

# Appendix B

## SysEx Control of KDFX

Any KDFX parameter that can be set to a destination of FXMod can also be controlled by MIDI system exclusive (SysEx) messages. This takes a little more effort, but allows more flexibility. It's especially useful when the K2600 is in Master effects mode (the FX Mode parameter on the Effect-mode page is set to Master). It's also a way to get additional real-time control—beyond the 18 FXMods that are available for a given program or setup.

Note that using SysEx control temporarily disables FXMod control for the corresponding parameter. For example, if a studio's Mix level is controlled by an FXMod, then you send a SysEx message to change it, the FXMod that was controlling the Mix level is disabled, and won't take effect again until the program or setup containing the FXMod gets selected.

You'll find general information about the K2600's SysEx implementation in Chapter 7.

### SysEx Message Structure

A standard SysEx message is a string of hexadecimal numerals, each of which represents a byte of MIDI data ranging in value from 0 to 127—for example 2A, which represents the decimal numeral 42:  $(2 \times 16) + 10$ ). The hexadecimal numerals correspond to particular SysEx commands. Many of these commands are standardized by the MIDI Specification. Others are assignable by individual manufacturers.

Every SysEx command consists of three basic parts: header, body, and end. The header includes general data, like where the message is intended to go, and what type of message it is. The body issues the specific commands you want to send, and the end simply indicates that the SysEx message is finished.

#### Header

The following table provides the header information required for sending a KDFX-control SysEx message to the K2600.

Hexadecimal Value	Corresponding Decimal Value	Corresponding SysEx Command
F0	240	Start of SysEx message
07	7	Manufacturer ID (7 is Kurzweil/Young Chang)
00	00	Unit ID; if you're sending SysEx from the same source to multiple K2600s, use a different ID value for each one
78	120	Product ID (78 is K2000/K2500/K2600)
1B	27	Message type (1B is KDFX control)

Every KDFX-control SysEx message you send to the K2600 must start with this string of numerals. This lets the K2600 know that the remainder of the message contains specific KDFX-control instructions.

## Body

The body of each SysEx message is where you issue one or more specific commands for KDFX control. Each specific command consists of four bytes (a string of four hexadecimal numerals). Each SysEx message you send can contain as many of these specific commands as you want.

Command Type	Allowable Values (Hexadecimal)	Allowable Values (Decimal)	Description
Device selection	00–2E	0–46	Studio component to be controlled (FXBus1, for example)
Parameter selection	Depends on device value	Depends on device value	Parameter to be controlled (Mix Lvl, for example)
Parameter value: MSB	00, 01, 7F	0, 1, 127	With LSB, sets value of parameter to be controlled
Parameter value: LSB	00–7F	0–127	Combined with MSB, sets value of parameter to be controlled

**Table B-1 SysEx Message Body**

See *MSB and LSB* on page -4 for an explanation of how to use MSB and LSB to send values in the range from -128 to 255.

## End

The last hexadecimal numeral in a SysEx message is always F7 (127 decimal), which indicates the end of the SysEx message.

## Device Codes

These codes identify the studio component that you want to control via SysEx. Use one of these values for the device selection byte in the body of your SysEx message.

Device Code (Hexadecimal)	Device Code (Decimal)	Studio Component
00	0	Send1 for Input A (or for A Left if Input A receives a mono signal)
01	1	Send1 for Input A Right (if Input A receives a mono signal)
02	2	Send1 for Input B (or for B Left if Input B receives a mono signal)
03	3	Send1 for Input B Right (if Input B receives a mono signal)
04	4	Send1 for Input C (or for C Left if Input C receives a mono signal)
05	5	Send1 for Input C Right (if Input C receives a mono signal)
06	6	Send1 for Input D (or for D Left if Input D receives a mono signal)
07	7	Send1 for Input D Right (if Input D receives a mono signal)
08–0F	8–15	Send2 for Inputs A–D (if input is stereo, use 08, 0A, 0C, and 0E)
10–17	16–23	1st EQ block for Inputs A–D
18–1F	24–31	2nd EQ block for Inputs A–D
20, 22, 24, 26	32, 34, 36, 38	Aux send for FXBuses 1–4
21, 23, 25, 27	33, 35, 37, 39	Mix send for FXBuses 1–4
28	40	Mix send for Aux bus
29	41	Final mix
2A	42	FX Preset for Aux bus
2B–2E	43–46	FX Preset for FXBuses 1–4

## Parameter Codes

These codes identify the specific parameters for each studio component (device). Use one of these values for the parameter selection byte in the body of your SysEx message.

Device Code (Hexadecimal)	Parameter Code (Hexadecimal)	Parameter Code (Decimal)	Parameter
00–0F	00	0	Level
	01	1	Pan or Balance
	02	2	Width (for stereo inputs only)
10–1F	00	0	Gain (or Frequency if EQ block is hipass or Lopass)
	01	1	Frequency
20–29	00	0	Level
	01	1	Balance
2A–2E	00	0	Wet/Dry (or In/Out)
	01–2B	1–43	Variable, depending on FX Preset

Here’s an example, which sets a value of 50% for the Wet/Dry mix of the effect on the Aux bus. We’ve included both hexadecimal and decimal values.

	Start	Manufacturer ID	Unit ID	Product ID	Message Type	Device Selection	Parameter Selection	Value MSB	Value LSB	End
Hex	F0	07	00	78	1B	2A	00	00	32	F7
Dec	240	7	0	120	27	42	0	0	50	247

## MSB and LSB

The K2600 can accept either unsigned (positive only) or signed (positive and negative) values. Unsigned values can range from 0 to 255, and signed values can range from -128 to 127. Both of these ranges require eight bits of MIDI information. Since each byte of MIDI information contains only 7 meaningful bits, you need two bytes to send eight bits of information. The K2600 interprets these bytes as a two-byte pair and not as unrelated bytes. The first byte, called the most-significant byte (MSB) sets the general range of the value, while the second byte (the least-significant byte or LSB) sets the specific range. The following table shows several decimal values and the corresponding MSB-LSB hexadecimal values.

Decimal Value	Corresponding Hexadecimal Value	Corresponding SysEx Command	
		MSB	LSB
255	00FF	01	7F
192	00C0	01	40
128	0080	01	00
127	007F	00	7F
64	0040	00	40
0	0000	00	00
-1	FFFF	7F	7F
-64	FFC0	7F	40
-127	FF81	7F	01
-128	FF80	7F	00

Here's a different way to look at it:

Parameter Value (Decimal)	MSB (Hexadecimal)	LSB
Unsigned, 128 to 255	01	(Parameter Value - 128 decimal)
Unsigned, 0 to 127	00	Parameter Value (decimal)
Signed, 0 to 127	00	Parameter Value (decimal)
Signed, -128 to -1	7F	(Parameter Value + 128 decimal)

For example, if you wanted to send a value of 216, the MSB would be 01 hex, and the LSB would be (216 - 128), or 88 decimal (58 hex). To send a value of -32, the MSB would be 7F, and the LSB would be (-32 + 128), or 96 decimal (60 hex).

If you're using a dedicated MIDI source to generate SysEx, you might not need to calculate the parameter values, since the MIDI source might do it for you. For example, with one well-known MIDI fader box, the following values configure a fader for control over the Wet/Dry mix of the effect on the Aux bus:

Function	<b>String</b>
String	<b>F0 07 00 78 1B 2A 00 pr pr F7</b>
Min	<b>0</b>
Max	<b>100</b>
Param Format	<b>2Byte, 7Bits, hi -&gt; lo</b>

Moving the fader changes the values represented by **pr**.

