

Remote Preset Editing via MIDI SysEx
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SPECIFICATION:

Focus: What's it all about.
General Info: Device Inquiry messages
Dumps: Sample Dump Standard like protocol
Format: The technical specifics.
Parameters: A List of ID's and their meanings.
Commands: A List of Commands and Examples.

Focus:

The main focus is to provide an easy to use, easy to implement, elegant protocol for the specific function of editing E4 presets from a remote system. Typically this would be a computer, with the potential for a large, colorful, graphical interface, superior to the standard E4 front panel display.

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 Voice or Group of Voices to edit.
- the ability to send a new individual parameter value to the E4.
- the ability to request from the E4 the value of an individual parameter.
- the ability to send a Dump of parameters to the E4.
- the ability to request from the E4 a Dump of parameters.
- the ability to Name a Preset.
- the ability to request the Name of a Preset/Sample.

- the ability to Catalogue the Folders/Banks/Presets/Samples of a disk.

General Information:

The E4 line of products support the Non-Real Time System Exclusive General Information Device Inquiry messages (sub-ID#1 = 06).

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

{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}

{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 = 01h,04h (Device family code, 14 bits, LSB first)
dd dd = Device family member code, 14 bits, LSB first
00h,05h = E4
01h,05h = E64
02h,05h = E4k
03h,05h = E64FX
04h,05h = E4XT
05h,05h = E4X
06h,05h = E6400
07h,05h = E4XT ULTRA
08h,05h = E6400 ULTRA

ss ss ss ss = Software revision level, 4 ASCII characters.
example: 4 . 0 0 = version 4.00

F7h = EOX

E4 Specific 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
21h = E4 ID
xxh = 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/Sample 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.

<Packet> = <2 Byte ID>, <2 Byte Data>.

The main packet has 2 parts; An ID portion and the Data portion. This is used for editing a parameter. The ID chooses the parameter, and the Data is the new value.

Every Parameter has a unique ID. This way, parameters can be individually manipulated. However, these Parameter ID's operate on a specific Voice/Group/Sample, as well as Global parameters.

The ID Byte is the Parameter ID, a 14-bit unsigned number split into 2 MIDI bytes, and sent LSB first.

The Data is a 14 bit signed or unsigned number split into 2 7-bit MIDI bytes, and sent LSB first.

<Packet> = <2 Byte ID>

The request packet requires only the Parameter ID, or Preset/Sample number. Typically used in a request for data from a particular Parameter.

<Packet> = <Preset/Sample #>, <ASCII string>

The Name packet contains the Preset or Sample number, followed by the name as a string of ASCII characters.

<Packet> = <Preset #>

Selecting another Preset.

<Checksum> = 1 Byte XOR(1's compliment) of the sum of the DATA bytes in the message.

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

<EOX> = F7h end of SYSEX.

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 and Sample Number Ranges may vary if Preset Flash, Sample ROM or Sample Flash are present. Preset and Sample information for ROM/Flash locations may be requested, but cannot be changed.

GLOBAL:

(LSB,MSB)

E4_PRESET_TRANSPOSE,	id = 0 (00h,00h)	min = -24;	max = +24	(semitones)
E4_PRESET_VOLUME,	id = 1 (01h,00h)	min = -96;	max = +10	(dB)
E4_PRESET_CTRL_A,	id = 2 (02h,00h)	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_B,	id = 3 (03h,00h)	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_C,	id = 4 (04h,00h)	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_D,	id = 5 (05h,00h)	min = -1;	max = 127	(-1 = off)
E4_PRESET_FX_A_ALGORITHM,	id = 6 (06h,00h)	min = 0;	max = 44	(see below)
E4_PRESET_FX_A_PARM_0,	id = 7 (07h,00h)	min = 0;	max = 90	
E4_PRESET_FX_A_PARM_1,	id = 8 (08h,00h)	min = 0;	max = 127	
E4_PRESET_FX_A_PARM_2,	id = 9 (09h,00h)	min = 0;	max = 127	
E4_PRESET_FX_A_AMT_0,	id = 10 (0Ah,00h)	min = 0;	max = 100	
E4_PRESET_FX_A_AMT_1,	id = 11 (0Bh,00h)	min = 0;	max = 100	
E4_PRESET_FX_A_AMT_2,	id = 12 (0Ch,00h)	min = 0;	max = 100	
E4_PRESET_FX_A_AMT_3,	id = 13 (0Dh,00h)	min = 0;	max = 100	
E4_PRESET_FX_B_ALGORITHM,	id = 14 (0Eh,00h)	min = 0;	max = 27	(see below)
E4_PRESET_FX_B_PARM_0,	id = 15 (0Fh,00h)	min = 0;	max = 127	
E4_PRESET_FX_B_PARM_1,	id = 16 (10h,00h)	min = 0;	max = 127	
E4_PRESET_FX_B_PARM_2,	id = 17 (11h,00h)	min = 0;	max = 127	
E4_PRESET_FX_B_AMT_0,	id = 18 (12h,00h)	min = 0;	max = 100	
E4_PRESET_FX_B_AMT_1,	id = 19 (13h,00h)	min = 0;	max = 100	
E4_PRESET_FX_B_AMT_2,	id = 20 (14h,00h)	min = 0;	max = 100	
E4_PRESET_FX_B_AMT_3,	id = 21 (15h,00h)	min = 0;	max = 100	

*** id 22 not used ***

LINKS:

E4_LINK_PRESET,	id = 23 (17h,00h)	min = 0;	max = 999	(1255)
E4_LINK_VOLUME,	id = 24 (18h,00h)	min = -96;	max = +10	
E4_LINK_PAN,	id = 25 (19h,00h)	min = -64;	max = +63	
E4_LINK_TRANSPOSE,	id = 26 (1Ah,00h)	min = -24;	max = +24	
E4_LINK_FINE_TUNE,	id = 27 (1Bh,00h)	min = -64;	max = +64	
E4_LINK_KEY_LOW,	id = 28 (1Ch,00h)	min = 0;	max = 127	(C-2 -> G8)
E4_LINK_KEY_LOWFADE,	id = 29 (1Dh,00h)	min = 0;	max = 127	
E4_LINK_KEY_HIGH,	id = 30 (1Eh,00h)	min = 0;	max = 127	(C-2 -> G8)
E4_LINK_KEY_HIGHFADE,	id = 31 (1Fh,00h)	min = 0;	max = 127	

E4_LINK_VEL_LOW,	id = 32 (20h,00h)	min = 0; max = 127
E4_LINK_VEL_LOWFADE,	id = 33 (21h,00h)	min = 0; max = 127
E4_LINK_VEL_HIGH,	id = 34 (22h,00h)	min = 0; max = 127
E4_LINK_VEL_HIGHFADE,	id = 35 (23h,00h)	min = 0; max = 127

*** id 36 not used ***

VOICES:

E4_GEN_GROUP_NUM,	id = 37 (25h,00h)	min = 1; max = 32
E4_GEN_SAMPLE,	id = 38 (26h,00h)	min = 0; max = 999 (2999)
E4_GEN_VOLUME,	id = 39 (27h,00h)	min = -96; max = +10
E4_GEN_PAN,	id = 40 (28h,00h)	min = -64; max = +63
E4_GEN_CTUNE,	id = 41 (29h,00h)	min = -72; max = +24 (Voice only)
E4_GEN_FTUNE,	id = 42 (2Ah,00h)	min = -64; max = +64
E4_GEN_XPOSE,	id = 43 (2Bh,00h)	min = -24; max = +24 (Voice only)
E4_GEN_ORIG_KEY,	id = 44 (2Ch,00h)	min = 0; max = 127 (60 = C3, Sample only)
E4_GEN_KEY_LOW,	id = 45 (2Dh,00h)	min = 0; max = 127 (C-2 -> G8)
E4_GEN_KEY_LOWFADE,	id = 46 (2Eh,00h)	min = 0; max = 127
E4_GEN_KEY_HIGH,	id = 47 (2Fh,00h)	min = 0; max = 127 (C-2 -> G8)
E4_GEN_KEY_HIGHFADE,	id = 48 (30h,00h)	min = 0; max = 127
E4_GEN_VEL_LOW,	id = 49 (31h,00h)	min = 0; max = 127
E4_GEN_VEL_LOWFADE,	id = 50 (32h,00h)	min = 0; max = 127
E4_GEN_VEL_HIGH,	id = 51 (33h,00h)	min = 0; max = 127
E4_GEN_VEL_HIGHFADE,	id = 52 (34h,00h)	min = 0; max = 127
E4_GEN_RT_LOW,	id = 53 (35h,00h)	min = 0; max = 127 (Voice only)
E4_GEN_RT_LOWFADE,	id = 54 (36h,00h)	min = 0; max = 127 (Voice only)
E4_GEN_RT_HIGH,	id = 55 (37h,00h)	min = 0; max = 127 (Voice only)
E4_GEN_RT_HIGHFADE,	id = 56 (38h,00h)	min = 0; max = 127 (Voice only)

Tuning:

E4_VOICE_NON_TRANSPOSE,	id = 57 (39h,00h)	min = 0; max = 1
0 = off		
1 = on		
E4_VOICE_CHORUS_AMOUNT,	id = 58 (3Ah,00h)	min = 0; max = 100 (%)
E4_VOICE_CHORUS_WIDTH,	id = 59 (3Bh,00h)	min = -128; max = 0

Displayed Value:

```
int pct = ((val + 128) * 100) / 128;
sprintf(buf, "%3d%", pct);
```

E4_VOICE_CHORUS_X,	id = 60 (3Ch,00h)	min = -32; max = +32 (ms)
--------------------	-------------------	---------------------------

Chorus initial ITD(Inter-Aural Time Delay):

Adjusts the delay of the left and right sounds.
Positive numbers delay the left channel more.
Negative numbers delay the right channel more.

```

(+ or -)      (+ or -)
0.000ms      = 0
0.045ms      = 1
0.090ms      = 2
0.136ms      = 3
0.181ms      = 4
0.226ms      = 5
0.272ms      = 6
0.317ms      = 7
0.362ms      = 8
0.408ms      = 9
0.453ms      = 10
0.498ms      = 11
0.544ms      = 12
0.589ms      = 13
0.634ms      = 14
0.680ms      = 15
0.725ms      = 16
0.770ms      = 17
0.816ms      = 18
0.861ms      = 19
0.907ms      = 20
0.952ms      = 21
0.997ms      = 22
1.043ms      = 23
1.088ms      = 24
1.133ms      = 25
1.179ms      = 26
1.224ms      = 27
1.269ms      = 28
1.315ms      = 29
1.360ms      = 30
1.405ms      = 31
1.451ms      = 32

```

```

E4_VOICE_DELAY,          id = 61 (3Dh,00h)      min = 0;  max = 10000  (ms)
E4_VOICE_START_OFFSET,  id = 62 (3Eh,00h)      min = 0;  max =    127

E4_VOICE_GLIDE_RATE,    id = 63 (3Fh,00h)      min = 0;  max = 127  (sec/oct)
  (Portamento)

```

Here are the function and tables for the displayed values:

This is for E4_VOICE_GLIDE_RATE only.

```

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, 0, 0, 0, 0, 0, 0,
1, 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,
};
```

```
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
0.186
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
0.724
0.764
0.808
0.856
0.904
0.956
1.010
1.068
1.128
1.194
1.264
1.334
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

E4_VOICE_GLIDE_CURVE, id = 64 (40h,00h) min = 0; max = 8
linear -> exponential; 0 = linear, 8 = most exponential curve

E4_VOICE_SOLO, id = 65 (41h,00h) min = 0; max = 8
"Monophonic" mode.

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

E4_VOICE_ASSIGN_GROUP, id = 66 (42h,00h) min = 0; max = 23

0 = Poly All
1 = Poly16 A
2 = Poly16 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

E4_VOICE_LATCHMODE, id = 67 (43h,00h) min = 0; max = 1

0 = off
1 = on

Amplifier:

E4_VOICE_VOLENV_DEPTH, id = 68 (44h,00h) min = 0; max = 16
Amp Env Depth: -96dB to -48dB by 3's

E4_VOICE_SUBMIX, id = 69 (45h,00h) min = -1; max = 3

Submix: -1 = voice
0 = main
1 = sub1
2 = sub2
3 = sub3
(if has Octopus card)
4 = sub4
5 = sub5
6 = sub6
7 = sub7

E4_VOICE_VENV_SEG0_RATE, id = 70 (46h,00h) min = 0; max = 127 (Atk1 Rate)
E4_VOICE_VENV_SEG0_TGTLVL, id = 71 (47h,00h) min = 0; max = 100 (Atk1 Level%)
E4_VOICE_VENV_SEG1_RATE, id = 72 (48h,00h) min = 0; max = 127 (Dcy1 Rate)
E4_VOICE_VENV_SEG1_TGTLVL, id = 73 (49h,00h) min = 0; max = 100 (Dcy1 Level%)
E4_VOICE_VENV_SEG2_RATE, id = 74 (4Ah,00h) min = 0; max = 127 (Rls1 Rate)
E4_VOICE_VENV_SEG2_TGTLVL, id = 75 (4Bh,00h) min = 0; max = 100 (Rls1 Level%)
E4_VOICE_VENV_SEG3_RATE, id = 76 (4Ch,00h) min = 0; max = 127 (Atk2 Rate)
E4_VOICE_VENV_SEG3_TGTLVL, id = 77 (4Dh,00h) min = 0; max = 100 (Atk2 Level%)
E4_VOICE_VENV_SEG4_RATE, id = 78 (4Eh,00h) min = 0; max = 127 (Dcy2 Rate)
E4_VOICE_VENV_SEG4_TGTLVL, id = 79 (4Fh,00h) min = 0; max = 100 (Dcy2 Level%)
E4_VOICE_VENV_SEG5_RATE, id = 80 (50h,00h) min = 0; max = 127 (Rls2 Rate)

E4_VOICE_VENV_SEG5_TGTLVL, id = 81 (51h,00h) min = 0; max = 100 (Rls2 Level%)

/*
* Filter Parameters: See Filter section below for filter types.
*/

E4_VOICE_FTYPE, id = 82 (52h,00h) min = 0; max = variable
E4_VOICE_FMORPH, id = 83 (53h,00h) min = 0; max = 255
E4_VOICE_FKEY_XFORM, id = 84 (54h,00h) min = 0; max = 127

E4_VOICE_FILT_GEN_PARM1, id = 85 (55h,00h) min = 0; max = 255 (reserved for future expansion)
E4_VOICE_FILT_GEN_PARM2, id = 86 (56h,00h) min = 0; max = 255 (reserved for future expansion)
E4_VOICE_FILT_GEN_PARM3, id = 87 (57h,00h) min = 0; max = 255
E4_VOICE_FILT_GEN_PARM4, id = 88 (58h,00h) min = 0; max = 255
E4_VOICE_FILT_GEN_PARM5, id = 89 (59h,00h) min = 0; max = 255
E4_VOICE_FILT_GEN_PARM6, id = 90 (5Ah,00h) min = 0; max = 255
E4_VOICE_FILT_GEN_PARM7, id = 91 (5Bh,00h) min = 0; max = 255
E4_VOICE_FILT_GEN_PARM8, id = 92 (5Ch,00h) min = 0; max = 255

E4_VOICE_FENV_SEG0_RATE, id = 93 (5Dh,00h) min = 0; max = 127 (Atk1 Rate)
E4_VOICE_FENV_SEG0_TGTLVL, id = 94 (5Eh,00h) min = 0; max = 100 (Atk1 Level%)
E4_VOICE_FENV_SEG1_RATE, id = 95 (5Fh,00h) min = 0; max = 127 (Dcy1 Rate)
E4_VOICE_FENV_SEG1_TGTLVL, id = 96 (60h,00h) min = 0; max = 100 (Dcy1 Level%)
E4_VOICE_FENV_SEG2_RATE, id = 97 (61h,00h) min = 0; max = 127 (Rls1 Rate)
E4_VOICE_FENV_SEG2_TGTLVL, id = 98 (62h,00h) min = 0; max = 100 (Rls1 Level%)
E4_VOICE_FENV_SEG3_RATE, id = 99 (63h,00h) min = 0; max = 127 (Atk2 Rate)
E4_VOICE_FENV_SEG3_TGTLVL, id = 100 (64h,00h) min = 0; max = 100 (Atk2 Level%)
E4_VOICE_FENV_SEG4_RATE, id = 101 (65h,00h) min = 0; max = 127 (Dcy2 Rate)
E4_VOICE_FENV_SEG4_TGTLVL, id = 102 (66h,00h) min = 0; max = 100 (Dcy2 Level%)
E4_VOICE_FENV_SEG5_RATE, id = 103 (67h,00h) min = 0; max = 127 (Rls2 Rate)
E4_VOICE_FENV_SEG5_TGTLVL, id = 104 (68h,00h) min = 0; max = 100 (Rls2 Level%)

E4_VOICE_LFO_RATE, id = 105 (69h,00h) min = 0; max = 127

Conversions for displayed values:

```
Void cnv_lfo_rate(Long val, Char *buf)
{
    sprintf (buf, "%2d.%02d", lfounits1[val], lfounits2[val]);
}
```

```
const unsigned char lfounits1[] =
{
    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, 1, 1, 1, 1, 1, 1,
```

```

2, 2, 2, 2, 2, 2, 2, 2,
2, 2, 2, 2, 2, 3, 3, 3,
3, 3, 3, 3, 3, 3, 3, 4,
4, 4, 4, 4, 4, 4, 4, 4,
5, 5, 5, 5, 5, 5, 5, 6,
6, 6, 6, 6, 6, 7, 7, 7,
7, 7, 7, 8, 8, 8, 8, 8,
9, 9, 9, 9, 10, 10, 10, 10,
10, 11, 11, 11, 11, 12, 12, 12,
13, 13, 13, 13, 14, 14, 14, 15,
15, 15, 16, 16, 17, 17, 17, 18,
};

```

```

const unsigned char      lfounits2[] =
{
8, 11, 15, 18, 21, 25, 28, 32,
35, 39, 42, 46, 50, 54, 58, 63,
67, 71, 76, 80, 85, 90, 94, 99,
04, 10, 15, 20, 25, 31, 37, 42,
48, 54, 60, 67, 73, 79, 86, 93,
00, 07, 14, 21, 29, 36, 44, 52,
60, 68, 77, 85, 94, 03, 12, 21,
31, 40, 50, 60, 70, 81, 91, 02,
13, 25, 36, 48, 60, 72, 84, 97,
10, 23, 37, 51, 65, 79, 94, 8,
24, 39, 55, 71, 88, 04, 21, 39,
57, 75, 93, 12, 32, 51, 71, 92,
13, 34, 56, 78, 00, 23, 47, 71,
95, 20, 46, 71, 98, 25, 52, 80,
9, 38, 68, 99, 30, 61, 93, 26,
60, 94, 29, 65, 01, 38, 76, 14,
};

```

E4_VOICE_LFO_SHAPE, id = 106 (6Ah,00h) min = 0; max = 7

- Shape: 0 = triangle
- 1 = sine
- 2 = sawtooth
- 3 = square
- 4 = 0,1,0,-1
- 5 = C,E,G,C
- 6 = C,D,F,G
- 7 = 8st Pent

E4_VOICE_LFO_DELAY, id = 107 (6Bh,00h) min = 0; max = 127
E4_VOICE_LFO_VAR, id = 108 (6Ch,00h) min = 0; max = 100 (%)
E4_VOICE_LFO_SYNC, id = 109 (6Dh,00h) min = 0; max = 1

- Sync: 0 = key sync
- 1 = free run

E4_VOICE_LFO2_RATE, id = 110 (6Eh,00h) min = 0; max = 127 (as above)
E4_VOICE_LFO2_SHAPE, id = 111 (6Fh,00h) min = 0; max = 7 (as above)
E4_VOICE_LFO2_DELAY, id = 112 (70h,00h) min = 0; max = 127
E4_VOICE_LFO2_VAR, id = 113 (71h,00h) min = 0; max = 100 (%)
E4_VOICE_LFO2_SYNC, id = 114 (72h,00h) min = 0; max = 1 (as above)

E4_VOICE_LFO2_OP0_PARM,	id = 115 (73h,00h)	min = 0; max = 10 (Lag 0:)
E4_VOICE_LFO2_OP1_PARM,	id = 116 (74h,00h)	min = 0; max = 10 (Lag 1:)
E4_VOICE_AENV_SEG0_RATE,	id = 117 (75h,00h)	min = 0; max = 127 (Atk1 Rate)
E4_VOICE_AENV_SEG0_TGTLVL,	id = 118 (76h,00h)	min = 0; max = 100 (Atk1 Level%)
E4_VOICE_AENV_SEG1_RATE,	id = 119 (77h,00h)	min = 0; max = 127 (Dcy1 Rate)
E4_VOICE_AENV_SEG1_TGTLVL,	id = 120 (78h,00h)	min = 0; max = 100 (Dcy1 Level%)
E4_VOICE_AENV_SEG2_RATE,	id = 121 (79h,00h)	min = 0; max = 127 (Rls1 Rate)
E4_VOICE_AENV_SEG2_TGTLVL,	id = 122 (7Ah,00h)	min = 0; max = 100 (Rls1 Level%)
E4_VOICE_AENV_SEG3_RATE,	id = 123 (7Bh,00h)	min = 0; max = 127 (Atk2 Rate)
E4_VOICE_AENV_SEG3_TGTLVL,	id = 124 (7Ch,00h)	min = 0; max = 100 (Atk2 Level%)
E4_VOICE_AENV_SEG4_RATE,	id = 125 (7Dh,00h)	min = 0; max = 127 (Dcy2 Rate)
E4_VOICE_AENV_SEG4_TGTLVL,	id = 126 (7Eh,00h)	min = 0; max = 100 (Dcy2 Level%)
E4_VOICE_AENV_SEG5_RATE,	id = 127 (7Fh,00h)	min = 0; max = 127 (Rls2 Rate)
E4_VOICE_AENV_SEG5_TGTLVL,	id = 128 (00h,01h)	min = 0; max = 100 (Rls2 Level%)

Cords:

E4_VOICE_CORD0_SRC,	id = 129 (01h,01h)	min = 0; max = 255
E4_VOICE_CORD0_DST,	id = 130 (02h,01h)	min = 0; max = 255
E4_VOICE_CORD0_AMT,	id = 131 (03h,01h)	min = -100; max = +100
E4_VOICE_CORD1_SRC,	id = 132 (04h,01h)	min = 0; max = 255
E4_VOICE_CORD1_DST,	id = 133 (05h,01h)	min = 0; max = 255
E4_VOICE_CORD1_AMT,	id = 134 (06h,01h)	min = -100; max = +100
E4_VOICE_CORD2_SRC,	id = 135 (07h,01h)	min = 0; max = 255
E4_VOICE_CORD2_DST,	id = 136 (08h,01h)	min = 0; max = 255
E4_VOICE_CORD2_AMT,	id = 137 (09h,01h)	min = -100; max = +100
E4_VOICE_CORD3_SRC,	id = 138 (0Ah,01h)	min = 0; max = 255
E4_VOICE_CORD3_DST,	id = 139 (0Bh,01h)	min = 0; max = 255
E4_VOICE_CORD3_AMT,	id = 140 (0Ch,01h)	min = -100; max = +100
E4_VOICE_CORD4_SRC,	id = 141 (0Dh,01h)	min = 0; max = 255
E4_VOICE_CORD4_DST,	id = 142 (0Eh,01h)	min = 0; max = 255
E4_VOICE_CORD4_AMT,	id = 143 (0Fh,01h)	min = -100; max = +100
E4_VOICE_CORD5_SRC,	id = 144 (10h,01h)	min = 0; max = 255
E4_VOICE_CORD5_DST,	id = 145 (11h,01h)	min = 0; max = 255
E4_VOICE_CORD5_AMT,	id = 146 (12h,01h)	min = -100; max = +100
E4_VOICE_CORD6_SRC,	id = 147 (13h,01h)	min = 0; max = 255
E4_VOICE_CORD6_DST,	id = 148 (14h,01h)	min = 0; max = 255
E4_VOICE_CORD6_AMT,	id = 149 (15h,01h)	min = -100; max = +100
E4_VOICE_CORD7_SRC,	id = 150 (16h,01h)	min = 0; max = 255
E4_VOICE_CORD7_DST,	id = 151 (17h,01h)	min = 0; max = 255
E4_VOICE_CORD7_AMT,	id = 152 (18h,01h)	min = -100; max = +100
E4_VOICE_CORD8_SRC,	id = 153 (19h,01h)	min = 0; max = 255
E4_VOICE_CORD8_DST,	id = 154 (1Ah,01h)	min = 0; max = 255
E4_VOICE_CORD8_AMT,	id = 155 (1Bh,01h)	min = -100; max = +100
E4_VOICE_CORD9_SRC,	id = 156 (1Ch,01h)	min = 0; max = 255
E4_VOICE_CORD9_DST,	id = 157 (1Dh,01h)	min = 0; max = 255
E4_VOICE_CORD9_AMT,	id = 158 (1Eh,01h)	min = -100; max = +100
E4_VOICE_CORD10_SRC,	id = 159 (1Fh,01h)	min = 0; max = 255
E4_VOICE_CORD10_DST,	id = 160 (20h,01h)	min = 0; max = 255
E4_VOICE_CORD10_AMT,	id = 161 (21h,01h)	min = -100; max = +100
E4_VOICE_CORD11_SRC,	id = 162 (22h,01h)	min = 0; max = 255
E4_VOICE_CORD11_DST,	id = 163 (23h,01h)	min = 0; max = 255

E4_VOICE_CORD11_AMT,	id = 164 (24h,01h)	min = -100;	max = +100
E4_VOICE_CORD12_SRC,	id = 165 (25h,01h)	min = 0;	max = 255
E4_VOICE_CORD12_DST,	id = 166 (26h,01h)	min = 0;	max = 255
E4_VOICE_CORD12_AMT,	id = 167 (27h,01h)	min = -100;	max = +100
E4_VOICE_CORD13_SRC,	id = 168 (28h,01h)	min = 0;	max = 255
E4_VOICE_CORD13_DST,	id = 169 (29h,01h)	min = 0;	max = 255
E4_VOICE_CORD13_AMT,	id = 170 (2Ah,01h)	min = -100;	max = +100
E4_VOICE_CORD14_SRC,	id = 171 (2Bh,01h)	min = 0;	max = 255
E4_VOICE_CORD14_DST,	id = 172 (2Ch,01h)	min = 0;	max = 255
E4_VOICE_CORD14_AMT,	id = 173 (2Dh,01h)	min = -100;	max = +100
E4_VOICE_CORD15_SRC,	id = 174 (2Eh,01h)	min = 0;	max = 255
E4_VOICE_CORD15_DST,	id = 175 (2Fh,01h)	min = 0;	max = 255
E4_VOICE_CORD15_AMT,	id = 176 (30h,01h)	min = -100;	max = +100
E4_VOICE_CORD16_SRC,	id = 177 (31h,01h)	min = 0;	max = 255
E4_VOICE_CORD16_DST,	id = 178 (32h,01h)	min = 0;	max = 255
E4_VOICE_CORD16_AMT,	id = 179 (33h,01h)	min = -100;	max = +100
E4_VOICE_CORD17_SRC,	id = 180 (34h,01h)	min = 0;	max = 255
E4_VOICE_CORD17_DST,	id = 181 (35h,01h)	min = 0;	max = 255
E4_VOICE_CORD17_AMT,	id = 182 (36h,01h)	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

0	=	Off	
4	=	XfdRnd	(Crossfade Random)
8	=	Key+	(Key 0...127)
9	=	Key~	(Key -64...+63)
10	=	Vel+	(Velocity 0...127)
11	=	Vel~	(Velocity -64...+63)
12	=	Vel<	(Velocity -127...0)
13	=	RlsVel	(Release Velocity)
14	=	Gate	
16	=	PitWl	(Pitch Wheel)
17	=	ModWl	(Mod Wheel)
18	=	Press	(Pressure)
19	=	Pedal	(Pedal)
20	=	MidiA	
21	=	MidiB	
22	=	FtSw1	(Foot Switch 1)
23	=	FtSw2	(Foot Switch 2)
24	=	Ft1FF	(Flip-Flop Foot Switch 1)
25	=	Ft2FF	(Flip-Flop Foot Switch 2)
26	=	MidiVl	(Midi Volume controller 7)
27	=	MidPn	(Midi Pan controller 10)
32	=	MidiC	
33	=	MidiD	
34	=	MidiE	

35 = MidiF
 36 = MidiG
 37 = MidiH
 38 = Thumb
 39 = ThmFF

 48 = KeyGld (Key Glide)

 72 = VEnv+ (Volume Envelope 0...127)
 73 = VEnv~ (Volume Envelope -64...+63)
 74 = VEnv< (Volume Envelope -127...0)

 80 = FEnv+ (Filter Envelope 0...127)
 81 = FEnv~ (Filter Envelope -64...+63)
 82 = FEnv< (Filter Envelope -127...0)

 88 = AEnv+ (Aux Envelope 0...127)
 89 = AEnv~ (Aux Envelope -64...+63)
 90 = AEnv< (Aux Envelope -127...0)

 96 = Lfo1~
 97 = Lfo1+
 98 = White (White Noise)
 99 = Pink (Pink Noise)
 100 = kRand1 (kRandom 1)
 101 = kRand2 (kRandom 2)

 104 = Lfo2~
 105 = Lfo2+
 106 = Lag0in (summing amp out)
 107 = Lag0
 108 = Lag1in (summing amp out)
 109 = Lag1

 144 = CkDwhl (Clock Double Whole Note)
 145 = CkWhle (Clock Whole Note)
 146 = CkHalf (Clock Half Note)
 147 = CkQtr (Clock Quarter Note)
 148 = Ck8th (Clock Eighth Note)
 149 = Ck16th (Clock Sixteenth Note)

 160 = DC (DC Offset)
 161 = Sum (Summing Amp)
 162 = Switch
 163 = Abs (Absolute Value)
 164 = Diode
 165 = FlipFlop
 166 = Quantiz (Quantizer)
 167 = Gain4X

Destination

0 = Off

 8 = KeySust

47 = FinePtch

48 = Pitch
49 = Glide
50 = ChrsAmt (Chorus Amount)
51 = 'ChrsITD (Chorus Position ITD)
52 = 'SStart (Sample Start)
53 = SLoop (Sample Loop)
54 = SRetrig (Sample Retrigger)

56 = FilFreq (Filter Frequency)
57 = 'FilRes (Filter Resonance)

64 = AmpVol (Amplifier Volume)
65 = AmpPan (Amplifier Pan)
66 = AmpXfd (Amplifier Crossfade)

72 = VEnvRts (Volume Envelope Rates)
73 = VEnvAtk (Volume Envelope Attack)
74 = VEnvDcy (Volume Envelope Decay)
75 = VEnvRls (Volume Envelope Release)

80 = FEnvRts (Filter Envelope Rates)
81 = FEnvAtk (Filter Envelope Attack)
82 = FEnvDcy (Filter Envelope Decay)
83 = FEnvRls (Filter Envelope Release)

86 = FEnvTrig (Filter Envelope Trigger/Retrigger)

88 = AEnvRts (Aux Envelope Rates)
89 = AEnvAtk (Aux Envelope Attack)
90 = AEnvDcy (Aux Envelope Decay)
91 = AEnvRls (Aux Envelope Release)

94 = AEnvTrig (Aux Envelope Trigger/Retrigger)

96 = Lfo1Rt (Lfo 1 Rate)
97 = Lfo1Trig (Lfo 1 Trigger/Retrigger)

104 = Lfo2Rt (Lfo 2 Rate)
105 = Lfo2Trig (Lfo 2 Trigger/Retrigger)
106 = Lag0in
108 = Lag1in

161 = Sum (Summing Amp)
162 = Switch
163 = Abs (Absolute Value)
164 = Diode
165 = FlipFlop
166 = Quantize
167 = Gain4X

168 = C00Amt (Cord Amount)
169 = C01Amt
170 = C02Amt
171 = C03Amt

172 = C04Amt
173 = C05Amt
174 = C06Amt
175 = C07Amt

176 = C08Amt
177 = C09Amt
178 = C10Amt
179 = C11Amt
180 = C12Amt
181 = C13Amt
182 = C14Amt
183 = C15Amt

184 = C16Amt
185 = C17Amt

Master Mode Global Parm

Master Setup Tuning:

MASTER_TUNING_OFFSET, id = 183 (37h,01h) min = -64; max = +64

display = +/-0.0

1.2
3.5
4.7
6.0
7.2
9.5
10.7
12.0
14.2
15.5
17.7
18.0
20.2
21.5
23.7
25.0
26.2
28.5
29.7
31.0
32.2
34.5
35.7
37.0
39.2
40.5
42.7
43.0
45.2
46.5
48.7
50.0

51.2
53.5
54.7
56.0
57.2
59.5
60.7
62.0
64.2
65.5
67.7
68.0
70.2
71.5
73.7
75.0
76.2
78.5
79.7
81.0
82.2
84.5
85.7
87.0
89.2
90.5
92.7
93.0
95.2
96.5
98.7
100.0

MASTER_TRANSPOSE, id = 184 (38h,01h) min = -12; max = +12

display:

C = -12
C# = -11
D = -10
D# = -9
E = -8
F = -7
F# = -6
G = -5
G# = -4
A = -3
A# = -2
off B = -1
(C) = 0
C# = +1
D = +2
D# = +3
E = +4
F = +5
F# = +6

G = +7
G# = +8
A = +9
A# = +10
B = +11
C = +12

Master Setup Output:

MASTER_HEADROOM, id = 185 (39h,01h) min = 0; max = 15
MASTER_HCHIP_BOOST, id = 186 (3Ah,01h) min = 0; max = 1

Output Boost: 0 = +0dB
1 = +12dB

MASTER_OUTPUT_FORMAT, id = 187 (3Bh,01h) min = 0; max = 2

Output Format: 0 = analog
1 = AES pro
2 = S/PDIF

MASTER_OUTPUT_CLOCK, id = 188 (3Ch,01h) min = 0; max = 1

Output Clock: 0 = 44.1kHz
1 = 48kHz

MASTER_AES_BOOST, id = 189 (3Dh,01h) min = 0; max = 1

AES Boost: 0 = off
1 = on

Master Setup Misc:

MASTER_SCSI_ID, id = 190 (3Eh,01h) min = 0; max = 7
(SCSI ID)

MASTER_SCSI_TERM, id = 191 (3Fh,01h) min = 0; max = 1

SCSI termination: 0 = on
1 = off

MASTER_USING_MAC, id = 192 (40h,01h) min = -1; max = 7

Avoid Host on SCSI ID: -1 = none
0 = ID 0
1 = ID 1
2 = ID 2
3 = ID 3
4 = ID 4
5 = ID 5
6 = ID 6
7 = ID 7 (Mac)

Master Setup Import:

MASTER_COMBINE_LR, id = 193 (41h,01h) min = 0; max = 1

Combine L/R into stereo: 0 = on
1 = off

MASTER_AKAI_LOOP_ADJ, id = 194 (42h,01h) min = 0; max = 1

Adjust Akai fractional loops: 0 = off
1 = on

MASTER_AKAI_SAMPLER_ID, id = 195 (43h,01h) min = -1; max = 7

Foreign sampler SCSI ID: -1 = none
0-7 = 0-7

id's 196,197 not used.

Master MIDI Mode:

MIDIGLO_BASIC_CHANNEL, id = 198 (46h,01h) min = 0; max = 15 (31 if has MIDI expansion card)

Basic Channel: 0-15 (31) = 1-16 (32)

MIDIGLO_MIDI_MODE, id = 199 (47h,01h) min = 0; max = 2

MIDI mode: 0 = omni
1 = poly
2 = multi

id 200 not used.

Master MIDI Cntrls1:

MIDIGLO_PITCH_CONTROL, id = 201 (49h,01h) min = -1; max = 33

MIDIGLO_MOD_CONTROL, id = 202 (4Ah,01h) min = -1; max = 33

MIDIGLO_PRESSURE_CONTROL, id = 203 (4Bh,01h) min = -1; max = 33

MIDIGLO_PEDAL_CONTROL, id = 204 (4Ch,01h) min = -1; max = 33

Display for these 4 parameters: -1 = off
0-31 = 0-31
32 = ptwheel
33 = chnpres

MIDIGLO_SWITCH_1_CONTROL, id = 205 (4Dh,01h) min = -1; max = 33

MIDIGLO_SWITCH_2_CONTROL, id = 206 (4Eh,01h) min = -1; max = 33

MIDIGLO_THUMB_CONTROL, id = 207 (4Fh,01h) min = -1; max = 33

Display for these 3 parameters: -1 = off
0-33 = 64-97

Master MIDI cntrls2:

MIDIGLO_MIDI_A_CONTROL,	id = 208 (50h,01h)	min = -1; max = 33
MIDIGLO_MIDI_B_CONTROL,	id = 209 (51h,01h)	min = -1; max = 33
MIDIGLO_MIDI_C_CONTROL,	id = 210 (52h,01h)	min = -1; max = 33
MIDIGLO_MIDI_D_CONTROL,	id = 211 (53h,01h)	min = -1; max = 33
MIDIGLO_MIDI_E_CONTROL,	id = 212 (54h,01h)	min = -1; max = 33
MIDIGLO_MIDI_F_CONTROL,	id = 213 (55h,01h)	min = -1; max = 33
MIDIGLO_MIDI_G_CONTROL,	id = 214 (56h,01h)	min = -1; max = 33
MIDIGLO_MIDI_H_CONTROL,	id = 215 (57h,01h)	min = -1; max = 33

Display for these 8 parameters: -1 = off
 0-31 = 0-31
 32 = ptwheel
 33 = chnpres

Master MIDI Prefs1:

MIDIGLO_VEL_CURVE,	id = 216 (58h,01h)	min = 0; max = 13
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Velocity Curve: 0 = linear
 1-13 = 1-13

MIDIGLO_VOLUME_SENSITIVITY,	id = 217 (59h,01h)	min = 0; max = 31
MIDIGLO_CTRL7_CURVE,	id = 218 (5Ah,01h)	min = 0; max = 2

Ctrl#7 Curve: 0 = linear
 1 = squared
 2 = logarithmic

MIDIGLO_PEDAL_OVERRIDE,	id = 219 (5Bh,01h)	min = 0; max = 1
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Global pedal override: 0 = off
 1 = on

Master MIDI Prefs2:

MIDIGLO_RCV_PROGRAM_CHANGE,	id = 220 (5Ch,01h)	min = 0; max = 1
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Rcv Program Change: 0 = off
 1 = on

MIDIGLO_SEND_PROGRAM_CHANGE,	id = 221 (5Dh,01h)	min = 0; max = 1
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Send Program Change: 0 = off
 1 = on

MIDIGLO_MAGIC_PRESET,	id = 222 (5Eh,01h)	min = 0; max = 128
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Magic load preset: 0 = off
 1-128 = Presets 000 - 127

PRESET_SELECT,	id = 223 (5Fh,01h)	min = 000; max = 999
LINK_SELECT,	id = 224 (60h,01h)	min = 0; max = (255 - Num of Voices)
VOICE_SELECT,	id = 225 (61h,01h)	min = 0; max = (255 - Num of links)
SAMPLE_ZONE_SELECT,	id = 226 (62h,01h)	min = 0; max = 255
GROUP_SELECT,	id = 227 (63h,01h)	min = 0; max = 31

These Selection Parameters are independant of what is selected from the front pannel of the E4. Once you select something remotely, the only way to change the selection is remotely, with a couple of exceptions. Any regular front pannel editing can be done without affecting what was selected for remote editing.

A Preset Selection will always remain until you change it.

A Link Selection will remain until you select another Link, or if you select another Preset, in which case no Links are selected.

Similar with a Voice Selection.

A Sample Zone selection will get reset if you select a new Voice or a new Preset.

Master Effects Parameter Section(similar to Preset Effects Parameters):

MASTER_FX_A_ALGORITHM,	id = 228 (64h,01h)	min = 0;	max = 44;	default = 14;
MASTER_FX_A_PARM_0,	id = 229 (65h,01h)	min = 0;	max = 90;	default = 54;
MASTER_FX_A_PARM_1,	id = 230 (66h,01h)	min = 0;	max = 127;	default = 64;
MASTER_FX_A_PARM_2,	id = 231 (67h,01h)	min = 0;	max = 127;	default = 0;
MASTER_FX_A_AMT_0,	id = 232 (68h,01h)	min = 0;	max = 100;	default = 10;
MASTER_FX_A_AMT_1,	id = 233 (69h,01h)	min = 0;	max = 100;	default = 20;
MASTER_FX_A_AMT_2,	id = 234 (6Ah,01h)	min = 0;	max = 100;	default = 30;
MASTER_FX_A_AMT_3,	id = 235 (6Bh,01h)	min = 0;	max = 100;	default = 40;

MASTER_FX_B_ALGORITHM,	id = 236 (6Ch,01h)	min = 0;	max = 27;	default = 1;
MASTER_FX_B_PARM_0,	id = 237 (6Dh,01h)	min = 0;	max = 127;	default = 0;
MASTER_FX_B_PARM_1,	id = 238 (6Eh,01h)	min = 0;	max = 127;	default = 3;
MASTER_FX_B_PARM_2,	id = 239 (6Fh,01h)	min = 0;	max = 127;	default = 0;
MASTER_FX_B_AMT_0,	id = 240 (70h,01h)	min = 0;	max = 100;	default = 10;
MASTER_FX_B_AMT_1,	id = 241 (71h,01h)	min = 0;	max = 100;	default = 15;
MASTER_FX_B_AMT_2,	id = 242 (72h,01h)	min = 0;	max = 100;	default = 30;
MASTER_FX_B_AMT_3,	id = 243 (73h,01h)	min = 0;	max = 100;	default = 0;

MASTER_FX_BYPASS,	id = 244 (74h,01h)	min = 0;	max = 1;	default = 0;
MASTER_FX_MM_CTRL_CHANNEL,	id = 245 (75h,01h)	min = -1;	max = 15;	default = -1;

MULTIMODE_CHANNEL,	id = 246 (76h,01h)	min = 1;	max = 16(32);	default = 1;
MULTIMODE_PRESET,	id = 247 (77h,01h)	min = -1;	max = 999(1255);	default = -1;
MULTIMODE_VOLUME,	id = 248 (78h,01h)	min = 0;	max = 127;	default = 127;
MULTIMODE_PAN,	id = 249 (79h,01h)	min = -64;	max = +63;	default = 0;
MULTIMODE_SUBMIX,	id = 250 (7Ah,01h)	min = -1;	max = 3(7);	default = -1;

Midi Expansion Card yields 32 total Channels.

Output Expansion Card yields Submix 4 - 7.

E4_LINK_INTERNAL_EXTERNAL,	id = 251 (7Bh,01h)	min = 0;	max = 16;	default = 0;
E4_LINK_FILTER_PITCH,	id = 252 (7Ch,01h)	min = 0;	max = 1;	default = 0;
E4_LINK_FILTER_MOD,	id = 253 (7Dh,01h)	min = 0;	max = 1;	default = 0;
E4_LINK_FILTER_PRESSURE,	id = 254 (7Eh,01h)	min = 0;	max = 1;	default = 0;
E4_LINK_FILTER_PEDAL,	id = 255 (7Fh,01h)	min = 0;	max = 1;	default = 0;
E4_LINK_FILTER_CTRL_A,	id = 256 (00h,02h)	min = 0;	max = 1;	default = 0;
E4_LINK_FILTER_CTRL_B,	id = 257 (01h,02h)	min = 0;	max = 1;	default = 0;
E4_LINK_FILTER_CTRL_C,	id = 258 (02h,02h)	min = 0;	max = 1;	default = 0;

```

E4_LINK_FILTER_CTRL_D,      id = 259 (03h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_CTRL_E,      id = 260 (04h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_CTRL_F,      id = 261 (05h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_CTRL_G,      id = 262 (06h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_CTRL_H,      id = 263 (07h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_SWITCH_1,     id = 264 (08h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_SWITCH_2,     id = 265 (09h,02h)   min = 0; max = 1; default = 0;
E4_LINK_FILTER_THUMB,       id = 266 (0Ah,02h)   min = 0; max = 1; default = 0;

```

```

0 = filter off
1 = filter on

```

```

/** ULTRA ONLY PARAMETERS *****/

```

```

MASTER_WORD_CLOCK_IN,      id = 267 (0Bh,02h)   min = 0; max = 4

```

```

Word Clock In: 0 = Internal
                1 = BNC
                2 = AES
                3 = ADAT
                4 = (future expansion)

```

```

MASTER_WORD_CLOCK_PHASE_IN, id = 268 (0Ch,02h)   min = 0; max = 511
MASTER_WORD_CLOCK_PHASE_OUT, id = 269 (0Dh,02h)   min = 0; max = 511

```

```

0.00 - 359.30 degrees in 512 increments.

```

```

MASTER_OUTPUT_DITHER,      id = 270 (0Eh,02h)   min = 0; max = 1

```

```

0 = off
1 = on

```

```

/** END ULTRA ONLY PARAMETERS *****/

```

```

MASTER_AUDITION_KEY,       id = 271 (0Fh,02h)   min = 0; max = 127

```

Effects Algorithms:

Preset Effect A:
(44 algorithms)

```

Master Effect A (Global Effects Edit)
Room 1-3
Hall 1-2
Plate
Delay
Panning Delay
Multitap 1
Multitap Pan
3 Tap
3 Tap Pan

```

Soft Room
Warm Room
Perfect Room
Tiled Room
Hard Plate
Warm Hall
Spacious Hall
Bright Hall
Brt Hall Pan
Bright Plate
BBall Court
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

Parameters:

E4_PRESET_FX_A_PARM_0 -> Decay Time: 0 - 90
E4_PRESET_FX_A_PARM_1 -> HF Damping: 0 - 127
E4_PRESET_FX_A_PARM_2 -> FxB==>FxA : 0 - 127

E4_PRESET_FX_A_AMT_0 -> Main FX A Send: 0 - 100%
E4_PRESET_FX_A_AMT_1 -> Sub1 FX A Send: 0 - 100%
E4_PRESET_FX_A_AMT_2 -> Sub2 FX A Send: 0 - 100%
E4_PRESET_FX_A_AMT_3 -> Sub3 FX A Send: 0 - 100%

Preset Effect B:
(27 algorithms)

Master Effect B (Global Effects Edit)
Chorus 1-5
Doubling
Slapback
Flange 1-7
Big Chorus
Symphonic
Ensemble

Delay
Delay Stereo
Delay Stereo 2
Panning Delay
Delay Chorus
Pan Dly Chrs 1-2
DualTap 1/3
DualTap 1/4
Vibrato
Distortion 1-2
DistortedFlange
DistortedChorus
DistortedDouble

Parameters:

E4_PRESET_FX_B_PARM_0 -> Feedback: 0 - 127
E4_PRESET_FX_B_PARM_1 -> LFO Rate: 0 - 127
E4_PRESET_FX_B_PARM_2 -> Delay Time: 0 - 127 (0 - 635ms in 5ms increments)

E4_PRESET_FX_B_AMT_0 -> Main FX A Send: 0 - 100%
E4_PRESET_FX_B_AMT_1 -> Sub1 FX A Send: 0 - 100%
E4_PRESET_FX_B_AMT_2 -> Sub2 FX A Send: 0 - 100%
E4_PRESET_FX_B_AMT_3 -> Sub3 FX A Send: 0 - 100%

For many filter parameters, I will need to supply tables to convert to displayed values(Hz,dB). I will include this information in a future document.

Filter Types:

2 Pole Low-pass:
4 Pole Low-pass:
6 Pole Low-pass:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Frequency: 57Hz to 20000Hz (see Filter Table 1)

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Q: 0 to 127

2nd Order High-pass:
4th Order High-pass:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Frequency: 69Hz to 18000Hz (see Filter Table 2)

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Q: 0 to 127

2nd Order Band-pass:
4th Order Band-pass:

Contrary Band-pass:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Frequency: 57Hz to 10000Hz (see Filter Table 3)

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Q: 0 to 127

Swept EQ 1 octave:

Swept EQ 2->1 oct:

Swept EQ 3->1 oct:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Frequency: 83Hz to 10000Hz (see Filter Table 3)

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Gain: -24.0 dB to +23.6 dB (see Filter Table 4)

Phaser 1:

Phaser 2:

Bat-Phaser:

Flanger Lite:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Frequency: 0 to 255

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Resonance: 0 to 127

Vocal Ah-Ay-Ee:

Vocal Oo-Ah:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Morph: 0 to 255

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Body Size: 0 to 127

Dual EQ Morph:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Morph: 0 to 255

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Gain: -24.0dB to +23.6dB (see Filter Table 4)

E4_VOICE_FILT_GEN_PARM3, id = 87 min = 0; max = 127
EQ 1 Low: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM4, id = 88 min = 0; max = 127
EQ 1 High: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM5, id = 89 min = 0; max = 127

EQ 1 Gain: -24.0dB to +23.6dB (see Filter Table 4)

E4_VOICE_FILT_GEN_PARM6, id = 90 min = 0; max = 127
EQ 2 Low: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM7, id = 91 min = 0; max = 127
EQ 2 High: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM8, id = 92 min = 0; max = 127
EQ 2 Gain: -24.0dB to +23.6dB (see Filter Table 4)

2EQ+Lowpass Morph:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Fc/Morph: 0 to 255

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
LPF Q: 0 to 127

E4_VOICE_FILT_GEN_PARM3, id = 87 min = 0; max = 127
EQ 1 Low: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM4, id = 88 min = 0; max = 127
EQ 1 High: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM5, id = 89 min = 0; max = 127
EQ 1 Gain: -24.0dB to +23.6dB (see Filter Table 4)

E4_VOICE_FILT_GEN_PARM6, id = 90 min = 0; max = 127
EQ 2 Low: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM7, id = 91 min = 0; max = 127
EQ 2 High: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM8, id = 92 min = 0; max = 127
EQ 2 Gain: -24.0dB to +23.6dB (see Filter Table 4)

2EQMorph+Exprssn:

E4_VOICE_FMORPH, id = 83 min = 0; max = 255
Morph: 0 to 255

E4_VOICE_FKEY_XFORM, id = 84 min = 0; max = 127
Expression: 0 to 127

E4_VOICE_FILT_GEN_PARM3, id = 87 min = 0; max = 127
EQ 1 Low: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM4, id = 88 min = 0; max = 127
EQ 1 High: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM5, id = 89 min = 0; max = 127
EQ 1 Gain: -24.0dB to +23.6dB (see Filter Table 4)

```

E4_VOICE_FILT_GEN_PARM6,   id = 90      min = 0;  max = 127
    EQ 2 Low: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM7,   id = 91      min = 0;  max = 127
    EQ 2 High: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM8,   id = 92      min = 0;  max = 127
    EQ 2 Gain: -24.0dB to +23.6dB (see Filter Table 4)

```

Peak/Shelf Morph:

```

E4_VOICE_FMORPH,           id = 83      min = 0;  max = 255
    Morph: 0 to 255

E4_VOICE_FKEY_XFORM,       id = 84      min = 0;  max = 127
    Peak: -24.0dB to +23.6dB (see Filter Table 4)

E4_VOICE_FILT_GEN_PARM3,   id = 87      min = 0;  max = 127
    low morph frame Freq: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM4,   id = 88      min = 0;  max = 127
    low morph frame Shelf: -64 to 63

E4_VOICE_FILT_GEN_PARM5,   id = 89      min = 0;  max = 127
    low morph frame Peak: -24.0dB to +23.6dB (see Filter Table 4)

E4_VOICE_FILT_GEN_PARM6,   id = 90      min = 0;  max = 127
    high morph frame Freq: 83Hz to 9824Hz (see Filter Table 5)

E4_VOICE_FILT_GEN_PARM7,   id = 91      min = 0;  max = 127
    high morph frame Shelf: -64 to 63

E4_VOICE_FILT_GEN_PARM8,   id = 92      min = 0;  max = 127
    high morph frame Peak: -24.0dB to +23.6dB (see Filter Table 4)

```

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..255*/
void cnv_morph_freq (int input, char *buf)

```

```

{
    sprintf (buf, "%dHz", fil_freq (input, 10000, 1006)); /*1009*/
}

/* 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);
}

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 Table 5:    cnv_morph_freq (2*input, value); /* input=0..127 */

/
*****/
/
*****/

```

Commands:

00h	Reserved. If received, the following 2 MIDI bytes form a 14 bit command.
01h	Parameter Edit
02h	Parameter Value Request
03h	Parameter min/max/default Request
04h	Parameter min/max/default Response
05h	Preset Name
06h	Preset Name Request
07h	Preset Name Character Update
08h	Preset Name Character Request
09h	Sample Name
0Ah	Sample Name Request
0Bh	Sample Name Character Update
0Ch	Sample Name Character Request

0Dh Preset Dump/NEW Preset Dump/NEW Preset Dump Request
0Eh Preset Dump Request

Configuration Utils:

10h Preset Memory Request
11h Preset Memory Response
12h Sample Memory Request
13h Sample Memory Response
14h Configuration Request (Hardware options installed, amount of RAM etc.)
15h Configuration Response

16h Preset Number of Voices Request
17h Preset Number of Voices Response
18h Preset Number of Links Request
19h Preset Number of Links Response
1Ah Preset Number of S Zones Request
1Bh Preset Number of S Zones Response
1Ch Voice Number of S Zones Request
1Dh Voice Number of S Zones Response
1Eh Extended Configuration Request (Hardware options installed, amount of RAM etc.)
1Fh Extended Configuration Response

Voice Utils:

20h New Voice
21h Delete Voice
22h Copy Voice

SZone Utils:

30h New Sample Zone
31h Get Multisample
32h Delete Sample Zone
33h Combine
34h Expand

Link Utils:

40h New Link
41h Delete Link
42h Copy Link

Sample Utils:

50h Sample Erase
52h Sample Memory Defrag

Misc Utils:

70h Copy Preset
71h Delete Preset
72h Multimode Map Dump
73h Multimode Map Dump Request
74h Erase RAM Bank
75h Erase All RAM Presets
76h Erase All RAM Samples

Dump/Handshaking:

79h NEW Dump Nak
7Ah NEW Dump Ack
7Bh EOF
7Ch Wait

7Dh	Cancel
7Eh	Nak
7Fh	Ack

Parameter Value Edit:

EXAMPLE:> {F0h,18h,21h,ddh,55h,01h,02h,<xxh,xxh,yyh,yyh>,<Checksum>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

01h = Command::Parameter Value Edit

02h = Byte count(number of Byte pairs)

{xxh,xxh} = Parameter ID (LSB first)

{yyh,yyh} = Parameter Data

<Checksum> = 1 Byte = XOR(1's compliment) of sum of {<xxh,xxh,yyh,yyh>}
= 7Fh is ignore checksum flag.

F7h = EOF

This message contains only 1 packet.

Do not send messages containing more than 256 Data Bytes, or 42 Parameter Edits, at a time.

Parameter Value Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,02h,01h,xxh,xxh,<Checksum>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

02h = Command::Parameter Value Request

01h = Byte count(number of Byte pairs)

{xxh,xxh} = Parameter ID (LSB first)

<Checksum> = 1 Byte = XOR(1's compliment) of sum of {xxh,xxh}

F7h = EOF

This message contains only 1 request packet.

The response a complete Parameter Value Edit SYSEX message for each parameter.

Do not send messages containing more than 256 Data Bytes, or 64 Parameter IDs, at a time.

Parameter Min/Max/Default Value Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,03h,xxh,xxh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

03h = Command::Parameter Min/Max/Default Value Request

xxh,xxh = The Parameter ID

F7h = EOF

RESPONSE:> {F0h,18h,21h,ddh,55h,04h,xxh,xxh,yyh,yyh,zzh,zzh,qqh,qqh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

04h = Command::Parameter Min/Max/Default

xxh,xxh = the Parameter ID

yyh,yyh = Parameter minimum value

zzh,zzh = Parameter maximum value

qqh,qqh = Parameter default value

F7h = EOF

Preset Name:

EXAMPLE:> {F0h,18h,21h,ddh,55h,05h,xxh,xxh,<STRING 1>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

05h = Command::ASCII Preset Name

xxh,xxh = Preset number 0-999

<STRING x> = <CHAR 1>,<CHAR 2>,...,<CHAR 16> = Preset Name

F7h = EOX

Preset Name Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,06h,xxh,xxh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

06h = Command::ASCII Preset Name Request

xxh,xxh = Preset number 0-999

F7h = EOX

The response is the ASCII Preset Name SYSEX message.

Preset Name Character Update:

EXAMPLE:> {F0h,18h,21h,ddh,55h,07h,xxh,xxh,yyh,zzh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

07h = Command::Preset Name Character Update

<xxh,xxh> = Preset number, LSB first

yyh = Character number (0-15)

zzh = ASCII character

F7h = EOX

Preset Name Character Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,08h,xxh,xxh,yyh,F7h}

F0h = sysex message

18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

08h = Command::Preset Name Character Request

<xxh,xxh> = Preset number, LSB first

yyh = Character number (0-15)

F7h = EOX

response is the Preset Name Character Update message.

Sample Name:

EXAMPLE:> {F0h,18h,21h,ddh,55h,09h,xxh,xxh,<STRING 1>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

09h = Command::ASCII Sample Name

xxh,xxh = Sample number 000-999

<STRING x> = <CHAR 1>,<CHAR 2>,...,<CHAR 16> = Sample Name

F7h = EOX

Sample Name Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Ah,xxh,xxh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

0Ah = Command::ASCII Sample Name Request

xxh,xxh = Sample number 000-999 (2999)

F7h = EOX

The response is the ASCII Sample Name SYSEX message.

Sample Name Character Update:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Bh,xxh,xxh,yyh,zzh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

0Bh = Command::Sample Name Character Update

<xxh,xxh> = Sample number, LSB first

yyh = Character number (0-15)

zzh = ASCII character

F7h = EOF

Sample Name Character Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Ch,xxh,xxh,yyh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

0Ch = Command::Sample Name Character Request

<xxh,xxh> = Sample number, LSB first

yyh = Character number (0-15)

F7h = EOF

response is the Sample Name Character Update message.

Dump Format:

The transfer of large messages shall follow a method similar to the MIDI Sample Dump Standard.

Generic Handshaking Messages:

ACK:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Fh,pph,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

7Fh = Command::Acknowledge; The last packet was received correctly.

pph = Packet number

F7h = EOX

NAK:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Eh,pph,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

7Eh = Command::Negative Acknowledge; The last packet was received
incorrectly, resend.

pph = Packet number

F7h = EOX

CANCEL:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Dh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

7Dh = Command::Cancel; Abort the Dump.

F7h = EOX

WAIT:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Ch,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

7Ch = Command::Wait; Stop sending packets until an ACK is received.

F7h = EOF

EOF:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Bh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = 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 = EOF

When a Dump is requested or initiated, the first element of the Dump sent is the Dump Header. This contains information on what kind of Dump it is, and how many Bytes are included in the Data. What follows are 266 Byte messages that each contain 256 Bytes of actual Data. The last message contains 256 Bytes, or LESS, depending on how much Data is left. The total number of these messages, and the number of Bytes (256 or less) of Data contained in the final message can be derived from the total number of Bytes in this Header. Generic handshaking messages will be used to negotiate the transfer. After all the Data messages have been sent, and End Of File will be sent, closing the transfer.

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

DUMP HEADER:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Dh,01h,00h,kkh,kkh,kkh,kkh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

0Dh = Command::Preset Dump;

01h = subCommand::Dump Header;

00h = Packet Number (first packet)

kkh,kkh,kkh,kkh = Number of bytes, LSB first.

F7h = EOF

DATA MESSAGE:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Dh,02h,kkh,<256 Data Bytes>,<Checksum>,F7h}

```

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

0Dh = Command::Preset Dump

02h = subCommand::Dump Message;

kkh = Running Packet count(low 7 bits in long dumps)

<256 Data Bytes> (except for last message)

<Checksum> = 1 Byte = 1's compliment of the sum of {<256 Data Bytes>}

F7h = EOX

```

Dump Data Formats:

```
/* short form */
```

```

PresetDump      ::= PresetNumber Name GlobalParms NoOfLinks { Link }*NoOfLinks
                                     NoOfVoices { Voice }*NoOfVoices.
PresetNumber    ::= 0 .. 999.
Name            ::= 16 * ASCIIChar.
GlobalParms     ::= E4_PRESET_TRANSPOSE ... E4_PRESET_FX_B_AMT_3.
NoOfLinks       ::= MAX(0 - 255, 255-NoOfVoices).
Link            ::= E4_LINK_PRESET ... E4_LINK_VEL_HIGHFADE.
NoOfVoices      ::= MAX(1 - 255, 255-NoOfLinks).
Voice           ::= E4_GEN_GROUP_NUM SingleSampleVoice | MultiSampleVoice.
SingleSampleVoice ::= E4_GEN_SAMPLE VoiceParams 1.
MultiSampleVoice ::= 3FFFh VoiceParams NoOfZones { Zone }*NoOfZones.
VoiceParams     ::= E4_GEN_VOLUME ... E4_VOICE_CORD17_AMT.
NoOfZones       ::= 0 .. 255.
Zone            ::= E4_GEN_SAMPLE E4_GEN_VOLUME E4_GEN_PAN E4_GEN_FTUNE E4_GEN_ORIG_KEY
                   E4_GEN_KEY_LOW ... E4_GEN_VEL_HIGHFADE.

```

```
/* long form */
```

```

Preset Dump:
<256 Data Bytes> x <? messages> = {<NUMBER>,<NAME>,<DATA 1>,<DATA 2>,...,}
    (last message may contain less than 256 Data Bytes)
<NUMBER> = Preset number
<NAME> = Preset Name, 16 ASCII characters
<DATA 1>,<DATA 2>,..., = (see below)

```

The Data is organized in the following way, and then broken into 256 Byte chunks.

{<NUMBER>,<NAME>,<Global Parm>,<Links>,<Voices>}

<NUMBER>:

Preset number (000 - 999)

<NAME>:

16 ASCII characters.

<Global Parm>:

Always starts with the first 6 parms. All parms are 2 Bytes.

E4_PRESET_TRANSPOSE,	id = 0	min = -24;	max = +24	(semitones)
E4_PRESET_VOLUME,	id = 1	min = -96;	max = +10	(dB)
E4_PRESET_CTRL_A,	id = 2	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_B,	id = 3	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_C,	id = 4	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_D,	id = 5	min = -1;	max = 127	(-1 = off)

Then effects A and effects B. If the effects A or B Algorithm is 0, then the effects parameters are the values of Master Effects A or B. After the effects, the next word is the beginning of the LINKS section of Data.

<Links>:

The first word is the number of Links in the Preset.
The max number of Links + the max number of Voices = 256.
Each Link has 13 parameters, so the number of Bytes remaining in this section is (13 words * 2 Bytes/word * number of Links).
These 13 word blocks are delivered in order of Link number, starting with 1. If there are no Links in the Preset then no Link data follows the Link count word.

<Voices>:

The first word is the number of Voices in the Preset.
The max number of Voices + the max number of Links = 256.

66 Bytes of Preset so far if no Links.

The next group of words applies to the first Voice.

The first word is the Group number associated with the Voice.

What follows are the Voice Parameters. If the Sample Number is 3FFFh, then it is a "multisample" voice. The first word following the Voice Parameters is the number of Sample Zones. If the number of Sample Zones is 1, the

Voice is not a "multisample", and the next word is the beginning of the next Voice(the Group number). If the number of Sample Zones is greater than 1, then Sample Zone Parameters corresponding to the number of Sample Zones follows, and after the last Sample Zone of the Voice, the next set of Voice parameters follow, assuming another Voice exists. If no more Voices exist after the last Sample Zone parameter of the current voice, then the Preset is complete.

The Voice Parameters consist of all the General Parameters(20), Tuning(11), Amp/Filt(37), Lfo/Aux(24), and Cords(54) groups of parameters. There are 146 total base(single Sample Voice) parameters per Voice. Additional Samples require additional parameters. This number along with the number of Samples word = 147 words, or 294 Bytes.

The Sample Parameters consist of a subset of the General Parameters. Each additional Sample requires a block of information containing the Sample number, and the 12 Sample parameters. There can be 255 of these additional Sample zones per Voice.

E4_GEN_SAMPLE,	id = 38	min = 0; max = 999(2999)
E4_GEN_VOLUME,	id = 39	min = -96; max = +10
E4_GEN_PAN,	id = 40	min = -64; max = +63
E4_GEN_FTUNE,	id = 42	min = -64; max = +64
E4_GEN_ORIG_KEY,	id = 44	min = 0; max = 127 (60 = C3)
E4_GEN_KEY_LOW,	id = 45	min = 0; max = 127 (C-2 -> G8)
E4_GEN_KEY_LOWFADE,	id = 46	min = 0; max = 127
E4_GEN_KEY_HIGH,	id = 47	min = 0; max = 127 (C-2 -> G8)
E4_GEN_KEY_HIGHFADE,	id = 48	min = 0; max = 127
E4_GEN_VEL_LOW,	id = 49	min = 0; max = 127
E4_GEN_VEL_LOWFADE,	id = 50	min = 0; max = 127
E4_GEN_VEL_HIGH,	id = 51	min = 0; max = 127
E4_GEN_VEL_HIGHFADE,	id = 52	min = 0; max = 127

The total Max number of words per Voice becomes $146 + (255*13) = 3461$. Each parameter is 2 bytes, for a total of 6922 Bytes. Each preset can have a maximum of 256 Voices(assuming no Links). The first word is the number of Voices, and only occurs once, so the total Bytes in a maximum sized Preset = $6920 * 256 = 1,771,520$ Bytes. This is just to give you an idea of the Theoretical limits, however it is advisable to keep the Presets to 64k or less.

Preset Dump Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Eh,xxh,xxh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

0Eh = Command::Preset Parameter Dump Request

<xxh,xxh> = Preset number

F7h = EOX

The response is the Preset Dump SYSEX message.

*If a non-existent Preset is requested, the response is a CANCEL message.

*WARNING! Only 1 Preset may be Dumped to or from the E4 at a time!

=====
NEW and IMPROVED Dump Format:

The transfer of large messages shall follow a method similar to the MIDI Sample Dump Standard.

Preset Dumps of the Old format may still be Requested from and Dumped to the E4.

Generic Handshaking Messages:

NEW ACK:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Ah,<pph,pph>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

7Ah = Command::Acknowledge; The last packet was received correctly.

<pph,pph> = Packet number

F7h = EOX

NEW NAK:

EXAMPLE:> {F0h,18h,21h,ddh,55h,79h,<pph,pph>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

79h = Command::Negative Acknowledge; The last packet was received incorrectly, resend.

<pph,pph> = Packet number

F7h = EOX

CANCEL:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Dh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

7Dh = Command::Cancel; Abort the Dump.

F7h = EOX

WAIT:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Ch,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

7Ch = Command::Wait; Stop sending packets until an ACK is received.

F7h = EOX

EOF:

EXAMPLE:> {F0h,18h,21h,ddh,55h,7Bh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = 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

When a Dump is requested or initiated, the first element of the Dump sent is the Dump Header. This contains information on the type of Dump (old or new), The 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 EOS the Dump may have come from. As parameters are added to newer version of EOS, the dump format can expand with that.

The Dump Engine within older EOS versions is smart enough to ignore Parameters it does not understand if a newer dump is transmitted to that old EOS Software.

What follows the Header message are 255-Byte messages that each contain 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.

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

NEW DUMP HEADER:

EXAMPLE:>

```
{F0h,18h,21h,ddh,55h,0Dh,03h,nnh,nnh,kkh,kkh,kkh,kkh,ggh,ggh,1lh,1lh,vvh,vvh,zzh,zzh,F7h}
```

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

0Dh = Command::Preset Dump;

03h = subCommand::NEW Dump Header;

<nnh,nnh> = Preset Number.

<kkh,kkh,kkh,kkh> = Number of Data bytes in the Dump, LSB first.

<ggh,ggh> = Number of Global Parameters, LSB first.

<1lh,1lh> = Number of Link Parameters per Link, LSB first.

<vvh,vvh> = Number of Voice Parameters per Voice, LSB first.

<zzh,zzh> = Number of Sample Zone Parameters per Sample Zone, LSB first.

F7h = EOX

NEW DATA MESSAGE:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Dh,04h,kkh,kkh,<244 Data Bytes>,<Checksum>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

0Dh = Command::Preset Dump

04h = subCommand::NEW Dump Message;

<kkh,kkh> = Running Packet count, LSB first, begins at 1

<244 Data Bytes> (except for last message)

<Checksum> = 1 Byte = 1's compliment of the sum of {<244 Data Bytes>}

F7h = EOF

NEW Dump Data Formats:

/* short form */

```
PresetDump      ::= Name GlobalParms NoOfLinks { Link }*NoOfLinks
                  NoOfVoices { Voice }*NoOfVoices.
Name             ::= 16 * ASCIIChar.
GlobalParms      ::= E4_PRESET_TRANSPOSE ... (end of Global Parameters).
NoOfLinks        ::= MAX(0 - 255, 255-NoOfVoices).
Link             ::= E4_LINK_PRESET ... (end of Link Parameters).
NoOfVoices       ::= MAX(1 - 255, 255-NoOfLinks).
Voice           ::= E4_GEN_GROUP_NUM SingleSampleVoice | MultiSampleVoice.
SingleSampleVoice ::= E4_GEN_SAMPLE VoiceParams 1.
MultiSampleVoice ::= 3FFFh VoiceParams NoOfZones { Zone }*NoOfZones.
VoiceParams      ::= E4_GEN_VOLUME ... (end of Voice Parameters).
NoOfZones        ::= 0 .. 255.
Zone            ::= E4_GEN_SAMPLE E4_GEN_VOLUME E4_GEN_PAN E4_GEN_FTUNE E4_GEN_ORIG_KEY
                  E4_GEN_KEY_LOW ... (end of Sample Zone Parameters).
```

/* long form */

Preset Dump:

```
<244 Data Bytes> x <? messages> = {<NAME>,<DATA 1>,<DATA 2>,...,}
    (last message may contain less than 244 Data Bytes)
<NAME> = Preset Name, 16 ASCII characters
<DATA 1>,<DATA 2>,..., = (see below)
```

The Data is organized in the following way, and then broken into 244 Byte chunks.

```
Preset Name:      16 Bytes
Global Parm:      44 Bytes
Number of Links:  2 Bytes
    Link Parm:    (58 Bytes * Number of Links)
Number of Voices: 2 Bytes
    Voice Parm:   (292 Bytes * Number of Voices)
    Number of SZones (2 Bytes * Number of Voices)
    SZone Parm:   (26 Bytes * Number of SZones per Voice)
```

1 Voice, no Links, no SZones: 358 Data Bytes

{<NAME>,<Global Parm>,<Links>,<Voices>}

<NAME>:

16 ASCII characters, 16 Bytes.

<Global Parm>:

There are currently 22 Global Parameters, for a total of 44 Bytes.

Always starts with the first 6 parms. All parms are 2 Bytes.

E4_PRESET_TRANSPOSE,	id = 0	min = -24;	max = +24	(semitones)
E4_PRESET_VOLUME,	id = 1	min = -96;	max = +10	(dB)
E4_PRESET_CTRL_A,	id = 2	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_B,	id = 3	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_C,	id = 4	min = -1;	max = 127	(-1 = off)
E4_PRESET_CTRL_D,	id = 5	min = -1;	max = 127	(-1 = off)

Then effects A and effects B. If the effects A or B Algorithm is 0, then the effects parameters are the values of Master Effects A or B. After the effects, the next word is the beginning of the LINKS section of Data. More Global Parameters may be added to future versions of EOS, in which case they would follow these Global Effects parameters, but before the LINK parameters. The number of Global Parameters is contained in the Header message.

<Links>:

There are currently 29 LINK parameters, or 58 Bytes per LINK.

The first word(2 Bytes, LSB first) is the number of Links in the Preset.
The max number of Links + the max number of Voices = 256.
Each Link currently has 29 parameters, so the number of Bytes remaining in this section is (29 words * 2 Bytes/word * number of Links).
These 28 word blocks are delivered in order of Link number, starting with 1. If there are no Links in the Preset then no Link data follows the 0 Link count word.

<Voices>:

62 Bytes of Preset so far if no Links.

The first word is the number of Voices in the Preset.
The max number of Voices + the max number of Links = 256.

The next group of words applies to the first Voice.

The first word is the Group number associated with the Voice.

What follows are the Voice Parameters.

The first word following the Voice Parameters is the number of Sample Zones.

- If the Sample Number is 3FFFh, then it is a "multisample" voice.
- If the number of Sample Zones is 1, the Voice is not a "multisample", and the next word is the beginning of the next Voice(the Group number).
- If the number of Sample Zones is greater than 1, then Sample Zone Parameters corresponding to the number of Sample Zones follows, and after the last Sample Zone of the Voice, the next set of Voice parameters follow, assuming another Voice exists.

If no more Voices exist after the last Sample Zone parameter of the current voice, then the Preset is complete.

The Voice Parameters currently consist of:

- General Parameters(20 if single Sample Zone, 19 if a MultiSample Voice),
- Tuning(11)
- Amp/Filt(37)
- Lfo/Aux(24)
- Cords(54)

There are 146 total base(single Sample Voice) parameters per Voice. This number along with the Number Of Samples word = 147 words, or 294 Bytes for a Single Sample Zone Voice.

Additional Sample Zones require an additional 13 parameters per Zone, but 1 less parameter in the Voice(The Sample Original Key Parameter).

The Sample Parameters consist of a subset of the General Parameters. Each additional Sample requires a block of information containing the Sample number, and the 13 current Sample parameters. There can be 255 of these additional Sample zones per Voice.

E4_GEN_SAMPLE,	id = 38	min = 0; max = 999(2999)
E4_GEN_VOLUME,	id = 39	min = -96; max = +10
E4_GEN_PAN,	id = 40	min = -64; max = +63
E4_GEN_FTUNE,	id = 42	min = -64; max = +64
E4_GEN_ORIG_KEY,	id = 44	min = 0; max = 127 (60 = C3)
E4_GEN_KEY_LOW,	id = 45	min = 0; max = 127 (C-2 -> G8)
E4_GEN_KEY_LOWFADE,	id = 46	min = 0; max = 127
E4_GEN_KEY_HIGH,	id = 47	min = 0; max = 127 (C-2 -> G8)
E4_GEN_KEY_HIGHFADE,	id = 48	min = 0; max = 127
E4_GEN_VEL_LOW,	id = 49	min = 0; max = 127
E4_GEN_VEL_LOWFADE,	id = 50	min = 0; max = 127
E4_GEN_VEL_HIGH,	id = 51	min = 0; max = 127
E4_GEN_VEL_HIGHFADE,	id = 52	min = 0; max = 127

The total Max number of words per Voice becomes $147 + (255*13) = 3462$. Each parameter is 2 bytes, for a total of 6924 Bytes. Each preset can have a maximum of 256 Voices (assuming no Links). So $256*6924 = 1772544$ Bytes. Add 62 Bytes for the Name, Globals, Number of Links, and Number of Voices and the total comes to 1,772,606 Bytes! This is just to give you an idea of the Theoretical limits, however it is advisable to keep the Presets to 64k or less.

Preset Dump Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,0Dh,05h,xxh,xxh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

0Dh = Command::Preset Dump

05h = subCommand::NEW Preset Dump Request;

<xxh,xxh> = Preset number

F7h = EOF

The response is the Preset Dump SYSEX message.

*If a non-existent Preset is requested, the response is a CANCEL message.

*WARNING! Only 1 Preset may be Dumped to or from the E4 at a time!

=====
Configuration Utilities:

Preset Memory Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,10h,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

10h = Command::Preset Memory Request

F7h = EOF

RESPONSE:> {F0h,18h,21h,ddh,55h,11h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

11h = Command::Preset Memory Response

<xxh,xxh> = Total Preset Memory (in kBytes) LSB first

<yyh,yyh> = Total Preset Memory Free (in kBytes) LSB first

F7h = EOX

Sample Memory Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,12h,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

12h = Command::Sample Memory Request

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,13h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

13h = Command::Sample Memory Response

<xxh,xxh> = Total Sample Memory (in MBytes) LSB first

<yyh,yyh> = Total Sample Memory Free (in 10's of kBytes) LSB first

F7h = EOX

Configuration Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,14h,F7h}

F0h = sysex message

18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

14h = Command::Configuration Request

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,15h,<Options>,<RAM>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

15h = Command::Configuration Response

<Options> = 7 bit number, each bit representing if an option is present or not.

bit 0: 0 = 64 Voices; 1 = 128 Voice
bit 1: 0 = No FX Card; 1 = FX Card installed
bit 2: 0 = No MIDI card; 1 = MIDI card installed
bit 3: 0 = No Octopus card; 1 = Octopus card installed
bit 4: 0 = No Digital I/O; 1 = Digital I/O installed
bit 5: 0 = <undefined>
bit 6: 0 = <undefined>

<RAM> = 2 Byte Sample RAM configuration(0 - 128 MB)

F7h = EOX

Preset Number Of Voices Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,16h,<xxh,xxh>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

16h = Command::Preset Num Of Voices Request

<xxh,xxh> = Preset Number (LSB first)

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,17h,<Num_Of_Voices>,F7h}

F0h = sysex message

18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

17h = Command::Preset Num Of Voices Response

<Num_Of_Voices> = 2 Byte number of Voices.

F7h = EOX

Preset Number Of Links Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,18h,<xxh,xxh>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

18h = Command::Preset Num Of Links Request

<xxh,xxh> = Preset Number (LSB first)

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,19h,<Num_Of_Links>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

19h = Command::Preset Num Of Links Response

<Num_Of_Voices> = 2 Byte number of Links.

F7h = EOX

Preset Number Of Sample Zones Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,1Ah,<xxh,xxh>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID

55h = Special Editor designator byte

1Ah = Command::Preset Num Of SZones Request

<xxh,xxh> = Preset Number (LSB first)

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,1Bh,<Num_Of_SZones>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

1Bh = Command::Preset Num Of SZones Response

<Num_Of_SZones> = 2 Byte number of SZones.

F7h = EOX

Voice Number Of Sample Zones Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,1Ch,<xxh,xxh>,<yyh,yyh>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

1Ch = Command::Voice Num Of SZones Request

<xxh,xxh> = Preset Number (LSB first)

<yyh,yyh> = Voice Number (LSB first)

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,1Dh,<V_Num_Of_SZones>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

1Dh = Command::Voice Num Of SZones Response

<V_Num_Of_SZones> = 2 Byte number of SZones.

F7h = EOX

Expanded Configuration Request:

This is a Read Only system.

EXAMPLE:> {F0h,18h,21h,ddh,55h,1Eh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

1Eh = Command::Configuration Request

F7h = EOX

RESPONSE:> {F0h,18h,21h,ddh,55h,1Fh,<Options1>,<Options2>,<RAM>,<ROM>,<Flash>,<reserved>,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

1Fh = Command::Configuration Response

<Options1> = 7 bit number, each bit representing if an option is present or not.

bit 0: 0 = 64 Voices; 1 = 128 Voice
bit 1: 0 = No FX Card; 1 = FX Card installed
bit 2: 0 = No MIDI card; 1 = MIDI card installed
bit 3: 0 = No Octopus card; 1 = Octopus card installed
bit 4: 0 = No Digital I/O; 1 = Digital I/O installed
bit 5: 0 = No Preset Flash; 1 = Preset Flash upgrade installed
bit 6: 0 = No ADAT I/O; 1 = ADAT I/O installed

<Options2> = 7 bit number, each bit representing if an option is present or not. Reserved for future expansion.

bit 0: 0 = <undefined>
bit 1: 0 = <undefined>
bit 2: 0 = <undefined>
bit 3: 0 = <undefined>
bit 4: 0 = <undefined>
bit 5: 0 = <undefined>
bit 6: 0 = <undefined>

<RAM> = 2 Byte Sample RAM configuration(0 - 128 MB)
<ROM> = 1 Byte Sample ROM configuration(0 - 128 MB) (0x7f = 128)
<Flash> = 1 Byte Sample Flash configuration(0 - 128 MB) (0x7f = 128)

<reserved> = 4 Bytes reserved for future expansion.

F7h = EOX

Voice Utility Commands:

New Voice:

Adds a new Voice to the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,20h,xxh,xxh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

20h = Command::New Voice

xxh,xxh = Preset Number

F7h = EOX

Delete Voice:

Deletes a Voice from the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,21h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

21h = Command::Delete Voice

xxh,xxh = Preset Number

yyh,yyh = Voice number (0 -> 255)

F7h = EOX

Copy Voice:

Copy a Voice to a new Voice in the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,22h,xxh,xxh,yyh,yyh,zzh,zzh,ggh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID
55h = Special Editor designator byte

22h = Command::Copy Voice

xxh,xxh = Source Preset (000 -> 999) LSB first
yyh,yyh = Source Voice (0 -> 255) LSB first
zzh,zzh = Destination Preset (000 -> 999) LSB first
ggh = Group Number (0 -> 31)

F7h = EOX

Sample Zone Commands:

New Sample Zone:

Adds a new Sample Zone to the currently selected Voice in the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,30h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

30h = Command::New Sample Zone

xxh,xxh = Preset Number
yyh,yyh = Voice Number

F7h = EOX

Get Multisample:

Replace Samples in currently selected Voice with Samples from any other Voice in the Bank.

EXAMPLE:> {F0h,18h,21h,ddh,55h,31h,xxh,xxh,yyh,yyh,zzh,zzh,qqh,qqh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

31h = Command::Get Multisample

xxh,xxh = Source Preset (000 -> 999)
yyh,yyh = Source Voicenum

zzh,zzh = Destination Preset
qqh,qqh = Destination Voicenum

F7h = EOX

Delete Sample Zone:

Delete the currently selected Sample Zone in the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,32h,xxh,xxh,yyh,yyh,zzh,zzh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

32h = Command::Delete Sample Zone

xxh,xxh = Preset Number
yyh,yyh = Voice Number
zzh,zzh = Sample Number

F7h = EOX

Combine:

Take all the Voices in the given group and Combine them into one Voice.

EXAMPLE:> {F0h,18h,21h,ddh,55h,33h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

33h = Command::Combine

xxh,xxh = Preset Number

yyh,yyh = Group number (0 -> 31)

F7h = EOX

Expand:

Expand all the Sample Zones in the currently selected Multisample Voice into separate Voices for each Sample Zone.

EXAMPLE:> {F0h,18h,21h,ddh,55h,34h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

34h = Command::Expand

xxh,xxh = Preset Number
yyh,yyh = Voice Number

F7h = EOX

Link Utility Commands:

New Link:

Adds a new Link to the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,40h,xxh,xxh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

40h = Command::New Link

xxh,xxh = Preset Number

F7h = EOX

Delete Link:

Delete currently selected Link from the Current Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,41h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

41h = Command::Delete Link

xxh,xxh = Preset Number
yyh,yyh = Link Number

F7h = EOX

Sample Defragment Memory:

EXAMPLE:> {F0h,18h,21h,ddh,55h,52h,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

52h = Command::Sample Defragment Memory

F7h = EOF

Copy Link:

Copy a Link from any Preset to any Preset.

EXAMPLE:> {F0h,18h,21h,ddh,55h,42h,xxh,xxh,yyh,yyh,zzh,zzh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

42h = Command::Copy Link

xxh,xxh = Source Preset (000 -> 999)

yyh,yyh = Source Link (0 -> 255)

zzh,zzh = Destination Preset (000 -> 999)

F7h = EOF

Sample Commands

Sample Erase:

EXAMPLE:> {F0h,18h,21h,ddh,55h,50h,xxh,xxh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

50h = Command::Sample Erase

xxh,xxh = Sample Number to Erase

F7h = EOX

Sample Defragment Memory:

EXAMPLE:> {F0h,18h,21h,ddh,55h,52h,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

52h = Command::Sample Defragment Memory

F7h = EOX

Preset Copy:

EXAMPLE:> {F0h,18h,21h,ddh,55h,70h,xxh,xxh,yyh,yyh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

70h = Command::Preset Copy

xxh,xxh = Source Preset number 0-999(1255)

yyh,yyh = Destination Preset number 0-999(1255)

F7h = EOX

Preset Copy destroys whatever Preset existed in the Destination location.

If There is not enough Preset memory to copy the Preset, the copy is aborted and a NAK message is sent as a reply.

Preset Delete:

EXAMPLE:> {F0h,18h,21h,ddh,55h,71h,xxh,xxh,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

71h = Command::Preset Delete

xxh,xxh = Preset number 0-999(1255)

F7h = EOX

Multimode Map Dump:

EXAMPLE:> {F0h,18h,21h,ddh,55h,72h,<multimode map>,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID

55h = Special Editor designator byte

72h = Command::Multimode Map Dump

<multimode map> = 128 Bytes for 16 MIDI Channels

256 Bytes for 32 MIDI Channels (if expansion card)

F7h = EOX

The structure of a Multimode Map is like a string of Parameters without their id's. Each Channel has 4 parameters, or 8 Bytes. The Channel number and Parameter id's are assumed by the fixed order of the message. For 16 channels this means 8 Bytes * 16, or 128 Bytes. For 32 Channels it is double, or 256 Bytes. If the receiving machine is sent a 32 Channel Multimode Map and does not have the Midi expansion card, it will Truncate the message and only read in the first 16 channels. If a Multimode Dump is requested from a machine with no Midi expansion card, it will only generate a dump of the 16 Channels.

Ch.1 Preset (2 Bytes)

Ch.1 Volume (2 Bytes)

Ch.1 Pan (2 Bytes)

Ch.1 Submix (2 Bytes)

Ch.2 Preset (2 Bytes)

Ch.2 Volume (2 Bytes)

Ch.2 Pan (2 Bytes)

Ch.2 Submix (2 Bytes)

Ch.3 Preset (2 Bytes)

Ch.3 Volume (2 Bytes)

Ch.3 Pan (2 Bytes)

Ch.3 Submix (2 Bytes)

...

Multimode Map Dump Request:

EXAMPLE:> {F0h,18h,21h,ddh,55h,73h,F7h}

F0h = sysex message

18h = EMU ID

21h = E4 ID

ddh = Device ID
55h = Special Editor designator byte

73h = Command::Multimode Map Dump Request

F7h = EOX

Erase Current RAM Bank:

EXAMPLE:> {F0h,18h,21h,ddh,55h,74h,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

74h = Command::Erase Current RAM Bank

F7h = EOX

Erase All RAM Presets:

EXAMPLE:> {F0h,18h,21h,ddh,55h,75h,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

75h = Command::Erase All RAM Presets

F7h = EOX

Erase All RAM Samples:

EXAMPLE:> {F0h,18h,21h,ddh,55h,76h,F7h}

F0h = sysex message
18h = EMU ID
21h = E4 ID
ddh = Device ID
55h = Special Editor designator byte

76h = Command::Erase All RAM Samples

F7h = EOX

