOX

This command is sent via the Hardware Configuration Request command 0Ah.

Hardware Configuration Request

This is a Read Only system.

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 0Ah, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
0Ah	=	Command::Configuration Request
F7h	=	EOX

This command causes a Hardware Configuration command to be sent.

Name Commands

Generic Name

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 0Bh, tt, xx, xx, yy, yy, <STRING 16>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
0Bh	=	Command::Generic Name
tt	=	Object Type
		1 = Preset
		2 = Instrument
		3 = (arp)
		4 = Setup
		5 = Demo
		6 = Riff
<xx, xx>	=	Object Number
<yy, yy>	=	Object ROM ID
<STRING x>	=	<Char 1>, <Char 2>, ..., <Char 16>=Object Name
F7h	=	EOX

This command is sent via the generic name request command. It conveys the name of the requested object.

Generic Name Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 0Ch, tt, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
0Ch	=	Command::Generic Name Request
tt	=	Object Type
<xx, xx>	=	Object Number
yy, yy>	=	Object ROM ID
F7h	=	EOX

This command causes a generic name command to be sent for the requested object.

Dump Commands

Proteus Preset Dump Format

The transfer of large messages is like the MIDI Sample Dump Standard. In this standard, large messages are broken up into smaller packets. "Closed-Loop" style dumps require the receiver to acknowledge each packet using handshake messages. "Open-Loop" style dumps do not require acknowledgement. Custom handshake messages are used because the number of packets in a dump may exceed a 7-bit packet number, the limit of the Generic Handshaking Messages as defined in the MIDI specification. See the section, "Dump Handshaking Messages" on page 31 for details.

When a Dump is requested or initiated, the first element of the dump sent is the Dump Header. This header contains information on the type of dump, preset number of the dump, how many bytes are included in the data, and the number of parameters in each section, which may depend on the version of Proteus the dump may have come from. As parameters are added to newer versions of Proteus, the dump format can expand. Older Proteus versions ignore any expanded dump parameters.

What follows the header message are 255-byte messages that each contain up to 244 bytes of actual data. The last message may contain LESS than 255 bytes, depending on how much data is left. Generic handshaking messages will be used to negotiate the transfer. After all the data messages have been sent, an End Of File message will be sent, closing the transfer.

Preset Dump SubCommands

00h	(reserved)
01h	Preset Dump Header Closed Loop
02h	Preset Dump Data Message Closed Loop
03h	Preset Dump Header Open Loop
04h	Preset Dump Data Message Open Loop
10h	Preset Common Dump Data Message
11h	Preset Common General Dump Data Message
12h	Preset Common Arp Dump Data Message
13h	Preset Common Effects Dump Data Message (Master or Preset)
14h	Preset Common Links Dump Data Message
20h	Preset Layer Dump Data Message
21h	Preset Layer Common Dump Data Message
22h	Preset Layer Filter Dump Data Message
23h	Preset Layer LFO Dump Data Message
24h	Preset Layer Envelopes Dump Data Message
25h	Preset Layer PatchCords Dump Data Message

Examples of the Dump Header, and the different types of data within the Data messages, follow.

Preset Dump Header

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 01h, nn, nn, xx, xx, xx, xx, aa, aa, bb, bb, cc, cc, dd,dd, ee, ee, ff, ff, gg, gg, hh, hh, ii, ii, jj, jj, kk, kk, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump;
01h	=	subCommand::Preset Dump Header (Closed Loop);

OR,

03h	=	subCommand::Preset Dump Header (Open Loop);
<nn, nn>	=	Preset Number.
<xx, xx, xx, xx>	=	Number of Data bytes in the Dump, LSB first.
<aa, aa>	=	Number of Preset Common General Parameters, LSB first.
<bb, bb>	=	Number of Reserved Parameters, LSB first.
<cc, cc>	=	Number of Preset Common Effects Parameters, LSB first.
<dd, dd>	=	Number of Preset Common Link Parameters, LSB first.
<ee, ee>	=	Number of Preset Layers, LSB first.
<ff, ff>	=	Number of Preset Layer General Parameters, LSB first.
<gg, gg>	=	Number of Preset Layer Filter Parameters, LSB first.
<hh, hh>	=	Number of Preset Layer LFO Parameters, LSB first.
<ii, ii>	=	Number of Preset Layer Envelope Parameters, LSB first.
<jj ,jj>	=	Number of Preset Layer PatchCord Parameters, LSB first.
<kk, kk>	=	Preset ROM ID
F7h	=	EOX

This message precedes the Preset Dump Data messages.

Preset Dump Data Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 02h, pp, pp, <244 Data Bytes>, <Checksum>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
02h	=	subCommand::Preset Dump Message (Closed Loop);
OR,		
04h	=	subCommand::Preset Dump Message (Open Loop);
<pp, pp>	=	Running Packet count, LSB first, begins at 1
<up to 244 Data Bytes>		
<Checksum>	=	1 Byte = 1's complement of the sum of {<244 Data Bytes>}
F7h	=	EOX

Preset Common Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 10h, <240 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
10h	=	subCommand::Preset Common Parameter Dump Message;
<240 Data Bytes>		
F7h	=	EOX

This message dumps the preset data that is not specified to a layer.

Preset Common General Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 11h, <126 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
11h	=	subCommand::Preset Common General Parameter Dump Message;
<126 Data Bytes>		
F7h	=	EOX

This message dumps only the Preset Common General Parameters.

Preset Common Arpeggiator Parameters Dump Message

EXAMPLE:> {F0h,18h, 0Fh,dd, 55h, 10h, 12h, <38 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
12h	=	subCommand::Preset Common Arpeggiator Parameter Dump Message;
<38 Data Bytes>		
F7h	=	EOX

This message dumps only the Preset Common Arp Parameters.

Preset Common Effects Parameters Dump Message

EXAMPLE:> {F0h,18h, 0Fh,dd, 55h, 10h, 13h, <38 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
13h	=	subCommand::Preset Common Effects Parameter Dump Message;
<38 Data Bytes>		
F7h	=	EOX

This message dumps only the Preset Common EffectsParameters.

Preset Common Link Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 14h, <46 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
14h	=	subCommand::Preset Common Link Parameter Dump Message;
<46 Data Bytes>		
F7h	=	EOX

This message dumps only the Preset Common Link Parameters.

Preset Layer Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 20h,<332 Data Bytes>,F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
20h	=	subCommand::Preset Layer Parameter Dump Message;
<332 Data Bytes>		
F7h	=	EOX

This message dumps all parameters in a given layer.

Preset Layer General Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 21h, <70 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
21h	=	subCommand::Preset Layer General Parameter Dump Message;
<70 Data Bytes>		
F7h	=	EOX

This message dumps all general parameters in a given layer.

Preset Layer Filter Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 22h, <14 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
22h	=	subCommand::Preset Layer Filter Parameter Dump Message;
<14 Data Bytes>		
F7h	=	EOX

Preset Layer LFO Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 23h, <28 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
23h	=	subCommand::Preset Layer LFO Parameter Dump Message;
<28 Data Bytes>		
F7h	=	EOX

Preset Layer Envelope Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 24h, <92 Data Bytes>, F7h}

F0h = sysex message

18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
24h	=	subCommand::Preset Layer Envelope Parameter Dump Message;

<92 Data Bytes>

F7h	=	EOX

Preset Layer Patchcord Parameters Dump Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 10h, 25h, <152 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
10h	=	Command::Preset Dump
25h	=	subCommand::Preset Layer PatchCord Parameter Dump Message;

<152 Data Bytes>

F7h	=	EOX

Preset Dump Request

Preset Dump Request SubCommands

00h	(reserved)
02h	Preset Dump Request (Closed Loop)
04h	Preset Dump Request (Open Loop)
10h	Preset Common Parameters Dump Request
11h	Preset Common General Params Dump Request
12h	Preset Common Arp Parameters Dump Request
13h	Preset Common FX Parameters Dump Request
14h	Preset Common Link Params Dump Request
20h	Preset Layer Parameters Dump Request
21h	Preset Layer General Params Dump Request
22h	Preset Layer Filter Params Dump Request
23h	Preset Layer LFO Parameters Dump Request
24h	Preset Layer Envelope Params Dump Request
25h	Preset Layer Cord Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 02h, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump
02h	=	subCommand::Preset Dump Request (Closed Loop);

or,

04h	=	subCommand::Preset Dump Request (Open Loop);
<xx, xx>	=	Preset number
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

This command requests a preset dump. The response is the Preset Dump SysEx message.

WARNING!
Only one Preset may be dumped to or from the unit at a time!

Preset Common Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 10h, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
10h	=	subCommand::Preset Common Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Common General Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 11h, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
11h	=	subCommand::Preset Common General Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Common Arpeggiator Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 12h, pph, pph, yyh, yyh, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
12h	=	subCommand::Preset Common Arpeggiator Parameter Dump Request;
<pph, pph>	=	Preset Number (LSB First), or -1 for Master Arp
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Common Effects Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 13h, pp, pp, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
13h	=	subCommand::Preset Common Effects Parameter Dump Request;
<pp, pp>	=	Preset Number (LSB first) or -1 for Master Effects
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Common Link Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 14h, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
14h	=	subCommand::Preset Common Link Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Layer Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 20h, xx, xx, ll, ll, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
20h	=	subCommand::Preset Layer Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<ll, ll>	=	Layer Number (LSB first)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Layer General Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 21h, xx, xx, ll, ll, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
21h	=	subCommand::Preset Layer General Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)

<ll, ll>	=	Layer Number (LSB first)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Layer Filter Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 22h, xx, xx, ll, ll, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
22h	=	subCommand::Preset Layer Filter Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<ll, ll>	=	Layer Number (LSB first)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Layer LFO Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 23h, xx, xx, ll, ll, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
23h	=	subCommand::Preset Layer LFO Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<ll, ll>	=	Layer Number (LSB first)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Layer Envelope Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 24h, xx, xx, ll, ll, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
24h	=	subCommand::Preset Layer Envelope Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<ll, ll>	=	Layer Number (LSB first)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Preset Layer Patchcord Parameters Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 11h, 25h, xx, xx, ll, ll, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
11h	=	Command::Preset Dump Request
25h	=	subCommand::Preset Layer PatchCord Parameter Dump Request;
<xx, xx>	=	Preset Number (LSB First)
<ll, ll>	=	Layer Number (LSB first)
<yy, yy>	=	Preset ROM ID number
F7h	=	EOX

Program Change/ Preset Map Dump

The Program Change/Preset table maps 128 different Presets to any of 128 Program Changes. The Dump assumes a Program Change order of 0 to 127, and lists only the Mapped Preset Numbers in that order, and then repeats the Preset ROM ID's in that order:

Example:
Program Change 0: Preset 112

Program Change 1: Preset 043

Program Change 2: Preset 001

Program Change 127: Preset 058

Preset Numbers are 2 MIDI Bytes, LSB first, for a total of 128*2 or 256 Data Bytes. Preset ROM ID Numbers are 2 MIDI Bytes, LSB first, for a total of 128*2 or 256 Data Bytes.

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 16h, <256 Data Bytes>, <256 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
16h	=	Command::Program Change/Preset Map Dump
<256 Data Bytes Preset Numbers>		
<256 Data Bytes Preset ROM ID Numbers>		
F7h	=	EOX

Program Change/ Preset Map Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 17h, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
17h	=	Command::Program Change/Preset Map Dump Request
F7h	=	EOX

Arpeggiator Pattern Dump

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 18h, pp,pp, xx, xx, yyh, yy, zz, zz, <NAME>, <256 data bytes>, rr, rr, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
18h	=	Command::Arpeggiator Pattern Dump
<pp, pp>	=	Arpeggiator Pattern Number (LSB first)
<xx, xx>	=	Number of Arpeggiator Steps per Pattern(LSB first)
<yy, yy>	=	Number of Arpeggiator Parameters per Step (LSB first)
<zz, zz>	=	Arpeggiator Pattern Loop Point (LSB first)
<NAME>	=	12 ASCII Character Pattern Name
<rr, rr>	=	DATA
F7h	=	EOX

Arpeggiator Pattern Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 19h, pph,pph, aah, aah F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
19h	=	Command::Arp Pattern Dump Request
<pph, pph>	=	Arpeggiator Pattern Number (LSB first)
<aah, aah>	=	Arpeggiator Pattern ROM ID
F7h	=	EOX

LCD Screen Dump

The Display on Proteus is a 2X24 ASCII display, so the Dump consists of 48 ASCII characters, row1 row2, left to right. This message can be sent to Proteus to write to the LCD.

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 1Ah, 01h, xx, yy, zz, <Custom Character Map>, <48 ASCII Chars>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
1Ah	=	Command::LCD Screen Dump
01h	=	LCD Screen Message
xx	=	Number of Rows in the Display (2)
yy	=	Number of Characters per Row (24)
zz	=	Number of Custom Characters per Screen (8)
<Custom Character Map>	=	zz MIDI Bytes representing which of the Palette Characters map to these 8 Slots. Numbers 0-7 in the following ASCII characters correspond to these Custom Characters.
<48 ASCII Chars>		
F7h	=	EOX

LCD Screen Dump Request

(Proteus 2000 & Audity 2000 only)

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 1Bh, 01h, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
1Bh	=	Command::LCD Screen Dump Request
01h	=	LCD Screen Message
F7h	=	EOX

LCD Custom Character Palette Message

(Proteus 2000 & Audity 2000 only)

Each Screen in the Proteus can have up to 8 "Custom" characters that are not a part of the ASCII character set. Each Custom character is essentially a bitmap. The Size of the Character Bitmap on the Proteus display is 7x5. Each Custom character is represented with 8 MIDI Bytes, corresponding to the 8 5-bit rows of the character, top to bottom
(3 MSBits are 0). The Proteus has a default "Palette" of Custom Characters, and this can be downloaded with the following messages. When a Screen Dump is requested, part of that Screen Dump is a mapping of which 8 Custom characters of this Palette is being used in that screen. Numbers 0-7 within the 48 "ASCII" characters of the Screen dump can be mapped to the Palette with that map.

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 1Ah, 02h, xx, yy, <Character Palettes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
1Ah	=	Command::LCD Screen Dump
02h	=	LCD Character Palette Message
xx	=	Number of total Custom Characters in the Palette
<Char Palettes>	=	8 x Number of Custom Characters(13)=104 Bytes
F7h	=	EOX

LCD Custom Character Palette Request

(Proteus 2000 & Audity 2000 only)

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h,1Bh, 02h, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
1Bh	=	Command::LCD Screen Dump Request
02h	=	LCD Character Palette Request
F7h	=	EOX

Setup Dump

A Setup Dump contains all settings selected by the Master Menu and settings made on the Preset Select screen, with the exception of the program/preset map and tuning tables (these can be dumped seperately). Only the current setup can be dumped. If other setups need to be dumped, the “Copy Setup” command must be used first to make them “current”. The following data is contained in the dump.

Master Common Parameters

Master Clock Tempo

Master FX Bypass

Master Transpose

Master Tune

Master Bend Range

Master Vel Curve

Master Output Format

Master Knob Quick Edit

Master Knob Deep Edit

Master Preset Edit All Layers

Master Demo Mode Enable

Master MIDI Parameters,

Master MIDI Mode

Master MIDI Mode Change

Master MIDI ID

Master MIDI A Control

Master MIDI B Control

Master MIDI C Control

Master MIDI D Control

Master MIDI E Control

Master MIDI F Control

Master MIDI G Control

Master MIDI H Control

Master MIDI FS1 Control

Master MIDI FS2 Control

Master MIDI FS3 Control

Master MIDI Tempo Ctrl Up

Master MIDI Tempo Ctrl Down,

Master MIDI Knob Out

Master MIDI Packet Delay,

Master MIDI I Control
Master MIDI J Control
Master MIDI K Control
Master MIDI L Control
Master Effects Parameters
Master FX A Algorithm
Master FX A Decay
Master FX A HFDamp
Master FX A>B
Master FX A Mix Main
Master FX A Mix Sub1
Master FX A Mix Sub2
Master FX B Algorithm
Master FX B Feedback
Master FX B LFO Rate
Master FX B Delay
Master FX B Mix Main
Master FX B Mix Sub1
Master FX B Mix Sub2
Master FX A Mix Sub3
Master FX B Mix Sub3
Arpeggiator
(*Independant of MIDI Channel*)
Multimode Basic Channel
Multimode FX Ctrl Channel
Multimode Tempo Ctrl Chan
(*Parameters for each of 32 MIDI channels*)
Multimode Preset
Multimode Volume
Multimode Pan
Multimode Mix Output
(reserved)
Multimode Channel Enable
(reserved)
Multimode RCV Prog Change
Multimode Preset ROM ID

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 1Ch, aa, aa, bb, bb, cc, cc, dd, dd, xx, xx, yy, yy, zz, zz, <736 Data Bytes>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
1Ch	=	Command::Multimode Map Dump
aa, aa	=	Number of Master General Parameters (11)
bb, bb	=	Number of Master MIDI Parameters (22)
cc, cc	=	Number of Master Effects Parameters (16)
dd, dd	=	Number of Reserved Parameters (0)
xx, xx	=	Number of Non Channel Parameters (LSB first)
yy, yy	=	Number of MIDI Channels (LSB first)
zz, zz	=	Number of Parameters per Channel (LSB first)
<16 Data Bytes>	=	16 ASCII character Setup Name
<22 Data Bytes>	=	Master General
<44 Data Bytes>	=	Master MIDI
<32 Data Bytes>	=	Master Effects
<40 Data Bytes>	=	Reserved
< 6 Data Bytes>	=	Non Channel Parameter Values
<576 Data Bytes>	=	Channel Parameters
F7h	=	EOX

Setup Dump Request

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 1Dh, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
1Dh	=	Command::SetupDump Request
F7h	=	EOX

Generic Dump Request

The generic dump replaces the setup dump (command 1Ch) as the new dump format sent by the command stations. The new dump format was created to replace the setup dump due to the inablity for the setup dump to be extended in order to add new data. The generic dump has the potential to replace all the various dump formats but for now is only used for master data dumps. The command stations still receive and understand the old setup dump and will transmit one if explicitly requested to do so via sysex.

Generic Dump Request

EXAMPLE:>F0 18 0F dd 55 61 00 01 00 00 00 00 00 F7

F0	=	sysex message
18	=	EMU id
0F	=	Proteus/Command station ID
dd	=	device ID
55	=	special editor designator byte
61	=	command::generic dump
00	=	subcommand::version 0
01	=	object type 01=master data
00	=	subtype 00=master setup
bb, bb	=	object number (zero for master setup data)
rr, rr	=	rom number (zero for master setup data)
F7	=	EOX

Generic Dump

F0	=	sysex message
18	=	EMU id
0F	=	Proteus/Command station ID
dd	=	device ID
55	=	special editor designator byte
61	=	command::generic dump
vv	=	subcommand::dump version
tt	=	object type 01=master data, others to follow
ss	=	subtype 00=master setup, others to follow
bb, bb	=	object number if applicable else zero
rr, rr	=	rom number if applicable else zero
nn, nn	=	number of param groups

<param group descriptors repeated nn,nn times>

gi, gi	=	starting parameter id for the group
gn, gn	=	number of paramters in the group. Each parameter id is in sequence from the starting id of the group
es, es	=	starting index of parameter elements
en, en	=	count of parameter elements

<parameter element data for each group repeated en, en times>

dd, dd	=	two byte data for each parameter in the group element repeated gn, gn times

F7	=	EOX

Dump Handshaking Messages

ACK

EXAMPLE:> {F0h, 18h, 0Fh, 55h, dd, 7Fh, <pp, pp>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
7Fh	=	Command::Acknowledge; The last packet was received correctly.
<pp, pp>	=	Packet number
F7h	=	EOX

NAK

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 7Eh, <pp, pp>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
7Eh	=	Command::Negative Acknowledge; The last packet was received incorrectly, resend.
<pp, pp>	=	Packet number
F7h	=	EOX

CANCEL

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 7Dh, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
7Dh	=	Command::Cancel; Abort the Dump.
F7h	=	EOX

WAIT

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 7Ch, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
7Ch	=	Command::Wait; Stop sending packets until an ACK is received.
F7h	=	EOX

EOF

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 7Bh, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
7Bh	=	Command::End Of File; No more packets follow, no response required. Must be sent at end of transfer.
F7h	=	EOX

Copy Utilities

(ROM->RAM, RAM->RAM)

20h	Copy Preset
21h	Copy Preset Common Parameters
22h	Copy Arp Parameters
23h	Copy Effects Parameters (Master or Preset)
24h	Copy Preset Link Parameters
25h	Copy Preset Layer
26h	Copy Preset Layer Common Parameters
27h	Copy Preset Layer Filter Parameters
28h	Copy Preset Layer LFO Parameters
29h	Copy Preset Layer Envelope Parameters
2Ah	Copy Preset Layer PatchCords
2Bh	Copy Arp Pattern
2Ch	Copy Master Setup

Copy Preset

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 20h, xx, xx, yy, yy, zz, zz, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
20h	=	Command::Copy Preset
xx, xx	=	Source Preset number (ROM or RAM) LSB first
yy, yy	=	Destination Preset number (RAM only) LSB firstPreset Number of -1 bis the Edit Buffer.
zz, zz	=	Source ROM ID
F7h	=	EOX

Preset Copy destroys whatever Preset existed in the Destination location.

Copy Arpeggiator Pattern

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 2Bh, xx, xx, yy, yy, zz, zz, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
2Bh	=	Command::Copy Arpeggiator Pattern Parameters
xx, xx	=	Source Arpeggiator Pattern(ROM or RAM) LSB first
yy, yy	=	Destination Arpeggiator Pattern (RAM only) LSB first
zz, zz	=	Source Arpeggiator Pattern ROM ID
F7h	=	EOX

Copy destroys whatever Parameters existed in the Destination location.

Copy Master Setup

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 2Ch, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
2Ch	=	Command::Copy Master Setup
xx, xx	=	Source Master Setup Number (-1 = Setup Edit Buffer) LSB first
yy, yy	=	Destination Master Setup (-1 = Setup Edit Buffer) LSB first

Either the Source or Destination MUST be the Setup Edit Buffer.

F7h	=	EOX

Copy destroys whatever Parameters existed in the Destination location.

Copy Pattern

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 2Dh, xx, xx, yy, yy, zz, zz, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
2Dh	=	Command::Copy Pattern
xx, xx	=	Source Pattern number (ROM or RAM) LSB first
yy, yy	=	Destination Pattern number (RAM only) LSB first Pattern Number of -1 bis the Edit Buffer.
zz, zz	=	Source ROM ID
F7h	=	EOX

Copy Song

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 2Eh, xx, xx, yy, yy, zz, zz, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
2Eh	=	Command::Copy Pattern
xx, xx	=	Source Song number (ROM or RAM) LSB first
yy, yy	=	Destination Song number (RAM only) LSB first Song Number of -1 bis the Edit Buffer.
zz, zz	=	Source ROM ID
F7h	=	EOX

Remote Front Panel Control Commands

Remote Control Comands give you complete control over the Proteus from a remote program. Complete front panel emulation is possible.

In order for the Proteus to respond to these commands, you must first "Open a Session" by sending the Open Session command. When a session is open, not only does the Proteus respond to Remote Control commands, it generates them as well when the user presses a button or turns a knob. This gives a front panel emulation program the ability to remain in sync with the Proteus even when someone is pushing buttons and turning knobs. Closing a Session turns these messages off, and disables responding to incoming remote control messages. It is not necessary to Open and close a session for each message, but it is generally reccommended not to open a session unless specifically using these features as MIDI bandwidth can be eaten up by the quantity of the generated messages.

Remote Control Subcommands

00h	(reserved)
10h	Open Session
11h	Close Session
20h	Button Event
21h	(reserved)
22h	Rotary Event
23h	LED State Event

Remote Control Open Session

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 40h, 10h, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
40h	=	Command::Remote Front Panel Control Command
10h	=	subCommand::Open Session subCommand
F7h	=	EOX

Remote Control Close Session

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 40h, 11h, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
40h	=	Command::Remote Front Panel Control Command
11h	=	subCommand::Close Session subCommand
F7h	=	EOX

Remote Control Button Event

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 40h, 20h, bb, bb, pp, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
40h	=	Command::Remote Front Panel Control Command
20	=	subCommand::Button Event subCommand
<bb, bb>	=	14-bit Button ID number (LSB first) 00h, 00h (reserved) 01h, 00h Master 02h, 00h Edit 03h, 00h Multi 04h, 00h Audition 10h, 00h Save/Copy 11h, 00h Home/Enter 20h, 00h Cursor Left 21h, 00h Cursor Right 30h, 00h Control
pp	=	00h for Button Release 01h for Button Press
F7h	=	EOX

Remote Control Rotary Event

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 40h, 22h, rr, rr, mm, mm, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
40h	=	Command::Remote Front Panel Control Command
22h	=	subCommand::Rotary Event subCommand
<ss, ss>	=	14-bit Button ID number (LSB first) 00h, 00h (reserved) 01h, 00h Main Encoder 10h, 00h Volume Knob 11h, 00h A/E Knob 12h, 00h B/F Knob 13h, 00h C/G Knob 14h, 00h D/H Knob
If Main ENCODE:		
<vvh, vvh>	=	14-bit signed Rotary motion Value (LSB first) positive = number of clicks moved clockwis- negative = number of clicks moved counter-clockwise
If Any Knob:		
<vvh, vvh>	=	0-127 absolute value (00h, 00h to 7Fh, 00h)
F7h	=	EOX

Remote Control LED State Event

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 40h, 23h, ll, ss, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
40h	=	Command::Remote Front Panel Control Command
23h	=	subCommand::Led State subCommand
ll	=	LED ID 00h (reserved) 01h Master 02h Edit 03h Multi 04h Audition 10h Save/Copy 11h Home/Enter 20h MIDI 30h Control A-D 31h Control E-H 32h Control I-L 40h Encoder A/E 41h Encoder B/F 42h Encoder C/G 43h Encoder D/H
ss	=	LED State 00h Off 01h On 02h Flash On 03h Flash Off
F7h	=	EOX

Other Messages

Error Message

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 70h, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
70h	=	Command::Error Message
xx, xx	=	Command that failed to execute.
yy, yy	=	Sub-Command that failed to execute (if relevant, otherwise 0), or Parameter ID that failed to Request or Update(invalid ID).
F7h	=	EOX

Randomize Preset

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 71h, xx, xx, yy, yy, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
71h	=	Command::Randomize Preset
xx, xx	=	Preset Number to Randomize
yy, yy	=	Rom ID of Preset to Randomize (0 for User)
F7h	=	EOX

Randomize Seed Preset

EXAMPLE:> {F0h, 18h, 0Fh, dd, 55h, 72h, xx, xx, yy, yy, <4 Byte Seed>, F7h}

F0h	=	sysex message
18h	=	EMU ID
0Fh	=	Proteus ID
dd	=	Device ID
55h	=	Special Editor designator byte
72h	=	Command::Randomize Preset
xx, xx	=	Preset Number to Randomize
yy, yy	=	Rom ID of Preset to Randomize (0 for User)
		<4 Byte Seed> LSB first.
F7h	=	EOX

Parameters

The following is a list of editable parameters and their ID's:

- Values recieved that are outside the min/max range will be clipped to within that range.
- Preset information for ROM Presets may be requested, but cannot be changed. Any message trying to change ROM data will be ignored.

Miscellaneous Parameters

Parameter	ID
(RESERVED)	id = 0 (00h,00h)
LCD_VIEW_ANGLE	id = 1 (01h,00h) min = -7; max = +8

Multi Mode Channel Select

Parameter	ID
(RESERVED)	id = 128 (00h,01h)
MULTIMODE_CHANNEL_SELECT	id = 129 (01h,01h) min = 0; max = 15

Multi Mode Parameters (Channel Specific - Per Channel)

Parameter	ID
MULTIMODE_PRESET	id = 130 (02h,01h) min = 0; max = 895
MULTIMODE_VOLUME	id = 131 (03h,01h) min = 0; max = 127
MULTIMODE_PAN	id = 132 (04h,01h) min = 0; max = 127 (64L-63R Displayed)
MULTIMODE_MIX_OUTPUT	id = 133 (05h,01h) min = -1; max = 2 -1 = Preset 0 = Main Outputs 1 = Submix1 Outputs 2 = Submix2 Outputs
MULTIMODE_ARP	id = 134 (06h,01h) min = -2; max = 1 -2 = off -1 = on 0 = P (Preset Arp) 1 = G (Global Arp)
MULTIMODE_CHANNEL_ENABLE	id = 135 (07h,01h) min = 0; max = 1
MULTIMODE_BANK_MAP	id = 136 (08h,01h) min = 0; max = 6
MULTIMODE_RCV_PROG_CHANGE	id = 137 (09h,01h) min = 0; max = 1
ROM ID	id = 138 (0Ah,01h) min = ?; max = ?

Multi Mode Parameters (Non-Channel Specific)

MULTIMODE_BASIC_CHANNEL *(Independent of MULTIMODE_CHANNEL_SELECT)*	id = 139 (0Bh,01h) min = 0; max = 15
MULTIMODE_FX_CTRL_CHANNEL *(Independent of MULTIMODE_CHANNEL_SELECT)*	id = 140 (0Ch,01h) min = -1; max = 15 -1 = Master FX 0 - 15 = Channels 1 - 16
MULTIMODE_TEMPO_CTRL_CHAN *(Independent of MULTIMODE_CHANNEL_SELECT)*	id = 141 (0Dh,01h) min = 0; max = 15 0 - 15 = Channels 1 - 16 (if in Omni, all channels valid)

Parameters

Multi Mode Parameters (Non-channel specific)

Parameter	ID
MULTI_NAME_CHAR0	id = 142 (0Eh,01h) min=32, max=127
MULTI_NAME_CHAR1	id = 143 (0Fh,01h) min=32, max=127
MULTI_NAME_CHAR2	id = 144 (10h,01h) min=32, max=127
MULTI_NAME_CHAR3	id = 145 (11h,01h) min=32, max=127
MULTI_NAME_CHAR4	id = 146 (12h,01h) min=32, max=127
MULTI_NAME_CHAR5	id = 147 (13h,01h) min=32, max=127
MULTI_NAME_CHAR6	id = 148 (14h,01h) min=32, max=127
MULTI_NAME_CHAR7	id = 149 (15h,01h) min=32, max=127
MULTI_NAME_CHAR8	id = 150 (16h,01h) min=32, max=127
MULTI_NAME_CHAR9	id = 151 (17h,01h) min=32, max=127
MULTI_NAME_CHAR10	id = 152 (18h,01h) min=32, max=127
MULTI_NAME_CHAR11	id = 153 (19h,01h) min=32, max=127
MULTI_NAME_CHAR12	id = 154 (1Ah,01h) min=32, max=127
MULTI_NAME_CHAR13	id = 155 (1Bh,01h) min=32, max=127
MULTI_NAME_CHAR14	id = 156 (1Ch,01h) min=32, max=127
MULTI_NAME_CHAR15	id = 157 (1Dh,01h) min=32, max=127

Note Trigger Parameters

(MP-7, XL-7, P2500, PX-7, PK-6, MK-6, XK-6, Halo, Vintage Keys)

Use the layer select command (898) to select the trigger (0 to 15) to program.

Parameter	ID
TRIGGER_NOTE	id =170 (2Ah,01h) min=0, max=127
TRIGGER_VEL	id =171 (2Bh,01h) min=0, max=127
TRIGGER_CHAN	id = 172 (2Ch,01h) min=-1, max=31 (-1 = use basic channel)
TRIGGER_LATCH	id =173 (2Dh,01h) min=0, max=1
TRIGGER_DEST	id = 174 (2Eh,01h) min=0, max=3 (int=0, ext=1, both=2, seq=3)

Programmable Knobs Parameters

(MP-7, XL-7, PX-7, P2500)

Use the layer select command (898) to select the knob (0 to 15) to program.

Parameter	ID
PROG_KNOB_NUM	id = 179 (33h,01h) min=1, max=119
PROG_KNOB_CHAN	id = 180 (34h,01h) min=-1, max=31 (-1 = use basic channel)
PROG_KNOB_DEST	id = 181 (35h,01h) min=0, max=3 (int=0, ext=1, both=2, seq=3)

Preset Select Trigger Parameters

(PK-6, MK-6, XK-6, Halo, Vintage Keys)

Use the layer select command (898) to select the trigger (0 to 15) to program.

Parameter	ID
SELECT_PRESET_INDEX	id =190 (3Eh, 01h)
SELECT_PRESET_ROMID	id = 191 (3Fh, 01h)
SELECT_PRESET_SENDMSB	id = 192 (40h, 01h) min=-1 (off), max=127
SELECT_PRESET_SENDLSB	id = 193 (41h, 01h) min=-1 (off), max=127
SELECT_PRESET_PROGRAM	id = 194 (42h, 01h) min=-1 (off), max=127

Master Parameters

(id = 256 (00h,02h) reserved)

Parameter	ID
(RESERVED)	id = 256 (00h,02h)
MASTER_CLOCK_TEMPO	id = 257 (01h,02h) min = 0; max = 500 0 = external 1-500 = 1-500 bpm
MASTER_FX_BYPASS	id = 258 (02h,02h) min = 0; max = 1

Parameter	ID
MASTER_TRANSPOSE	id = 259 (03h,02h) min = -12; max = +12 C = -12 C# = +1 C# = -11 D = +2 D = -10 D# = +3 D# = -9 E = +4 E = -8 F = +5 F = -7 F# = +6 F# = -6 G = +7 G = -5 G# = +8 G# = -4 A = +9 A = -3 A# = +10 A# = -2 B = +11 B = -1 C = +12 off (C) = 0
MASTER_TUNE	id = 260 (04h,02h) min = -63; max = +63 display = +/-0.0 **Actual tuning in cents - Values 0-63** 0 1.2 26.2 51.2 76.2 3.5 28.5 53.5 78.5 4.7 29.7 54.7 79.7 6.0 31.0 56.0 81.0 7.2 32.2 57.2 82.2 9.5 34.5 59.5 84.5 10.7 35.7 60.7 85.7 12.0 37.0 62.0 87.0 14.2 39.2 64.2 89.2 15.5 40.5 65.5 90.5 17.7 42.7 67.7 92.7 18.0 43.0 68.0 93.0 20.2 45.2 70.2 95.2 21.5 46.5 71.5 96.5 23.7 48.7 73.7 98.7 25.0 50.0 75.0
(reserved)	id = 261 (05h,02h) min = ?; max = ?
(reserved)	id = 262 (06h,02h) min = ?; max = ?
(reserved)	id = 263 (07h,02h) min = ?; max = ?
MASTER_BEND_RANGE	id = 264 (08h,02h) min = 0; max = 12

Parameter	ID
MASTER_TRANSPOSE	id = 259 (03h,02h) min = -12; max = +12 C = -12 C# = +1 C# = -11 D = +2 D = -10 D# = +3 D# = -9 E = +4 E = -8 F = +5 F = -7 F# = +6 F# = -6 G = +7 G = -5 G# = +8 G# = -4 A = +9 A = -3 A# = +10 A# = -2 B = +11 B = -1 C = +12 off (C) = 0
MASTER_TUNE	id = 260 (04h,02h) min = -63; max = +63 display = +/-0.0 **Actual tuning in cents - Values 0-63** 0 1.2 26.2 51.2 76.2 3.5 28.5 53.5 78.5 4.7 29.7 54.7 79.7 6.0 31.0 56.0 81.0 7.2 32.2 57.2 82.2 9.5 34.5 59.5 84.5 10.7 35.7 60.7 85.7 12.0 37.0 62.0 87.0 14.2 39.2 64.2 89.2 15.5 40.5 65.5 90.5 17.7 42.7 67.7 92.7 18.0 43.0 68.0 93.0 20.2 45.2 70.2 95.2 21.5 46.5 71.5 96.5 23.7 48.7 73.7 98.7 25.0 50.0 75.0
(reserved)	id = 261 (05h,02h) min = ?; max = ?
(reserved)	id = 262 (06h,02h) min = ?; max = ?
(reserved)	id = 263 (07h,02h) min = ?; max = ?
MASTER_BEND_RANGE	id = 264 (08h,02h) min = 0; max = 12

Parameter	ID
MASTER_VEL_CURVE	id = 265 (09h,02h) min = 0; max = 13 Velocity Curve: 0 = linear 1-13 = 1-13
MASTER_OUTPUT_FORMAT	id = 266 (0Ah,02h) min= 1; max = 2 Output Format: 1 = S/PDIF 2 = AES Pro
MASTER_KNOB_EDIT	id = 267 (0Bh,02h) min = 0; max = 1
DEEP_EDIT	id = 268 (0Ch,02h) min = 0; max = 1
EDIT_ALL_LAYERS	id = 269 (0Dh,02h) min = 0; max = 1

Local Controller Parameters

(XL-7, MP-7, PX-7, PK-6, MK-6, XK-6, Halo, Vintage Keys)

Parameter	ID
LOCAL_CONTROLLERS_CHAN	id = 280 (18h, 02h) min=-1 max=31 (-1 = use basic channel)
LOCAL_AFTERTOUCH_CURVE	id = 281 (19h, 02h) min=0, max= (depends on model)
LOCAL_POLYAFTER_CURVE	id = 282 (1Ah, 02h) min=0, max=(depends on model)
LOCAL_KBD_VEL_CURVE	id = 283 (1Bh, 02h) min=0, max=(depends on model)
LOCAL_CONTROL	id = 284 (1Ch, 02h) min=0, max=(depends on model)
LOCAL_KBD_TRANSPOSE	id = 285 (1Dh, 02h) min=-36, max=36

Parameter	ID
LOCAL_FOOTSW1_FUNC	id = 286 (1Eh, 02h) min=0, max=11
LOCAL_FOOTSW2_FUNC	id = 287 (1Fh, 02h) min=0, max=11

Footswitch = 0, Start/Stop = 1, Play = 2, Stop = 3, Punch In/Out = 4, TapTempo = 5, Channel Up = 6, Channel Down = 7, Sequence Up = 8, Sequence Down = 9, Preset Up = 10, Preset Down = 11

Parameter	ID
LOCAL_PEDAL_FUNC	id = 288 (20h, 02h) min=0, max=2 (FootCtrl = 0, ChannelVol = 1, MasterVol = 2)
LOCAL_TRIG_FUNC	id = 289 (21h, 02h) min=0, max=1 (Play Notes = 0, Play Beats = 1)

Master MIDI Parameters

Parameter	ID
(RESERVED)	id = 384 (00h,03h)
MIDI_MODE	id = 385 (01h,03h) min = 0; max = 2 MIDI mode: 0 = omni 1 = poly 2 = multi
MIDI_MODE_CHANGE	id = 386 (02h,03h) min = 0; max = 1 omni, poly, multi change enabled/disabled
(reserved)	id = 387 (03h,03h) min = ?; max = ?
MIDI_ID	id = 388 (04h,03h) min = 0; max = 126
(reserved)	id = 389 (05h,03h) min = ?; max = ?
(reserved)	id = 390 (06h,03h) min = ?; max = ?
MIDI_A_CONTROL,	id = 391 (07h,03h) min = 0; max = 31
MIDI_B_CONTROL	id = 392 (08h,03h) min = 0; max = 31
MIDI_C_CONTROL	id = 393 (09h,03h) min = 0; max = 31
MIDI_D_CONTROL	id = 394 (0Ah,03h) min = 0; max = 31
MIDI_E_CONTROL	id = 395 (0Bh,03h) min = 0; max = 31
MIDI_F_CONTROL	id = 396 (0Ch,03h) min = 0; max = 31
MIDI_G_CONTROL	id = 397 (0Dh,03h) min = 0; max = 31
MIDI_H_CONTROL	id = 398 (0Eh,03h) min = 0; max = 31 Display for these 8 parameters:
MIDI_FS1_CONTROL	id = 399 (0Fh,03h) min = 64; max = 79
MIDI_FS2_CONTROL	id = 400 (10h,03h) min = 64; max = 79
MIDI_FS3_CONTROL	id = 401 (11h,03h) min = 64; max = 79 Display for these 3 parameters:
MIDI_TEMPO_CTRL_UP	id = 402 (12h,03h) min = -3; max = 31
MIDI_TEMPO_CTRL_DOWN	id = 403 (13h,03h) min = -3; max = 31 -3 = off -2 = Mpr (Mono Pressure) -1 = Pwh (Pitch wheel) 0 - 31 = 0-31 Display for these 2 Parameters:
MIDI_KNOB_OUT	id = 404 (14h,03h) min = 0;max = 1
MIDI_SYSEX_DELAY	id = 405 (15h,03h) min = 0; max = 8000 (milliseconds) Delay between SysEx messages in multi-message dumps.
MIDI_I_CONTROL	id = 406 (16h,03h) min = 70; max = 95
MIDI_J_CONTROL	id = 407 (17h,03h) min = 70; max = 95
MIDI_K_CONTROL	id = 408 (18h,03h) min = 70; max = 95
MIDI_L_CONTROL	id = 409 (19h,03h) min = 70; max = 95
MASTER_MIDI_M_CONTROL	id = 411 (1Bh,03h) min=1, max=95

Parameter	ID
MASTER_MIDI_N_CONTROL	id = 412 (1Ch,03h) min=1, max=95
MASTER_MIDI_O_CONTROL	id = 413 (1Dh,03h) min=1, max=95
MASTER_MIDI_P_CONTROL	id = 414 (1Eh,03h) min=1, max=95
MIDI_KBD_XMIT	id = 415 (1Fh,03h) min=0, max=1
MIDI_CLOCK_XMIT	id = 416 (20h,03h) min=0, max=3, (Off=0, MidiOutA=1, MidiOutB=2, Both=3)
MIDI_MERGE_OUT_A	id = 417 (21h,03h) min=0, max=1
MIDI_MERGE_OUT_B	id = 418 (22h,03h) min=0, max=1
MIDI_USE_B_CHANS	id = 419 (23h,03h) min=0, max=1
MIDI_USE_B_CHANS	id = 420 (24h,03h) min=0, max=2, (off,on,on record only)
MIDI_USE_TRACK_CHAN	id = 421 (25h,03h) min=0, max=1
MIDI_ALLOW_LOCAL_ON_OFF	id = 422 (26h,03h) min=0, max=1

Master Effects Parameters

Parameter	ID
(RESERVED)	id = 512 (00h,04h)
MASTER_FX_A_ALGORITHM	id = 513 (01h,04h) min = 1; max = 44;
MASTER_FX_A_DECAY	id = 514 (02h,04h) min = 0; max = 90;
MASTER_FX_A_HFDAMP	id = 515 (03h,04h) min = 0; max = 127;
MASTER_FXB_SEND_FXA	id = 516 (04h,04h) min = 0; max = 127;
MASTER_FX_A_MIX_SEND 1	id = 517 (05h,04h) min = 0; max = 100;
MASTER_FX_A_MIX_SEND 2	id = 518 (06h,04h) min = 0; max = 100;
MASTER_FX_A_MIX_SEND 3	id = 519 (07h,04h) min = 0; max = 100;
MASTER_FX_B_ALGORITHM	id = 520 (08h,04h) min = 1; max = 32;
MASTER_FX_B_FEEDBACK	id = 521 (09h,04h) min = 0; max = 127;
MASTER_FX_B_LFO_RATE	id = 522 (0Ah,04h) min = 0; max = 127;
MASTER_FX_B_DELAY	id = 523 (0Bh,04h) min = 0; max = 127;
MASTER_FX_B_MIX_SEND 1	id = 524 (0Ch,04h) min = 0; max = 100;
MASTER_FX_B_MIX_SEND 2	id = 525 (0Dh,04h) min = 0; max = 100;
MASTER_FX_B_MIX_SEND 3	id = 526 (0Eh,04h) min = 0; max = 100;
MASTER_FX_A_MIX_SEND 4	id = 527 (0Fh,04h) min = 0; max = 100;
MASTER_FX_B_MIX_SEND 4	id = 528 (10h,04h) min = 0; max = 100;

Master Arpeggiator Parameters

Parameter	ID
(RESERVED)	id = 640 (00h,05h)
MASTER_ARP_STATUS	id = 641 (01h,05h) min = 0; max = 1
MASTER_ARP_MODE	id = 642 (02h,05h) min = 0; max = 7 0 = up 1 = down 2 = up/down 3 = forward assign 4 = backward assign 5 = forward/backward assign 6 = random 7 = pattern
MASTER_ARP_PATTERN	id = 643 (03h,05h) min = 0; max = 199
MASTER_ARP_NOTE	id = 644 (04h,05h) min = 1; max = 19
MASTER_ARP_VEL	id = 645 (05h,05h) min = 0; max = 127
MASTER_ARP_GATE_TIME	id = 646 (06h,05h) min = 1; max = 100 (%)
MASTER_ARP_EXT_COUNT	id = 647 (07h,05h) min = 0; max = 15
MASTER_ARP_EXT_INT	id = 648 (08h,05h) min = 1; max = 16

Parameter	ID
MASTER_ARP_SYNC	id = 649 (09h,05h) min = 0; max = 1 0 = key sync 1 = quantized
MASTER_ARP_PREDELAY	id = 650 (0Ah,05h) min = 0; max = 19
MASTER_ARP_DURATION	id = 651 (0Bh,05h) min = 0; max = 19
MASTER_ARP_RECYCLE	id = 652 (0Ch,05h) min = 0; max = 1
MASTER_ARP_KBD_THRU	id = 653 (0Dh,05h) min = 0; max = 1
MASTER_ARP_LATCH	id = 654 (0Eh,05h) min = 0; max = 1
MASTER_ARP_KR_LOW	id = 655 (0Fh,05h) min = 0; max = 127
MASTER_ARP_KR_HIGH	id = 656 (10h,05h) min = 0; max = 127
MASTER_ARP_XMIT_MIDI	id = 657 (11h,05h) min = 0; max = 1 Off = 0, Xmit Arps = 1, Xmit Riffs = 2, Xmit Both = 3
MASTER_ARP_SONG_START	id = 658 (12h,05h) min = 0; max = 1 Off = 0, Start Arps = 1, Start Riffs = 2, Start Both = 3
MASTER_ARP_PATTERN_SPEED	id = 659 (13h,05h) min = -2; max = 2 -2 = 4X -1 = 2X 0 = 1X +1 = 1/2X +2 = 1/4X
ARP_POST_DELAY	id = 661 (15h,05h) min = 0; max = 19

Arpeggiator Pattern Edit Parameters

Parameter	ID
(RESERVED)	id = 768 (00h,06h)
ARP_PATTERN_SELECT	id = 769 (01h,06h) min = 0; max = 299
ARP_PATTERN_STEP_SELECT	id = 770 (02h,06h) min = 0; max = 32
ARP_NAME_CHAR_0	id = 771 (03h,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_1	id = 772 (04h,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_2	id = 773 (05h,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_3	id = 774 (06h,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_4	id = 775 (07h,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_5	id = 776 (08h,06h) min = 32; max = 127 (ASCII Char)

Parameter	ID
ARP_NAME_CHAR_6	id = 777 (09h,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_7	id = 778 (0Ah,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_8	id = 779 (0Bh,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_9	id = 780 (0Ch,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_10	id = 781 (0Dh,06h) min = 32; max = 127 (ASCII Char)
ARP_NAME_CHAR_11	id = 782 (0Eh,06h) min = 32; max = 127 (ASCII Char)
ARP_PATTERN_LOOP_POINT	id = 783 (0Fh,06h) min = 0; max = 31
ARP_STEP_KEY_OFFSET	id = 784 (10h,06h) min = -52; max = +48 -49 = tie -50 = rest -51 = skip -52 = end
ARP_STEP_VELOCITY	id = 785 (11h,06h) min = 0; max = 127 0 = ply
ARP_STEP_DURATION	id = 786 (12h,06h) min = 1; max = 19
ARP_STEP_REPEAT	id = 787 (13h,06h) min = 0; max = 31

BEATS Trigger Parameters

The following parameters are per 24 triggers, where the layer select command (id 898) selects the trigger to edit.

trigger 0 to 15	=	trigger part 1 to 16
trigger 16,17,18,19	=	trigger group 1,2,3,4
trigger 20	=	start/stop
trigger 21	=	clear
trigger 22	=	mute
trigger 23	=	hold

Parameter	ID
BEATS_TRIGGER_KEY	id = 160 (20h, 01h) min = 0 (C-2) max = 127 (G8)
BEATS_TRIGGER_LATCH	id =161 (21h, 01h) unlatched=0, latched=1, 1-Bar=2

The following are per 16 parts, where the layer select command (id 898) selects the part.

Parameter	ID
BEATS_VELOCITY	id = 164 (24h, 01h) -1 = use trigger vel, 0 to 127
BEATS_XPOSE	id = 165 (25h, 01h) min = -36, max = + 36
BEATS_GROUP	id = 166 (26h, 01h) min = 0, max = 4

The following are normal single items.

Parameter	ID
BEATS_MODE	id = 271 (0Fh, 02h) Off = 0, On = 1, Preset = 2, Master = 3
BEATS_CHANNEL	id = 272 (10h, 02h) -1 = basic chan, 0 to 15
BEATS_TRIGGER_CHANNEL	id = 273 (11h, 02h) -1 = basic chan, 0 to 15
BEATS_TRIGGER_OFFSET	id = 274 (12h, 02h) min = -128, max = +127
BEATS_IGNORE_TEMPO	id = 275 (13h, 02h) min = 0, max = 1
BEATS_IGNORE_CONTROLLERS	id = 276 (14h, 02h) min = 0, max = 1
MASTER_RIFF_ROM_ID	id = 277 (15h, 02h) any valid rom id (xlead = 7)
MASTER_RIFF_NDX	id = 278 (16h, 02h) any valid riff index 0 to?

Preset Common General Edit Parameters

Parameter	ID
PRESET_SELECT	id = 897 (01h,07h) min = -1; max = 255 (-1 = Edit Buffer)
LAYER_SELECT	id = 898 (02h,07h) min = -1; max = 3 -1 = Select All Layers 0-3 = Layers 1 - 4

These Selection Parameters are independent of what is selected from the Proteus front panel. Once you select something remotely, the only way to change the selection is remotely.

Any regular front panel editing can be done without affecting what was selected for remote editing.

Parameter	ID
PRESET_NAME_CHAR_0	id = 899 (03h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_1	id = 900 (04h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_2	id = 901 (05h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_3	id = 902 (06h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_4	id = 903 (07h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_5	id = 904 (08h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_6	id = 905 (09h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_7	id = 906 (0Ah,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_8	id = 907 (0Bh,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_9	id = 908 (0Ch,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_10	id = 909 (0Dh,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_11	id = 910 (0Eh,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_12	id = 911 (0Fh,07h) min = 32; max = 127 (ASCII Char)

Parameter	ID
PRESET_NAME_CHAR_13	id = 912 (10h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_14	id = 913 (11h,07h) min = 32; max = 127 (ASCII Char)
PRESET_NAME_CHAR_15	id = 914 (12h,07h) min = 32; max = 127 (ASCII Char)
PRESET_CTRL_A	id = 915 (13h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_B	id = 916 (14h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_C	id = 917 (15h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_D	id = 918 (16h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_E	id = 919 (17h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_F	id = 920 (18h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_G	id = 921 (19h,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_H	id = 922 (1Ah,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_KBD_TUNE	id = 923 (1Bh,07h) min = 0; max = 5 0 = equal 1 = Just C 2 = Valloti 3 = 19-Tone 4 = Gamelan 5 = Just C2 6 = Just C-minor 7 = Just C3 8 = Werkmeister III 9 = Kirnberger 10 = Scarlatti 11 = Repeating Octave 12 - 23 = User
PRESET_CTRL_I	id = 924 (1Ch,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_J	id = 925 (1Dh,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_K	id = 926 (1Eh,07h) min = -1; max = 127 (-1 = Current Controller Value)

Parameter	ID
PRESET_CTRL_L	id = 927 (1Fh,07h) min = -1; max = 127 (-1 = Current Controller Value)
PRESET_CTRL_M	id = 967 (71h,07h) min =-1 max =127 (-1=use current controller value)
PRESET_CTRL_N	id = 968 (72h,07h) min =-1 max =127 (-1=use current controller value)
PRESET_CTRL_O	id = 969 (73h,07h) min =-1 max =127 (-1=use current controller value)
PRESET_CTRL_P	id = 970 (74h,07h) min =-1 max =127 (-1=use current controller value)
PRESET_RIFF	id = 928 (20h,07h) min = -1; max = 127 (-127 - MIDI Note; 1-TBD Riff number)
PRESET_RIFF_ROM_ID	id = 929 (21h,07h) min = -1; max = 255
PRESET_TEMPO_OFFSET	id = 930 (22h,07h) min = 0; max = 4 0 = x1/4 1 = x1/2 2 = x1 3 = x2 4 = x4
PRESET_CORD_0_SOURCE	id = 931 (23h,07h) min = 0; max = 255
PRESET_CORD_0_DEST	id = 932 (24h,07h) min = 0; max = 255
PRESET_CORD_0_AMOUNT	id = 933 (25h,07h) min = -100; max =255
PRESET_CORD_1_SOURCE	id = 934 (26h,07h) min = 0; max = 255
PRESET_CORD_1_DEST	id = 935 (27h,07h) min = 0; max = 255
PRESET_CORD_1_AMOUNT	id = 936 (28h,07h) min = -100; max =255
PRESET_CORD_2_SOURCE	id = 937 (29h,07h) min = 0; max = 255
PRESET_CORD_2_DEST	id = 938 (2Ah,07h) min = 0; max = 255
PRESET_CORD_2_AMOUNT	id = 939 (2Bh,07h) min = -100; max =255
PRESET_CORD_3_SOURCE	id = 940 (2Ch,07h) min = 0; max = 255
PRESET_CORD_3_DEST	id = 941 (2Dh,07h) min = 0; max = 255
PRESET_CORD_3_AMOUNT	id = 942 (2Eh,07h) min = -100; max =255
PRESET_CORD_4_SOURCE	id = 943 (2Fh,07h) min = 0; max = 255
PRESET_CORD_4_DEST	id = 944 (30h,07h) min = 0; max = 255
PRESET_CORD_4_AMOUNT	id = 945 (31h,07h) min = -100; max =255
PRESET_CORD_5_SOURCE	id = 946 (32h,07h) min = 0; max = 255
PRESET_CORD_5_DEST	id = 947 (33h,07h) min = 0; max = 255
PRESET_CORD_5_AMOUNT	id = 948 (34h,07h) min = -100; max =255
PRESET_CORD_6_SOURCE	id = 949 (35h,07h) min = 0; max = 255
PRESET_CORD_6_DEST	id = 950 (36h,07h) min = 0; max = 255
PRESET_CORD_6_AMOUNT	id = 951 (37h,07h) min = -100; max =255
PRESET_CORD_7_SOURCE	id = 952 (38h,07h) min = 0; max = 255

Parameter	ID
PRESET_CORD_7_DEST	id = 953 (39h,07h) min = 0; max = 255
PRESET_CORD_7_AMOUNT	id = 954 (3Ah,07h) min = -100; max =255
PRESET_CORD_8_SOURCE	id = 955 (3Bh,07h) min = 0; max = 255
PRESET_CORD_8_DEST	id = 956 (3Ch,07h) min = 0; max = 255
PRESET_CORD_8_AMOUNT	id = 957 (3Dh,07h) min = -100; max =255
PRESET_CORD_9_SOURCE	id = 958 (3Eh,07h) min = 0; max = 255
PRESET_CORD_9_DEST	id = 959 (3Fh,07h) min = 0; max = 255
PRESET_CORD_9_AMOUNT	id = 960 (40h,07h) min = -100; max =255
PRESET_CORD_10_SOURCE	id = 961 (41h,07h) min = 0; max = 255
PRESET_CORD_10_DEST	id = 962 (42h,07h) min = 0; max = 255
PRESET_CORD_10_AMOUNT	id = 963 (43h,07h) min = -100; max =255
PRESET_CORD_11_SOURCE	id = 964 (44h,07h) min = 0; max = 255
PRESET_CORD_11_DEST	id = 965 (45h,07h) min = 0; max = 255
PRESET_CORD_11_AMOUNT	id = 966 (46h,07h) min = -100; max =255

Source	Destination
0 = Off	0 = Off
16 = PitWl (Pitch Wheel)	1 = FX_A_Send 1
17 = ModWl (Mod Wheel)	2 = FX_A_Send 2
18 = Press (Pressure)	3 = FX_A_Send 3
19 = Pedal (Pedal)	4 = FX_A_Send 4
20 = MidiA	5 = FX_B_Send 1
21 = MidiB	6 = FX_B_Send 2
22 = FtSw1 (Foot Switch 1)	7 = FX_B_Send 3
23 = FtSw2 (Foot Switch 2)	8 = FX_B_Send 4
24 = Ft1FF (FlipFlop FootSwitch 1)	96 = ArpRate (Arpeggiator Rate)
25 = Ft2FF (FlipFlop FootSwitch 2)	97 = ArpExten (Arpeggiator Extension)
26 = MidiVl (Volume controller 7)	98 = ArpVel (Arpeggiator Velocity)
27 = MidPn (Pan controller 10)	99 = ArpGate (Arpeggiator Gate)
32 = MidiC	100 = ArpIntvl (Arpeggiator Interval)
33 = MidiD	112 = BeatsVelG1 (Beats Velocity Group 1)
34 = MidiE	113 = BeatsVelG2 (Beats Velocity Group 2)
35 = MidiF	114 = BeatsVelG3 (Beats Velocity Group 3)
36 = MidiG	115 = BeatsVelG4 (Beats Velocity Group 4)
37 = MidiH	116 = BeatsXpsG1 (Beats Transpose Grp 1)
40 = MidiI	117 = BeatsXpsG2 (Beats Transpose Grp 2)
41 = MidiJ	118 = BeatsXpsG3 (Beats Transpose Grp 3)

Source	Destination
42 = MidiK	119 = BeatsXpsG4 (Beats Transpose Grp 4)
43 = MidiL	120 = BeatsBusy (Beats Busy)
160 = DC (DC Offset)	121 = BeatsVari (Beats Variation)
	128 = PLagIn (Preset Lag In)
	129 = PLagAmt (Preset Lag Amount)
	131 = PRampRt (Preset Ramp Rate)

Preset Common Arpeggiator Edit Parameters

Parameter	ID
(RESERVED)	id = 1024 (00h,08h)
PRESET_ARP_STATUS	id = 1025 (01h,08h) min = 0; max = 1
PRESET_ARP_MODE	id = 1026 (02h,08h) min = 0; max = 7 0 = up 1 = down 2 = up/down 3 = forward assign 4 = backward assign 5 = forward/backward assign 6 = random 7 = pattern
PRESET_ARP_PATTERN	id = 1027 (03h,08h) min = 0; max = 299
PRESET_ARP_NOTE	id = 1028 (04h,08h) min = 0; max = 19
PRESET_ARP_VEL	id = 1029 (05h,08h) min = 0; max = 127
PRESET_ARP_GATE_TIME	id = 1030 (06h,08h) min=1; max=100 (%)
PRESET_ARP_EXT_COUNT	id = 1031 (07h,08h) min = 0; max = 15
PRESET_ARP_EXT_INT	id = 1032 (08h,08h) min = 1; max = 16
PRESET_ARP_SYNC	id = 1033 (09h,08h) min = 0; max = 1 0 = key sync, 1 = quantized
PRESET_ARP_PRE_DELAY	id = 1034 (0Ah,08h) min = 0; max = 19
PRESET_ARP_DURATION	id = 1035 (0Bh,08h) min = 0; max = 19
PRESET_ARP_RECYCLE	id = 1036 (0Ch,08h) min = 0; max = 1
PRESET_ARP_KBD_THRU	id = 1037 (0Dh,08h) min = 0; max = 1
PRESET_ARP_LATCH	id = 1038 (0Eh,08h) min = 0; max = 1
PRESET_ARP_KR_LOW	id = 1039 (0Fh,08h) min = 0; max = 127
PRESET_ARP_KR_HIGH	id = 1040 (10h,08h) min = 0; max = 127

Parameter	ID
PRESET_ARP_PATTERN_SPEED	id = 1041 (11h,08h) min = -2; max = 2 -2 = 4X -1 = 2X 0 = 1X +1 = 1/2X +2 = 1/4X
PRESET_ARP_PATTERN_ROM_ID	id = 1042 (12h,08h)
ARP_POST_DELAY	id = 1043 (13h, 08h) min = 0, max = 19

Preset Common Effects Edit Parameters

Parameters	ID
(RESERVED)	id = 1152 (00h,09h)
PRESET_FX_A_ALGORITHM	id = 1153 (01h,09h) min = 0; max = 44; (0 = Master)
PRESET_FX_A_DECAY	id = 1154 (02h,09h) min = 0; max = 90;
PRESET_FX_A_HFDAMP	id = 1155 (03h,09h) min = 0; max = 127;
PRESET_FX_A>B	id = 1156 (04h,09h) min = 0; max = 127;
PRESET_FX_A_MIX_MAIN	id = 1157 (05h,09h) min = 0; max = 100;
PRESET_FX_A_MIX_SUB1	id = 1158 (06h,09h) min = 0; max = 100;
PRESET_FX_A_MIX_SUB2	id = 1159 (07h,09h) min = 0; max = 100;
PRESET_FX_B_ALGORITHM	id = 1160 (08h,09h) min = 0; max = 32; (0 = Master)
PRESET_FX_B_FEEDBACK	id = 1161 (09h,09h) min = 0; max = 127;
PRESET_FX_B_LFO_RATE	id = 1162 (0Ah,09h) min = 0; max = 127;
PRESET_FX_B_DELAY	id = 1163 (0Bh,09h) min = 0; max = 127;
PRESET_FX_B_MIX_MAIN	id = 1164 (0Ch,09h) min = 0; max = 100;
PRESET_FX_B_MIX_SUB1	id = 1165 (0Dh,09h) min = 0; max = 100;
PRESET_FX_B_MIX_SUB2	id = 1166 (0Eh,09h) min = 0; max = 100;
PRESET_FX_A_MIX_SUB3	id = 1167 (0Fh,09h) min = 0; max = 100;
PRESET_FX_B_MIX_SUB4	id = 1168 (10h,09h) min = 0; max = 100;

Preset Common Links Edit Parameters

Parameter	ID
(RESERVED)	id = 1280 (00h,0Ah)
LINK_1_PRESET	id = 1281 (01h,0Ah) min = -1; max = 895
LINK_1_VOLUME	id = 1282 (02h,0Ah) min = -96; max = +10
LINK_1_PAN	id = 1283 (03h,0Ah) min = -64; max = +64

Parameter	ID
LINK_1_TRANSPOSE	id = 1284 (04h,0Ah) min = -24; max = +24
LINK_1_DELAY	id = 1285 (05h,0Ah) min = -19; max = 127
LINK_1_KEY_LOW	id = 1286 (06h,0Ah) min = 0; max = 127 (C-2 -> G8)
LINK_1_KEY_HIGH	id = 1287 (07h,0Ah) min = 0; max = 127 (C-2 -> G8)
LINK_1_VEL_LOW	id = 1288 (08h,0Ah) min = 0; max = 127
LINK_1_VEL_HIGH	id = 1289 (09h,0Ah) min = 0; max = 127
LINK_2_PRESET	id = 1290 (0Ah,0Ah) min = -1; max = 895
LINK_2_VOLUME	id = 1291 (0Bh,0Ah) min = -96; max = +10
LINK_2_PAN	id = 1292 (0Ch,0Ah) min = -64; max = +64
LINK_2_TRANSPOSE	id = 1293 (0Dh,0Ah) min = -24; max = +24
LINK_2_DELAY	id = 1294 (0Eh,0Ah) min = -19; max = 127
LINK_2_KEY_LOW	id = 1295 (0Fh,0Ah) min = 0; max = 127 (C-2 -> G8)
LINK_2_KEY_HIGH	id = 1296 (10h,0Ah) min = 0; max = 127 (C-2 -> G8)
LINK_2_VEL_LOW	id = 1297 (11h,0Ah) min = 0; max = 127
LINK_2_VEL_HIGH	id = 1298 (12h,0Ah) min = 0; max = 127
LINK_1_PRESET_ROM_ID	id = 1299 (13h,0Ah) min = 0; max = 255
LINK_2_PRESET_ROM_ID	id = 1300 (14h,0Ah) min = 0; max = 255

Preset Layer General Edit Parameters

Parameter	ID
(RESERVED)	id = 1408 (00h,0Bh)
LAYER_INSTRUMENT	id = 1409 (01h,0Bh) min = 0; max = Maximum number of instruments
LAYER_VOLUME	id = 1410 (02h,0Bh) min = -96; max = +10
LAYER_PAN	id = 1411 (03h,0Bh) min = -64; max = +63
LAYER_SUBMIX	id = 1412 (04h,0Bh) min = 0; max = 2 0 = main 1 = sub1 2 = sub2
LAYER_KEY_LOW	id = 1413 (05h,0Bh) min = 0; max = 127 (C-2 -> G8)
LAYER_KEY_LOWFADE	id = 1414 (06h,0Bh) min = 0; max = 127
LAYER_KEY_HIGH	id = 1415 (07h,0Bh) min = 0; max = 127 (C-2 -> G8)
LAYER_KEY_HIGHFADE	id = 1416 (08h,0Bh) min = 0; max = 127

Parameter	ID
LAYER_VEL_LOW	id = 1417 (09h,0Bh) min = 0; max = 127
LAYER_VEL_LOWFADE	id = 1418 (0Ah,0Bh) min = 0; max = 127
LAYER_VEL_HIGH	id = 1419 (0Bh,0Bh) min = 0; max = 127
LAYER_VEL_HIGHFADE	id = 1420 (0Ch,0Bh) min = 0; max = 127
LAYER_RT_LOW	id = 1421 (0Dh,0Bh) min = 0; max = 127
LAYER_RT_LOWFADE	id = 1422 (0Eh,0Bh) min = 0; max = 127
LAYER_RT_HIGH	id = 1423 (0Fh,0Bh) min = 0; max = 127
LAYER_RT_HIGHFADE	id = 1424 (10h,0Bh) min = 0; max = 127
LAYER_CTUNE	id = 1425 (11h,0Bh) min = -36; max = +36
LAYER_FTUNE	id = 1426 (12h,0Bh) min = -64; max = +64
LAYER_DBL_DETUNE	id = 1427 (13h,0Bh) min = 0; max = 100 (off,1-100)
LAYER_DBL_DETUNE_WIDTH	id = 1428 (14h,0Bh) min = 0; max = 100
LAYER_TRANSPOSE	id = 1429 (15h,0Bh) min = -36; max = +36
LAYER_NON_TRANSPOSE	id = 1430 (16h,0Bh) min = 0; max = 1
LAYER_BEND	id = 1431 (17h,0Bh) min = -1; max = 12
LAYER_GLIDE_RATE	id = 1432 (18h,0Bh) min = 0; max = 127
LAYER_GLIDE_CURVE	id = 1433 (19h,0Bh) min = 0; max = 8 0 = linear 1-8 = exp1-exp8
LAYER_LOOP	id = 1434 (1Ah,0Bh) min = 0; max = 1
LAYER_START_DELAY	id = 1435 (1Bh,0Bh) min = -25 max = 127 -25 to -1 displayed same as LFO1_RATE on page 61.
LAYER_START_OFFSET	id = 1436 (1Ch,0Bh) min = 0; max = 127
LAYER_SOLO	id = 1437 (1Dh,0Bh) min = 0; max = 8 0 = off 1 = multiple trigger 2 = melody(last) 3 = melody(low) 4 = melody(high) 5 = synth(last) 6 = synth(low) 7 = synth(high) 8 = fingered glide

Parameter	ID
LAYER_GROUP	id = 1438 (1Eh,0Ch) min = 0; max = 23 0 = poly all 1 = poly 16 A 2 = poly 16 B 3 = poly 8 A 4 = poly 8 B 5 = poly 8 C 6 = poly 8 D 7 = poly 4 A 8 = poly 4 B 9 = poly 4 C 10 = poly 4 D 11 = poly 2 A 12 = poly 2 B 13 = poly 2 C 14 = poly 2 D 15 = mono A 16 = mono B 17 = mono C 18 = mono D 19 = mono E 20 = mono F 21 = mono G 22 = mono H 23 = mono I
LAYER_INST_ROM_ID	id = 1439 (1Fh,0Bh) min = 0; max = 255

Preset Layer Filter Edit Parameters

Parameter	ID
(RESERVED)	id = 1536 (00h,0Ch)
LAYER_FILT_TYPE	id = 1537 (01h,0Ch) min = 0; max = 255 (Scattered like PatchCords. See table below.)
LAYER_FILT_FREQ	id = 1538 (02h,0Ch) min = 0; max = 255
LAYER_FILT_Q	id = 1539 (03h,0Ch) min = 0; max = 127

Preset Layer LFOs Edit Parameters

Parameter	ID
(RESERVED)	id = 1664 (00h,0Dh)
LAYER_LFO1_RATE	id = 1665 (01h,0Dh) min = -25; max = 127 -25 = 8/1 -24 = 4/1d -23 = 8/1t -22 = 4/1 -21 = 2/1d -20 = 4/1t -19 = 2/1 -18 = 1/1d -17 = 2/1t -16 = 1/1 -15 = 1/2d -14 = 1/1t -13 = 1/2 -12 = 1/4d -11 = 1/2t -10 = 1/4 -9 = 1/8d -8 = 1/4t -7 = 1/8 -6 = 1/16d -5 = 1/8t -4 = 1/16 -3 = 1/32d -2 = 1/16t -1 = 1/32

Parameter	ID
LAYER_LFO1_SHAPE	id = 1666 (02h,0Dh) min = -1; max = 15 -1 = random 0 = triangle 1 = sine 2 = sawtooth 3 = square 4 = sine 5 = 33% pulse 6 = 25% pulse 7 = 16% pulse 8 = 12% pulse 9 = pat:octaves 10 = pat:5th + oct 11 = pat sus4trip 12 = pat:neener 13 = sine 1, 2 14 = sine 1, 3, 5 15 = sine + noise 16 = hemiquaver
LAYER_LFO1_DELAY	id = 1667 (03h,0Dh) min = -25; max = 127 (-25 to -1, see LFO1_RATE)
LAYER_LFO1_VAR	id = 1668 (04h,0Dh) min = 0; max = 100 %
LAYER_LFO1_SYNC	id = 1669 (05h,0Dh) min = 0; max = 1 0 = key sync 1 = free run
LAYER_LFO2_RATE	id = 1670 (06h,0Dh) min = -25; max = 127 (as above)
LAYER_LFO2_SHAPE	id = 1671 (07h,0Dh) min = 0; max = 3 (as above)
LAYER_LFO2_DELAY	id = 1672 (08h,0Dh) min = -25) max = 127 (-25 to -1, see LFO1_RATE)
LAYER_LFO2_VAR	id = 1673 (09h,0Dh) min = 0; max = 100 %
LAYER_LFO2_SYNC	id = 1674 (0Ah,0Dh) min = 0; max = 1 (as above)

Preset Layer Envelope Edit Parameters

Alternate Amplifier (Volume) Envelope Mode:

Parameter	ID
(RESERVED)	id = 1792 (00h,0Eh)
LAYER_VOL_ENV_MODE	id = 1793 (01h,0Eh) min = 0; max = 2 0 = factory 1 = abs time-based 2 = tempo-based
LAYER_VENV_ATK1_RATE	id = 1794 (02h,0Eh) min = 0; max = 127
LAYER_VENV_ATK1_LVL	id = 1795 (03h,0Eh) min = 0; max = 100 %
LAYER_VENV_DCY1_RATE	id = 1796 (04h,0Eh) min = 0; max = 127
LAYER_VENV_DCY1_LVL	id = 1797 (05h,0Eh) min = 0; max = 100 %
LAYER_VENV_RLS1_RATE	id = 1798 (06h,0Eh) min = 0; max = 127
LAYER_VENV_RLS1_LVL	id = 1799 (07h,0Eh) min = 0; max = 100 %
LAYER_VENV_ATK2_RATE	id = 1800 (08h,0Eh) min = 0; max = 127
LAYER_VENV_ATK2_LVL	iid = 1801 (09h,0Eh) min = 0; max = 100 %
LAYER_VENV_DCY2_RATE	id = 1802 (0Ah,0Eh) min = 0; max = 127
LAYER_VENV_DCY2_LVL	id = 1803 (0Bh,0Eh) min = 0; max = 100 %
LAYER_VENV_RLS2_RATE	id = 1804 (0Ch,0Eh) min = 0; max = 127
LAYER_VENV_RLS2_LVL	id = 1805 (0Dh,0Eh) min = 0; max = 100 %

Filter Envelope Mode

Parameter	ID
LAYER_FILT_ENV_MODE	id = 1806 (0Eh,0Eh) min = 1; max = 2 1 = time-based 2 = tempo-based
LAYER_FENV_ATK1_RATE	id = 1807 (0Fh,0Eh) min = 0; max = 127
LAYER_FENV_ATK1_LVL	id = 1808 (10h,0Eh) min = -100; max = 100 (%)
LAYER_FENV_DCY1_RATE	id = 1809 (11h,0Eh) min = 0; max = 127
LAYER_FENV_DCY1_LVL	id = 1810 (12h,0Eh) min = -100; max = 100 (%)
LAYER_FENV_RLS1_RATE	id = 1811 (13h,0Eh) min = 0; max = 127
LAYER_FENV_RLS1_LVL	id = 1812 (14h,0Eh) min = -100; max = 100 (%)
LAYER_FENV_ATK2_RATE	id = 1813 (15h,0Eh) min = 0; max = 127
LAYER_FENV_ATK2_LVL	id = 1814 (16h,0Eh) min = -100; max = 100 (%)
LAYER_FENV_DCY2_RATE	id = 1815 (17h,0Eh) min = 0; max = 127
LAYER_FENV_DCY2_LVL	id = 1816 (18h,0Eh) min = -100; max = 100 (%)
LAYER_FENV_RLS2_RATE	id = 1817 (19h,0Eh) min = 0; max = 127
LAYER_FENV_RLS2_LVL	id = 1818 (1Ah,0Eh) min = -100; max = 100 (%)

Auxiliary Envelope Mode

Parameter	ID
LAYER_AUX_ENV_MODE	id = 1819 (1Bh,0Eh) min = 1; max = 2 1 = time-based 2 = tempo-based
LAYER_AENV_ATK1_RATE	id = 1820 (1Ch,0Eh) min = 0; max = 127
LAYER_AENV_ATK1_LVL	id = 1821 (1Dh,0Eh) min = -100; max = 100 (%)
LAYER_AENV_DCY1_RATE	id = 1822 (1Eh,0Eh) min = 0; max = 127
LAYER_AENV_DCY1_LVL	id = 1823 (1Fh,0Eh) min = -100; max = 100 (%)
LAYER_AENV_RLS1_RATE	id = 1824 (20h,0Eh) min = 0; max = 127
LAYER_AENV_RLS1_LVL	id = 1825 (21h,0Eh) min = -100; max = 100 (%)
LAYER_AENV_ATK2_RATE	id = 1826 (22h,0Eh) min = 0; max = 127
LAYER_AENV_ATK2_LVL	id = 1827 (23h,0Eh) min = -100; max = 100 (%)

Parameter	ID
LAYER_AENV_DCY2_RATE	id = 1828 (24h,0Eh) min = 0; max = 127
LAYER_AENV_DCY2_LVL	id = 1829 (25h,0Eh) min = -100; max = 100 (%)
LAYER_AENV_RLS2_RATE	id = 1830 (26h,0Eh) min = 0; max = 127
LAYER_AENV_RLS2_LVL	id = 1831 (27h,0Eh) min = -100; max = 100 (%)
LAYER_FENV_REPEAT	id = 1833 (29h,0Eh) min = 0 = normal; max = 1 = repeat
LAYER_AUXENV_REPEAT	id = 1834 (2Ah,0Eh) min = 0 = normal; max = 1 = repeat

Preset Layer PatchCords Edit Parameters

Parameter	ID
(RESERVED)	id = 1920 (00h,0Fh)
LAYER_CORD0_SRC	id = 1921 (01h,0Fh) min = 0; max = 255
LAYER_CORD0_DST	id = 1922 (02h,0Fh) min = 0; max = 255
LAYER_CORD0_AMT	id = 1923 (03h,0Fh) min = -100; max = +100
LAYER_CORD1_SRC	id = 1924 (04h,0Fh) min = 0; max = 255
LAYER_CORD1_DST	id = 1925 (05h,0Fh) min = 0; max = 255
LAYER_CORD1_AMT	id = 1926 (06h,0Fh) min = -100; max = +100
LAYER_CORD2_SRC	id = 1927 (07h,0Fh) min = 0; max = 255
LAYER_CORD2_DST	id = 1928 (08h,0Fh) min = 0; max = 255
LAYER_CORD2_AMT	id = 1929 (09h,0Fh) min = -100; max = +100
LAYER_CORD3_SRC	id = 1930 (0Ah,0Fh) min = 0; max = 255
LAYER_CORD3_DST	id = 1931 (0Bh,0Fh) min = 0; max = 255
LAYER_CORD3_AMT	id = 1932 (0Ch,0Fh) min = -100; max = +100
LAYER_CORD4_SRC	id = 1933 (0Dh,0Fh) min = 0; max = 255
LAYER_CORD4_DST	id = 1934 (0Eh,0Fh) min = 0; max = 255
LAYER_CORD4_AMT	id = 1935 (0Fh,0Fh) min = -100; max = +100
LAYER_CORD5_SRC	id = 1936 (10h,0Fh) min = 0; max = 255
LAYER_CORD5_DST	id = 1937 (11h,0Fh) min = 0; max = 255
LAYER_CORD5_AMT	id = 1938 (12h,0Fh) min = -100; max = +100
LAYER_CORD6_SRC	id = 1939 (13h,0Fh) min = 0; max = 255

Parameter	ID
LAYER_CORD6_DST	id = 1940 (14h,0Fh) min = 0; max = 255
LAYER_CORD6_AMT	id = 1941 (15h,0Fh) min = -100; max = +100
LAYER_CORD7_SRC	id = 1942 (16h,0Fh) min = 0; max = 255
LAYER_CORD7_DST	id = 1943 (17h,0Fh) min = 0; max = 255
LAYER_CORD7_AMT	id = 1944 (18h,0Fh) min = -100; max = +100
LAYER_CORD8_SRC	id = 1945 (19h,0Fh) min = 0; max = 255
LAYER_CORD8_DST	id = 1946 (1Ah,0Fh) min = 0; max = 255
LAYER_CORD8_AMT	id = 1947 (1Bh,0Fh) min = -100; max = +100
LAYER_CORD9_SRC	id = 1948 (1Ch,0Fh) min = 0; max = 255
LAYER_CORD9_DST	id = 1949 (1Dh,0Fh) min = 0; max = 255
LAYER_CORD9_AMT	id = 1950 (1Eh,0Fh) min = -100; max = +100
LAYER_CORD10_SRC	id = 1951 (1Fh,0Fh) min = 0; max = 255
LAYER_CORD10_DST	id = 1952 (20h,0Fh) min = 0; max = 255
LAYER_CORD10_AMT	id = 1953 (21h,0Fh) min = -100; max = +100
LAYER_CORD11_SRC	id = 1954 (22h,0Fh) min = 0; max = 255
LAYER_CORD11_DST	id = 1955 (23h,0Fh) min = 0; max = 255
LAYER_CORD11_AMT	id = 1956 (24h,0Fh) min = -100; max = +100
LAYER_CORD12_SRC	id = 1957 (25h,0Fh) min = 0; max = 255
LAYER_CORD12_DST	id = 1958 (26h,0Fh) min = 0; max = 255
LAYER_CORD12_AMT	id = 1959 (27h,0Fh) min = -100; max = +100
LAYER_CORD13_SRC	id = 1960 (28h,0Fh) min = 0; max = 255
LAYER_CORD13_DST	id = 1961 (29h,0Fh) min = 0; max = 255
LAYER_CORD13_AMT	id =1962 (2Ah,0Fh) min = -100; max = +100
LAYER_CORD14_SRC	id = 1963 (2Bh,0Fh) min = 0; max = 255
LAYER_CORD14_DST	id = 1964 (2Ch,0Fh) min = 0; max = 255
LAYER_CORD14_AMT	id = 1965 (2Dh,0Fh) min = -100; max = +100
LAYER_CORD15_SRC	id = 1966 (2Eh,0Fh) min = 0; max = 255
LAYER_CORD15_DST	id = 1967 (2Fh,0Fh) min = 0; max = 255
LAYER_CORD15_AMT	id = 1968 (30h,0Fh) min = -100; max = +100
LAYER_CORD16_SRC	id = 1969 (31h,0Fh) min = 0; max = 255
LAYER_CORD16_DST	id = 1970 (32h,0Fh) min = 0; max = 255

Parameter	ID
LAYER_CORD16_AMT	id = 1971 (33h,0Fh) min = -100; max = +100
LAYER_CORD17_SRC	id = 1972 (34h,0Fh) min = 0; max = 255
LAYER_CORD17_DST	id = 1973 (35h,0Fh) min = 0; max = 255
LAYER_CORD17_AMT	id = 1974 (36h,0Fh) min = -100; max = +100
LAYER_CORD18_SRC	id = 1975 (37h,0Fh) min = 0; max = 255
LAYER_CORD18_DST	id = 1976 (38h,0Fh) min = 0; max = 255
LAYER_CORD18_AMT	id = 1977 (39h,0Fh) min = -100; max = +100
LAYER_CORD19_SRC	id = 1978 (3Ah,0Fh) min = 0; max = 255
LAYER_CORD19_DST	id = 1979 (3Bh,0Fh) min = 0; max = 255
LAYER_CORD19_AMT	id = 1980 (3Ch,0Fh) min = -100; max = +100
LAYER_CORD20_SRC	id = 1981 (3Dh,0Fh) min = 0; max = 255
LAYER_CORD20_DST	id = 1982 (3Eh,0Fh) min = 0; max = 255
LAYER_CORD20_AMT	id = 1983 (3Fh,0Fh) min = -100; max = +100
LAYER_CORD21_SRC	id = 1984 (40h,0Fh) min = 0; max = 255
LAYER_CORD21_DST	id = 1985 (41h,0Fh) min = 0; max = 255
LAYER_CORD21_AMT	id = 1986 (42h,0Fh) min = -100; max = +100
LAYER_CORD22_SRC	id = 1987 (43h,0Fh) min = 0; max = 255
LAYER_CORD22_DST	id = 1988 (44h,0Fh) min = 0; max = 255
LAYER_CORD22_AMT	id = 1989 (45h,0Fh) min = -100; max = +100
LAYER_CORD23_SRC	id = 1990 (46h,0Fh) min = 0; max = 255
LAYER_CORD23_DST	id = 1991 (47h,0Fh) min = 0; max = 255
LAYER_CORD23_AMT	id = 1992 (48h,0Fh) min = -100; max = +100

There are a maximum of 256 Source and Destination settings (including Off). They are grouped, and not numbered in a linear fashion. Additions may be included in the future.

Source	Destination
0 = Off	0 = Off
4 = XfdRnd (Crossfade Random)	8 = KeySust
8 = Key+ (Key 0...127)	47 = FinePtch
9 = Key~ (Key -64...+63)	48 = Pitch
10 = Vel+ (Velocity 0...127)	49 = Glide

Source	Destination
11 = Vel~ (Velocity -64...+63)	50 = ChrsAmt (Chorus Amount)
12 = Vel< (Velocity -127...0)	51 = 'ChrsITD (Chorus Position ITD)
13 = RlsVel (Release Velocity)	52 = 'SStart (Sample Start)
14 = Gate	53 = SLoop (Sample Loop)
16 = PitWl (Pitch Wheel)	54 = SRetrig (Sample Retrigger)
17 = ModWl (Mod Wheel)	56 = FilFreq (Filter Frequency)
18 = Press (Pressure)	57 = 'FilRes (Filter Resonance)
19 = Pedal (Pedal)	64 = AmpVol (Amplifier Volume)
20 = MidiA	65 = AmpPan (Amplifier Pan)
21 = MidiB	66 = AmpXfd (Amplifier Crossfade)
22 = FtSw1 (Foot Switch 1)	72 = VEnvRts (Volume Envelope Rates)
23 = FtSw2 (Foot Switch 2)	73 = VEnvAtk (Volume Envelope Attack)
24 = Ft1FF (Flip-Flop Foot Switch 1)	74 = VEnvDcy (Volume Envelope Decay)
25 = Ft2FF (Flip-Flop Foot Switch 2)	75 = VEnvRls (Volume Envelope Release)
26 = MidiVl (Midi Volume controller 7)	80 = FEnvRts (Filter Envelope Rates)
27 = MidPn (Midi Pan controller 10)	81 = FEnvAtk (Filter Envelope Attack)
32 = MidiC	82 = FEnvDcy (Filter Envelope Decay)
33 = MidiD	83 = FEnvRls (Filter Envelope Release)
34 = MidiE	86 = FEnvTrig (FilterEnvelopeTrigger/Retrigger)
35 = MidiF	88 = AEnvRts (Aux Envelope Rates)
36 = MidiG	89 = AEnvAtk (Aux Envelope Attack)
37 = MidiH	90 = AEnvDcy (Aux Envelope Decay)
38 = Thumb	91 = AEnvRls (Aux Envelope Release)
39 = ThmFF	94 = AEnvTrig (Aux Envelope Trigger/Retrigger)
40 = MidiI	96 = Lfo1Rt (Lfo 1 Rate)
41 = MidiJ	97 = Lfo1Trig (Lfo 1 Trigger/Retrigger)
42 = MidiK	104 = Lfo2Rt (Lfo 2 Rate)

Source	Destination
43 = MidiL	105 = Lfo2Trig (Lfo 2 Trigger/Retrigger)
48 = KeyGld (Key Glide)	106 = Lag0in
72 = VEnv+ (Volume Envelope 0...127)	108 = Lag1in
73 = VEnv~ (Volume Envelope -64...+63)	161 = Sum (Summing Amp)
74 = VEnv< (Volume Envelope -127...0)	162 = Switch
80 = FEnv+ (Filter Envelope 0...127)	163 = Abs (Absolute Value)
81 = FEnv~ (Filter Envelope -64...+63)	164 = Diode
82 = FEnv< (Filter Envelope -127...0)	165 = FlipFlop
88 = AEnv+ (Aux Envelope 0...127)	166 = Quantize
89 = AEnv~ (Aux Envelope -64...+63)	167 = Gain4X
90 = AEnv< (Aux Envelope -127...0)	168 = C00Amt (Cord Amount)
96 = Lfo1~	169 = C01Amt
97 = Lfo1+	170 = C02Amt
98 = White (White Noise)	171 = C03Amt
99 = Pink (Pink Noise)	172 = C04Amt
100 = kRand1 (kRandom 1)	173 = C05Amt
101 = kRand2 (kRandom 2)	174 = C06Amt
104 = Lfo2~	175 = C07Amt
105 = Lfo2+	176 = C08Amt
106 = Lag0in (summing amp out)	177 = C09Amt
107 = Lag0	178 = C10Amt
108 = Lag1in (summing amp out)	179 = C11Amt
109 = Lag1	180 = C12Amt
128 = PLagOut	181 = C13Amt
129 = PRampOut	182 = C14Amt
144 = CkDwhl (Clock Double Whole Note)	183 = C15Amt
145 = CkWhle (Clock Whole Note)	184 = C16Amt

Source	Destination
146 = CkHalf (Clock Half Note)	185 = C17Amt
147 = CkQtr (Clock Quarter Note)	186 = C18Amt
148 = Ck8th (Clock Eighth Note)	187 = C19Amt
149 = Ck16th (Clock Sixteenth Note)	188 = C20Amt
150 = ClkOctal (Clock Octal Whole Note)	189 = C21Amt
151 = ClkQuad (Clock Quad Whole Note)	190 = C22Amt
160 = DC (DC Offset)	191 = C23Amt
161 = Sum (Summing Amp)	
162 = Switch	
163 = Abs (Absolute Value)	
164 = Diode	
165 = FlipFlop	
166 = Quantiz (Quantizer)	
167 = Gain4X	

The PatchCord Sources appear in a slightly different order in the UI:

Sources as They Appear in the User Interface (Listed from left to right, top to bottom.)

Off	Key+	Key+ -	Vel+
Vel+ -	Vel<	RlsVel	Gate
PitchWhl	Pressure	ModWhl	Pedal
MidiVol	MidiPan	MidiA	MidiB
MidiC	MidiD	MidiE	MidiF
MidiG	MidiH	MidiI	MidiJ
MidiK	MidiL	PLagOut	PRampOut
FootSw1	Foot1FF	FootSw2	Foot2FF
FootSw3	Foot3FF	KeyGlide	VolEnv+
VolEnv+ -	VolEnv<	FilEnv+	FilEnv+-
FilEnv<	AuxEnv+	AuxEnv+-	AuxEnv<
Lfo1+	Lfo1+ -	Lfo2+	Lfo2+ -
White	Pink	XfdRand	KeyRand1
KeyRand2	Lag0sum	Lag0	Lag1sum
Lag1	ClkOctal	ClkQuad	ClkDwhl
ClkWhole	ClkHalf	ClkQtr	Clk8th

Sources as They Appear in the User Interface (Listed from left to right, top to bottom.)

Clk16th	DC	Sum	Switch
Abs	Diode	FlipFlop	Quantize
Gain4X			

Glide Rate (portamento)

Here are the function and tables for the displayed values:

Parameter	ID

LAYER_GLIDE_RATE	LOCAL Void cnv_glide_rate (Long val, Char *buf)
	int msec = (envunits1[val] * 1000 + envunits2[val] *10) / 5;
	sprintf(buf, "%2d.%03dsec/oct", msec/1000, msec % 1000);
	const unsigned char envunits1[] =
	{
	0, 0, 0, 0, 0, 0, 0, 0,
	0, 0, 0, 0, 0, 0, 0, 0,
	0, 0, 0, 0, 0, 0, 0, 0,
	0, 0, 0, 0, 0, 0, 0, 0,
	0, 0, 0, 0, 0, 0, 0, 0,
	0, 0, 0, 0, 0, 0, 0, 0,
	1, 1, 1, 1, 1, 1, 1, 1,
	1, 1, 1, 1, 2, 2, 2, 2,
	2, 2, 2, 3, 3, 3, 3, 3,
	4, 4, 4, 4, 5, 5, 5, 5,
	6, 6, 7, 7, 7, 8, 8, 9,
	9, 10, 11, 11, 12, 13, 13, 14,
	15, 16, 17, 18, 19, 20, 22, 23,
	24, 26, 28, 30, 32, 34, 36, 38,
	41, 44, 47, 51, 55, 59, 64, 70,
	76, 83, 91, 100, 112, 125, 142, 163,
	};

Parameter	ID

LAYER_GLIDE_RATE *Continued*	const unsigned char envunits2[] =
	{
	00, 01, 02, 03, 04, 05, 06, 07,
	8, 9, 10, 11, 12, 13, 14, 15,
	16, 17, 18, 19, 20, 21, 22, 23,
	25, 26, 28, 29, 32, 34, 36, 38,
	41, 43, 46, 49, 52, 55, 58, 62,
	65, 70, 74, 79, 83, 88, 93, 98,
	04, 10, 17, 24, 31, 39, 47, 56,
	65, 74, 84, 95, 06, 18, 31, 44,
	59, 73, 89, 06, 23, 42, 62, 82,
	04, 28, 52, 78, 05, 34, 64, 97,
	32, 67, 06, 46, 90, 35, 83, 34,
	87, 45, 06, 70, 38, 11, 88, 70,
	56, 49, 48, 53, 65, 85, 13, 50,
	97, 54, 24, 06, 02, 15, 44, 93,
	64, 60, 84, 41, 34, 70, 56, 03,
	22, 28, 40, 87, 9, 65, 36, 69,
	};
	0.000sec/oct to 0.046sec/oct by 2's
	0.050 0.052 0.056 0.058 0.064
	0.068 0.072 0.076 0.082 0.086
	0.092 0.098 0.104 0.110 0.116
	0.124 0.130 0.140 0.148 0.158
	0.166 0.176 0.724 0.764 0.808
	0.856 0.904 0.956 1.010 1.068
	1.128 1.194 1.264 1.334 0.186
	0.196 0.208 0.220 0.234 0.248
	0.262 0.278 0.294 0.312 0.330
	0.348 0.368 0.390 0.412 0.436
	0.462 0.488 0.518 0.546 0.578
	0.612 0.646 0.684 1.412 1.492
	1.580 1.670 1.766 1.868 1.974
	2.090 2.212 2.340 2.476 2.622
	2.776 2.940 3.112 3.298 3.496
	3.706 3.930 4.170 4.426 4.700
	4.994 5.308 5.648 6.012 6.404
	6.830 7.288 7.786 8.328 8.920
	9.568 10.282 11.068 11.940 12.912
	14.006 15.244 16.656 18.280 20.174
	22.148 25.130 28.472 32.738

Effects Algorithms:

Preset Effects A **Master Effects A** (44 algorithms)	**Preset Effects B** **Master Effects B** (32 algorithms)
Room 1-3	Chorus 1-5
Hall 1-2	Doubling
Plate	Slapback
Delay	Flange 1-7
Panning Delay	Big Chorus
Multitap 1	Symphonic
Multitap Pan	Ensemble
3 Tap	Delay
3 Tap Pan	Delay Stereo
Soft Room	Delay Stereo 2
Warm Room	Panning Delay
Perfect Room	Delay Chorus
Tiled Room	Pan Dly Chrs 1-2
Hard Plate	DualTap 1/3
Warm Hall	DualTap 1/4
Spacious Hall	Vibrato
Bright Hall	Distortion 1-2
Brt Hall Pan	DistortedFlange
Bright Plate	DistortedChorus
BBall Court	DistortedDouble
Gymnasium	
Cavern	
Concert 9	
Concert 10 Pan	
Reverse Gate	
Gate 2	
Gate Pan	
Concert 11	
MediumConcert	
Large Concert	
Lg Concert Pan	
Canyon	
DelayVerb 1-3	
DelayVerb4Pan	
DelayVerb5Pan	
DelayVerb 6-9	

Filter Types

id = 1537 (01h,0Ch) min = 0; max = 255 (scattered like PatchCords)

Filters (1 through 26			**Filters (27 through 51)**		
"Classic	4 LPF"	= (00h,00h)	"DeadRinger	12 REZ"	= (0Bh,01h)
"Smooth	2 LPF"	= (01h,00h)	"TB-OrNot-TB	12 EQ+"	= (0Ch,01h)
"Steeper	6 LPF"	= (02h,00h)	"Ooh-To-Eee	12 VOW"	= (0Dh,01h)
"Shallow	2 HPF"	= (08h,00h)	"BolandBass	12 EQ+"	= (0Eh,01h)
"Deeper	4 HPF"	= (09h,00h)	"MultiQVox	12 VOW"	= (0Fh,01h)
"Band-pass1	2 BPF"	= (10h,00h)	"TalkingHedz	12 VOW"	= (10h,01h)
"Band-pass2	4BPF"	= (11h,00h)	"ZoomPeaks	12 REZ"	= (11h,01h)
"ContraBand	6 BPF"	= (12h,00h)	"DJAlkaline	12 EQ+"	= (12h,01h)
"Swept1oct	6 EQ+"	= (20h,00h)	"BassTracer	12 EQ+"	= (13h,01h)
"Swept2>1oct	6 EQ+"	= (21h,00h)	"RogueHertz	12 EQ+"	= (14h,01h)
"Swept3>1oct	6 EQ+"	= (22h,00h)	"RazorBlades	12 EQ-"	= (15h,01h)
"PhazeShift1	6 PHA"	= (40h,00h)	"RadioCraze	12 EQ-"	= (16h,01h)
"PhazeShift2	6 PHA"	= (41h,00h)	"Eeh-To-Aah	12 VOW"	= (17h,01h)
"BlissBatz	6 PHA"	= (42h,00h)	"UbuOrator	12 VOW"	= (18h,01h)
"FlangerLite	6 FLG"	= (48h,00h)	"DeepBouche	12 VOW"	= (19h,01h)
"Aah-Ay-Eeh	6 VOW"	= (50h,00h)	"FreakShifta	12 PHA"	= (1Ah,01h)
"Ooh-To-Aah	6 VOW"	= (51h,00h)	"CruzPusher	12 PHA"	= (1Bh,01h)
"Off -- ---" (turns filter off)		= (7Fh,00h)	"AngelzHairz	12 FLG"	= (1Ch,01h)
"AceOfBass	12 EQ+"	= (03h,01h)	"DreamWeava	12 FLG"	= (1Dh,01h)
"MegaSweepz	12 LPF"	= (04h,01h)	"AcidRavage	12 REZ"	= (1Eh,01h)
"EarlyRizer	12 LPF"	= (05h,01h)	"BassOMatic	12 REZ"	= (1Fh,01h)
"Millennium	12 LPF"	= (06h,01h)	"LucifersQ	12 REZ"	= (20h,01h)
"MeatyGizmo	12 REZ"	= (07h,01h)	"ToothComb	12 REZ"	= (21h,01h)
"KlubKlassi	12 LPF"	= (08h,01h)	"EarBender	12 WAH"	= (22h,01h)
"BassBox-303	12 LPF"	= (09h,01h)	KlangKling	12 SFX"	= (23h,01h)
"FuzziFace	12 DST"	= (0Ah,01h)			

Filter Parameters

Parameter	ID
LAYER_FILT_FREQ	id = 1538 (02h,0Bh) min = 0; max = 255
LAYER_FILT_Q	id = 1539 (03h,0Bh) min = 0; max = 127 Q: 0 to 127

"Classic 4 LPF" = (00h,00h) "Smooth 2 LPF" = (01h,00h) "Steeper 6 LPF" = (02h,00h)	Frequency: 57Hz to 20000Hz *(see Filter Table 1)*
"Shallow 2 HPF" = (08h,00h) "Deeper 4 HPF" = (09h,00h)	Frequency: 69Hz to 18000Hz *(see Filter Table 2)*
"Band-pass1 2 BPF" = (10h,00h) "Band-pass2 4 BPF" = (11h,00h) "ContraBand 6 BPF" = (12h,00h)	Frequency: 57Hz to 10000Hz *(see Filter Table 3)*
"Swept1oct 6 EQ+" = (20h,00h) "Swept2>1oct6 EQ+" = (21h,00h) "Swept3>1oct 6 EQ+" = (22h,00h)	Frequency: 83Hz to 10000Hz *(see Filter Table 3)* Gain: -24.0 dB to +23.6 dB *(see Filter Table 4)*
"PhazeShift1 6 PHA" = (40h,00h) "PhazeShift2 6 PHA" = (41h,00h) "BlissBatz 6 PHA" = (42h,00h) "FlangerLite 6 FLG" = (48h,00h)	
"Aah-Ay-Eeh 6 VOW" = (50h,00h) "Ooh-To-Aah6 VOW" = (51h,00h)	Morph: 0 to 255 Body Size: 0 to 127

All Others (12th order)

Filter Tables

Filter Table 1:	sprintf (value, "%dHz", fil_freq (input, 20000, 1002)); /* input=0..255 */
Filter Table 2:	sprintf (value, "%dHz", fil_freq (input, 18000, 1003)); /* input=0..255 */
Filter Table 3:	sprintf (value, "%dHz", fil_freq (input, 10000, 1006)); /*1009; input=0..255 */
Filter Table 4:	cnv_morph_gain (input, value); /* input=0..127 */

FILTER Hz and dB DISPLAY TABLE CALCULATIONS:

```
/*
 *
 * example fil_freq (100, 20000, 1002)
 * in=0..255
 */
int fil_freq (int input, int maxfreq, int mul)
{
    int f = maxfreq;
    input = 255 - input;
    while (input-- > 0)
      f *= mul, f /= 1024;
    return f;
}

/* in=0..127 out=-24..+24    (32in ==> 12out) */
void cnv_morph_gain (int input, char *buf)
{
    int gain10x = -240 + ((input * 120) / 32);
    int gain_i  = gain10x / 10;
    int gain_f  = abs (gain10x % 10);
    sprintf (buf, "%s%d.%1ddB",
             gain10x >= 0 ? "+" : "-",
             abs (gain_i),
             gain_f);
}
```

The Filters appear in a different order in the UI, as follows:

Filters as They Appear in the User Interface
(Listed from left to right, top to bottom.)

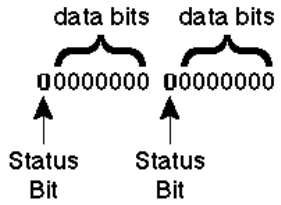
"Off	-- ---"	= (7Fh,00h)			
"Classic	4 LPF"	= (00h,00h)	"Smooth	2 LPF"	= (01h,00h)
"Steeper	6 LPF"	= (02h,00h)	"MegaSweepz	12 LPF"	= (04h,01h)
"EarlyRizer	12 LPF"	= (05h,01h)	"Millennium	12 LPF"	= (06h,01h)
"KlubKlassik	12 LPF"	= (08h,01h)	"BassBox-303	12 LPF"	= (09h,01h)
"Shallow	2 HPF"	= (08h,00h)	"Deeper	4 HPF"	= (09h,00h)
"Band-pass1	2 BPF"	= (10h,00h)	"Band-pass2	4 BPF"	= (11h,00h)
"ContraBand	6 BPF"	= (12h,00h)	"Swept1oct	6 EQ+"	= (20h,00h)
"Swept2>1oct	6 EQ+"	= (21h,00h)	"Swept3>1oct	6 EQ+"	= (22h,00h)
"DJAlkaline	12 EQ+"	= (12h,01h)	"AceOfBass	12 EQ+"	= (03h,01h)
"TB-OrNot-T	12 EQ+"	= (0Ch,01h)	"BolandBass	12 EQ+"	= (0Eh,01h)
"BassTracer	12 EQ+"	= (13h,01h)	"RogueHertz	12 EQ+"	= (14h,01h)
"RazorBlades	12 EQ-"	= (15h,01h)	"RadioCraze	12 EQ-"	= (16h,01h)
"Aah-Ay-Eeh	6 VOW"	= (50h,00h)	"Ooh-To-Aah	6 VOW"	= (51h,00h)
"MultiQVox	12 VOW"	= (0Fh,01h)	"Ooh-To-Eee	12 VOW"	= (0Dh,01h)
"TalkingHedz	12 VOW"	= (10h,01h)	"Eeh-To-Aah	12 VOW"	= (17h,01h)
"UbuOrator	12 VOW"	= (18h,01h)	"DeepBouche	12 VOW"	= (19h,01h)
"PhazeShift1	6 PHA"	= (40h,00h)	"PhazeShift2	6 PHA"	= (41h,00h)
"FreakShifta	12 PHA"	= (1Ah,01h)	"CruzPusher	12 PHA"	= (1Bh,01h)
"FlangerLite	6 FLG"	= (48h,00h)	"AngelzHairz	12 FLG"	= (1Ch,01h)
"DreamWeava	12 FLG"	= (1Dh,01h)	"MeatyGizmo	12 REZ"	= (07h,01h)
"DeadRinger	12 REZ"	= (0Bh,01h)	"ZoomPeaks	12 REZ"	= (11h,01h)
"AcidRavage	12 REZ"	= (1Eh,01h)	"BassOMatic	12 REZ"	= (1Fh,01h)
"LucifersQ	12 REZ"	= (20h,01h)	"ToothComb	12 REZ"	= (21h,01h)
"EarBender	12 WAH"	= (22h,01h)	"FuzziFace	12 DST"	= (0Ah,01h)
"BlissBatz	6 PHA"	= (42h,00h)	"KlangKling	12 SFX"	= (23h,01h)

14-bit Signed 2's Complement Numbers

If the data value is negative, you must first take the 2's complement of the number: In the case of a 14-bit number this is equivalent to adding 16384 to the original negative value.

To fit the 7-bit MIDI protocol, numbers must be “nibble-ized”.

Status Bit MUST be “0” in MIDI data bytes.



To get the 14-bit nibble-ized value (of a positive value or a 2's complemented negative value):

msb = value DIV 128 (divide and ignore the remainder)

lsb = value MOD 128 (divide and use only the remainder)

To go the other way (convert 14 bit signed 2's complement to a signed real number):

raw Value = (msb*128) + lsb (gives you the unsigned raw value) if raw Value ≥ 8192 (8192 = 2^13)

then signed Value = raw value - 16384 (16384 = 2^14)

Example: To find the “nibble-ized” Hex value of -127:

1. -127 + 16384 = 16257
2. 16257 ÷ 128 = 127 r1
3. 127 in Hex = 7F = msb
4. 1 in Hex = 01 = lsb
5. Parameter value would be transmitted as 01 7F

Example: To find the “nibble-ized” Hex value of parameter number 257:

1. 257 ÷ 128 = 2 r1
2. 2 in Hex = 02 = msb
3. 1 in Hex = 01 = lsb
4. Parameter number would be transmitted as 01 02

Notes

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