

XW-P1/XW-G1 MIDI Implementation

CASIO COMPUTER CO., LTD.

Contents

I	MIDI Message Overview	9
1	Product Configuration as a MIDI Device	9
1.1	System Section	9
1.2	Performance Controller Section	9
1.3	Sound Generator Section	9
2	Timbre Type Specific Operation	10
3	Controlling Send/Receive of MIDI Messages in Each Instrument Part	10
4	Conditions that Disable Message Send and Receive	10
II	Channel Message	11
5	Note Off	11
6	Note On	11
7	Control Change	12
7.1	Bank Select (00H,20H)	12
7.2	Modulation (01H)	13
7.3	Portamento (05H)(Solo Synthesizer tone selected)	13
7.4	Data Entry (06H,26H)	13
7.5	Volume (07H)	13
7.6	Pan (0AH)	14
7.7	Expression (0BH)	14
7.8	General Use Controllers 1 through 8 (10H through 13H, 50H through 53H)	14
7.9	Hold1 (40H)	15
7.10	Portamento On/Off(41H)(Solo Synthesizer tone selected)	15

7.11	Sostenuto (42H)	16
7.12	Soft (43H)	16
7.13	Drawbar Position 16'(46H)(Drawbar tone selected)	16
7.14	Filter Resonance(47H)	16
7.15	Drawbar Position 5 1/3'(47H)(Drawbar tone selected)	17
7.16	Release Time (48H)	17
7.17	Drawbar Position 8'(48H)(Drawbar tone selected)	17
7.18	Attack Time (49H)	17
7.19	Drawbar Position 4'(49H)(Drawbar tone selected)	18
7.20	Filter Cut Off (4AH)	18
7.21	Drawbar Position 2 2/3'(4AH)(Drawbar tone selected)	18
7.22	Drawbar Position 2'(4BH)(Drawbar tone selected)	19
7.23	Vibrato Rate (4CH)	19
7.24	Drawbar Position 1 3/5'(4CH)(Drawbar tone selected)	19
7.25	Vibrato Depth (4DH)	19
7.26	Drawbar Position 1 1/3'(4DH)(Drawbar tone selected)	20
7.27	Vibrato Delay (4EH)	20
7.28	Drawbar Position 1'(4EH)(Drawbar tone selected)	20
7.29	Drawbar Organ Type(4FH)(Drawbar tone selected)	21
7.30	Drawbar Organ 2nd Percussion(54H)(Drawbar tone selected)	21
7.31	Drawbar Organ 3rd Percussion(55H)(Drawbar tone selected)	21
7.32	Drawbar Organ Percussion Decay Time(56H)(Drawbar tone selected)	21
7.33	Drawbar Organ Key On Click(57H)(Drawbar tone selected.)	22
7.34	Drawbar Organ Key Off Click(58H)(Drawbar tone selected.)	22
7.35	Vibrato Rate (59H)(Drawbar tone selected.)	22
7.36	Vibrato Depth (5AH)(Drawbar tone selected)	22
7.37	Reverb Send (5BH)	23
7.38	Chorus Send (5DH)	23
7.39	NRPN (62H,63H)	23
7.40	RPN (64H,65H)	33
7.41	All Sound Off (78H)	35
7.42	Reset All Controllers (79H)	35
7.43	All Notes Off (7BH)	35
7.44	Omni Off (7CH)	35
7.45	Omni On (7DH)	36
7.46	Mono (7EH)	36
7.47	Poly (7FH)	36

8 Program Change

36

9	Channel After Touch	37
10	Pitch Bend	37
III	System Message	39
11	Timing Clock	39
12	Start	39
13	Stop	39
14	Active Sensing	39
15	System Exclusive Message	40
15.1	Universal Real Time System Exclusive Message	40
15.2	Universal Non Real Time System Exclusive Message	42
15.3	Instrument-Specific System Exclusive Message	42
IV	Instrument-Specific System Exclusive Messages	43
16	Format	43
16.1	Message Classifications	43
16.2	Basic Message Structure	44
16.3	Format of Each Field	44
17	Individual Parameter Operations	52
18	Parameter Set Transfer	52
18.1	Communication Modes	52
18.2	One-way Mode Communication Flow	53
18.3	Handshake Mode Communication Flow	55
V	Parameter List	63
19	Using the Parameter List	63
20	System Parameters	63
20.1	System Information Parameter	63
20.2	System Exclusive Protocol Parameter	64
20.3	Data Management Parameter	64

21	Patch Parameter	66
21.1	Analog Input Tune Parameter	66
21.2	Card Audio Parameter	66
21.3	DSP Output Parameter	66
21.4	DSP Setup Parameter	66
21.5	Master EQ Parameter	66
21.6	Master Tune Parameter	67
21.7	Master Mixer Parameter	67
21.8	Part Parameter	67
21.9	System Chorus Parameter	68
21.10	System Reverb Parameter	68
21.11	Patch Etc Parameter	68
22	Tone Parameter	69
22.1	Basic Parameter	69
23	Melody Parameter	70
23.1	Melody Parameter	70
24	Drum Parameter	70
24.1	Instrument Parameter (x128instrument)	70
24.2	Velocity Split Parameter (x4velocity-split x128instrument)	71
24.3	LFO Parameter	71
25	Drawbar Parameter(XW-P1 only)	71
25.1	Drawbar Parameter	71
26	Hex Layer Parameter(XW-P1 only)	72
26.1	Hex Layer Parameter (x6layer)	72
26.2	Hex Layer LFO Parameter	72
27	Solo Synth Parameter	73
27.1	Solo Synth OSC Block Basic (x6oscillator)	73
27.2	Solo Synth OSC Block Oscillator (x5oscillator)	73
27.3	Solo Synth OSC Block Filter (x5oscillator)	74
27.4	Solo Synth OSC Block Amp (x5oscillator)	75
27.5	Solo Synth Etc (x8controller)	76
27.6	Solo Synth Controller (x8controller)	76
27.7	Solo Synth LFO (x2lfo)	78
27.8	Solo Synth PWM	79
27.9	Solo Synth Total Filter	79

28	User Wave Parameter(XW-G1 only)	80
28.1	User Wave Key Splits Parameter (x10splits)	80
28.2	User Wave LFO Parameter	80
28.3	User Wave Looper Parameter	81
29	DSP Parameter	81
29.1	DSP Basic	81
30	All Data Parameter	81
30.1	All Directory Info	81
31	Step Sequencer Parameter	82
31.1	Step Sequencer Directory Info	82
32	Step Sequencer Chain Parameter	82
32.1	Step Sequencer Chain Directory Info	82
33	Arpeggio Parameter	82
33.1	Arpeggio Directory Info	82
34	Phrase Parameter	82
34.1	Phrase Directory Info	82
35	Spec Parameter	82
VI	Parameter Set List	85
36	Parameter Set Table	85
36.1	XW-P1	85
36.2	XW-G1	86
VII	DSP Parameter List	87
37	DSP Type List	87
37.1	Solo Synth DSP	87
37.2	Normal DSP	87
38	DSP Parameter Set Type	88
38.1	Solo Synth Bypass	88
38.2	Solo Synth Auto Pan	88
38.3	Solo Synth Distortion	89
38.4	Solo Synth Flanger	89

38.5	Solo Synth Chorus	89
38.6	Solo Synth Delay	89
38.7	Solo Synth Ring Modulator	90
38.8	Wah	90
38.9	Compressor	90
38.10	Distortion	90
38.11	Enhancer	90
38.12	Auto Pan	90
38.13	Tremolo	91
38.14	Phaser	91
38.15	Flanger	91
38.16	Chorus	91
38.17	Delay	92
38.18	Reflection	92
38.19	Rotary	92
38.20	Ring Modulator	93
38.21	LoFi	93
38.22	Wah Compressor	93
38.23	Wah Distortion	93
38.24	Wah Chorus	94
38.25	Wah Flanger	94
38.26	Wah Reflection	94
38.27	Wah Tremolo	94
38.28	Wah Auto Pan	95
38.29	Compressor Wah	95
38.30	Compressor Distortion	95
38.31	Compressor Chorus	96
38.32	Compressor Flanger	96
38.33	Compressor Reflection	96
38.34	Compressor Tremolo	96
38.35	Compressor Auto Pan	96
38.36	Distortion Wah	97
38.37	Distortion Compressor	97
38.38	Distortion Chorus	97
38.39	Distortion Flanger	97
38.40	Distortion Reflection	98
38.41	Distortion Tremolo	98
38.42	Distortion Auto Pan	98
38.43	Chorus Reflection	98
38.44	Chorus Auto Pan	98

38.45	Flanger Reflection	99
38.46	Flanger Auto Pan	99
38.47	Reflection Distortion	100
38.48	Reflection Chorus	100
38.49	Reflection Auto Pan	100
38.50	Tremolo Distortion	100
38.51	Tremolo Chorus	100
38.52	Tremolo Flanger	101
38.53	Tremolo Reflection	101

VIII Setting Values and Send/ Receive Values 102

39	Setting Value Tables	102
39.1	Off/On Setting Value Table	102
39.2	-64 - 0 - +63 Setting Value Table	102
39.3	Pan Setting Value Table	102
39.4	Fine Tune Setting Value Table	102
39.5	Drawbar Position 設定値テーブル	103
39.6	Sine/Vintage Setting Value Table	103
39.7	Tempo Sync Setting Value Table	103
39.8	0-3 Setting Value Table	103
39.9	0-5 Setting Value Table	103
39.10	Chorus Mode Setting Value Table	104
39.11	Delay Level Setting Value Table	104
39.12	Delay Type Setting Value Table	104
39.13	LFO Wave Form1 Setting Value Table	104
39.14	LFO Wave Form2 Setting Value Table	104
39.15	LFO Wave Form3 Setting Value Table	104
39.16	LoFi Noise Level Setting Value Table	104
39.17	Reflection Setting Value Table	105
39.18	Ring Type Setting Value Table	105
39.19	Rotate/Brake Setting Value Table	105
39.20	Slow/Fast Setting Value Table	105
39.21	-128 - 0 +127 Setting Value Table	105
39.22	-256 - 0 +255 Setting Value Table	105
39.23	Envelope Clock Trigger Setting Value Table	106
39.24	Filter Cutoff Setting Value Table	106
39.25	Filter Gain Setting Value Table	107
39.26	Synth Ext Osc Pitch Shifter Mode Setting Value Table	107

39.27	Synth Ext Osc Pitch Shifter Mix Setting Value Table	107
39.28	Synth LFO Wave Setting Value Table	108
39.29	Synth LFO Sync Setting Value Table	108
39.30	Synth LFO Clock Sync Setting Value Table	108
39.31	Synth Total Filter Type Setting Value Table	109
39.32	Hex Layer Detune Setting Value Table	109

IX MIDI Implementation Notation 110

40	Value Notation	110
40.1	Hexadecimal Notation	110
40.2	Binary Notation	110

Part I

MIDI Message Overview

1 Product Configuration as a MIDI Device

As a MIDI device, this Instrument consists of the System Section, Sound Generator Section, and Performance Controller Section described below. Each of these sections can send and receive specific MIDI Messages in accordance with its function.

1.1 System Section

The System Section manages the Instrument status and user data. A communication method known as a “bulk dump” can be used for two-way transfer of user data between the Instrument and a computer.

1.2 Performance Controller Section

The Performance Controller Section performs keyboard play and controller operations, and generates performance messages in accordance with auto play, etc. Basically, generated performance messages are sent to external destinations while also being transmitted to the Sound Generator Section. The channel number of the sent channel message is in accordance with the Instrument’s MIDI setting. For details about the MIDI setting, see the Instrument User’s Guide.

1.3 Sound Generator Section

The Sound Generator Section mainly performs receive of performance information and sound source setting information. It consists of a common part that does not depend on the channel and a musical instrument part that is independent of each channel.

1.3.1 Sound Generator Common Block

The common block consists of system effects, master control, etc. These can be controlled by mixer function, effect function, general universal system exclusive messages, or the Instrument’s system exclusive messages or all.

1.3.2 Instrument Part Block

The instrument part section consists of a total of 16 instrument parts. The settings of each part can be changed using the mixer function, channel messages or Instrument’s system exclusive messages or all. Part numbers 01 through 04 in particular are called a zone, and the zone editor function can be used to modify operations and settings. See the Instruments User’s Guide for details about zones.

The functions assigned to each part are shown below. The MIDI send channel and MIDI receive channel can be changed using the Instruments’s MIDI settings.

Part number	MIDI Receive Ch	MIDI Send Ch	Assigned Function
01	01-16	01-16	Zone 1/Step Sequencer(Solo 1)/Multi-function Phrase 1(Note1)/SMF play/MIDI IN
02	01-16	01-16	Zone 2/SMF play/MIDI IN
03	01-16	01-16	Zone 3/SMF play/MIDI IN
04	01-16	01-16	Zone 4/SMF play/MIDI IN
05	01-16	01-16	Multi-function Phrase 1(Note1)/SMF play/MIDI IN
06	01-16	01-16	Multi-function Phrase 2(Note1)/SMF play/MIDI IN
07	01-16	01-16	Guide on/Precount on/SMF play/MIDI IN
08	01-16	01-16	Step Sequencer(Drum 1)/SMF play/MIDI IN
09	01-16	01-16	Step Sequencer(Drum 2)/SMF play/MIDI IN
10	01-16	01-16	Step Sequencer(Drum 3)/SMF play/MIDI IN
11	01-16	01-16	Step Sequencer(Drum 4)/SMF play/MIDI IN
12	01-16	01-16	Step Sequencer(Drum 5)/SMF play/MIDI IN
13	01-16	01-16	Step Sequencer(Base)/SMF play/MIDI IN
14	01-16	01-16	Step Sequencer(Solo 1)/SMF play/MIDI IN
15	01-16	01-16	Step Sequencer(Solo 2)/SMF play/MIDI IN
16	01-16	01-16	Step Sequencer(Chord)/SMF play/MIDI IN

Note : Multi-function key is available on the XW-G1 only.

2 Timbre Type Specific Operation

The sound source operation performed for a sound generator instrument receive message may depend on the value of the Timbre Type (see “About the Timbre Type” in “8 Program Change”) of each part’s operation mode. For details, see the explanation for each message.

3 Controlling Send/Receive of MIDI Messages in Each Instrument Part

Send and receive of MIDI messages for each instrument part can be controlled by mixer function and global Instrument MIDI settings, Performance MIDI settings, NRPN messages, and Instrument-specific system exclusive messages. See the Instrument’s User’s Guide for details.

4 Conditions that Disable Message Send and Receive

No MIDI messages at all can be sent or received while “Please Wait ...” is on the display.

Part II

Channel Message

MIDI Message Send by Assignable Knobs When the Instrument is in the Performance Mode, any control change, after touch, or other MIDI message from CC:00H to CC:65H can be assigned to the assignable knobs, so the MIDI messages are sent by knob operation. For details about the functions that can be assigned, see the User's Guide.

MIDI Message Send by Multi-function Key Any control change, polyphonic key pressure, or other MIDI message from CC:00H to CC:77H can be assigned to the multi-function key, so the MIDI message is sent are sent by key operation. (The Multi-function key is supported by the XW-G1 only.) For details about the functions that can be assigned, see the User's Guide.

MIDI Message Receive by Virtual Controller When the tone is a Solo Synthesizer tone, CC:00H-CC:61H and/or after touch and other effects can be assigned a virtual controller source, which makes it possible to send and receive their MIDI messages. Operation when a message is received is in accordance with the function assigned to the destination of the virtual controller. For details about the functions that can be assigned, see the User's Guide.

5 Note Off

Message Format: 8nH kkH vvH
9nH kkH 00H(receive only)

n: MIDI Channel Number
kk: Key Number
vv: Velocity(Send:40H, Receive:Ignored)

Send Sent when the keyboard is played, when play is performed using Auto Accompaniment, and when recorded song data is played back. The key number changes in accordance with on the Transpose function and Octave Shift function.

Receive Receipt stops a note being sounded by a note on message.

6 Note On

Message Format: 9nH kkH vvH

n: MIDI Channel Number
kk: Key Number
vv: Velocity

Send Sent when the keyboard is played, when play is performed using Auto Accompaniment, and when recorded song data is played back. The key number changes in accordance with on the Transpose function and Octave Shift function.

Receive Receipt sounds a note of the corresponding instrument part.

7 Control Change

Message Format: BnH cCH vvH

n: MIDI Channel Number
 cc: Control Number
 vv: Value

Drawbar Operation by Control Change Message When a drawbar tone is selected on the applicable MIDI channel (n: MIDI Channel Number), control change messages can be used to perform various drawbar parameter operations. (Drawbar tone selection is supported by the XW-P1 only.) Specifically, control change message assignment can be switched as shown below when a non-drawbar tone is selected or when a drawbar tone is selected.

Control Change Number	Non-drawbar tone selected	Drawbar tone selected
46H	-	Drawbar Position 16'
47H	Filter Resonance	Drawbar Position 5 1/3'
48H	Release Time	Drawbar Position 8'
49H	Attack Time	Drawbar Position 4'
4AH	Filter Cut Off	Drawbar Position 2 2/3'
4BH	-	Drawbar Position 2'
4CH	Vibrato Rate	Drawbar Position 1 3/5'
4DH	Vibrato Depth	Drawbar Position 1 1/3'
4EH	Vibrato Delay	Drawbar Position 1'
4FH	-	Drawbar Organ Type
54H	-	Drawbar Organ 2nd Percussion
55H	-	Drawbar Organ 3rd Percussion
56H	-	Drawbar Organ Percussion Decay Time
57H	-	Drawbar Organ Key On Click
58H	-	Drawbar Organ Key Off Click
59H	-	Vibrato Rate
5AH	-	Vibrato Depth

For details about messages, see each section of this manual that covers them.

7.1 Bank Select (00H,20H)

Message Format: BnH 00H mmH (MSB)
 BnH 20H 11H (LSB)

n: MIDI Channel Number
 mm: MSB Value(Note1)
 11: LSB Value(Send:00H, Receive:Ignored)

Note1 : For details about the relationship between the MSB value and the tone, see the Tone List that comes with the Instrument.

Send Sent when tone, performance number, or Step Sequencer number is selected.

Receive Receipt causes a change in the tone bank number stored in Instrument memory, but the tone is not actually changed until a Program Change message is received. For details, see “8 Program Change”.

The performance number and Step Sequencer number can also be changed by the bank program. For details, see “8 Performance Number/Step Sequencer Number Switching by Bank Select Message and Program Change Message”. For details about performance and the Step Sequencer, see the User’s Guide.

7.2 Modulation (01H)

Message Format: BnH 01H vvH

n: MIDI Channel Number
vv: Value

Send Sent when the modulation wheel is operated.

Receive Receipt adds, to the tone being sounded, modulation of a depth specified by the value. In the case of a tone that already has modulation applied, receipt of this message increases the modulation depth. The modulation effect differs according to the tone being used.

7.3 Portamento (05H)(Solo Synthesizer tone selected)

Note : This message is valid only when a Solo Synthesizer tone is selected for the MIDI channel.

Message Format: BnH 05H vvH

n: MIDI Channel Number
vv: Value

Receive Receipt changes the portamento application time.

7.4 Data Entry (06H,26H)

Message Format: BnH 06H mmH (MSB)

BnH 26H 11H (LSB)

n: MIDI Channel Number
mm: MSB Value
11: LSB Value

Send Sent when there is a change to the parameter assigned to RPN, NRPN.

Receive Receipt changes the parameter assigned to RPN, NRPN.

7.5 Volume (07H)

Message Format: BnH 07H vvH

n: MIDI Channel Number
vv: Value

Send Sent when the mixer part volume is changed.

Receive Receipt changes the mixer part volume.

7.6 Pan (0AH)

Message Format: BnH 0AH vvH

n: MIDI Channel Number
vv: Value(Note1)

Note1 : For information about the relationship between setting values and send/receive values, see “39.3 Pan Setting Value Table” in “VIII Setting Values and Send/Receive Values”.

Send Sent when the pan of any part is changed.

Receive Receipt changes the pan of the corresponding part.

7.7 Expression (0BH)

Message Format: BnH 0BH vvH

n: MIDI Channel Number
vv: Value

Receive Receipt changes the Expression value.

7.8 General Use Controllers 1 through 8 (10H through 13H, 50H through 53H)

On this Instrument, these messages are used to control DSP operation.

Message Format:	BnH 10H vvH	DSP Parameter7 [1]
	BnH 11H vvH	DSP Parameter7 [2]
	BnH 12H vvH	DSP Parameter7 [3]
	BnH 13H vvH	DSP Parameter7 [4]
	BnH 50H vvH	DSP Parameter7 [5]
	BnH 51H vvH	DSP Parameter7 [6]
	BnH 52H vvH	DSP Parameter7 [7]
	BnH 53H vvH	DSP Parameter7 [8]

n: MIDI Channel Number
vv: Value

Send Sent when the drawbar rotary button is operated or when the sliders to which DSP parameters A and B are assigned are operated.

Receive Receipt changes the value of DSP Parameter 7 [1 to 8] (7-bit parameter) assigned to the part specified by the MIDI Channel Number. Any message received that corresponds to the parameter of a number not being used by the currently selected DSP is ignored. For details about Parameter 7 of each DSP, see the explanations under “VII DSP Parameter List”.

Received values and parameter setting values The range of the value of each DSP Parameter 7 array element depends on the selected DSP or array number. Unlike manipulation of a DSP parameter using a System Exclusive Message, a value received by this control change message is always in the range of 0 to 127, but the range is changed in accordance with the setting range of the applicable parameter setting. Because of this, it is impossible for a value to be outside of the range. Conversion to the parameter setting value from the value received with the message can be represented in general terms by the expression shown below.

$$\text{Parameter Setting Value} = \text{Parameter Minimum Value} + (\text{Parameter Maximum Value} - \text{Parameter Minimum Value}) * \left(\frac{\text{Received Value}}{127} \right)$$

7.9 Hold1 (40H)

Message Format: BnH 40H vvH

n: MIDI Channel Number

vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a pedal that has a sustain (damper) function is operated.

Receive Receipt performs an operation equivalent to a sustain pedal operation.

Timbre Type Specific Operation This operation differs in accordance with the Timbre Type (see “About the Timbre Type” in “8 Program Change”) setting.

- Timbre Type: Melody, Drawbar, Hex Layer, Solo Synth or User Wave
Sustain off/on control is performed in accordance with the value of the received message.
- Timbre Type: Drum
The received message does not affect sound source operation.

7.10 Portamento On/Off(41H)(Solo Synthesizer tone selected)

Note : This message is valid only when a Solo Synthesizer tone is selected for the the MIDI channel.

Message Format: BnH 41H vvH

n: MIDI Channel Number

vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the portamento on/off setting.

7.11 Sostenuto (42H)

Message Format: BnH 42H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a pedal that has a sostenuto function is operated.

Receive Receipt performs an operation equivalent to a sostenuto pedal operation.

7.12 Soft (43H)

Message Format: BnH 43H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a pedal that has a soft function is operated.

Receive Receipt performs an operation equivalent to a soft pedal operation.

7.13 Drawbar Position 16'(46H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 46H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 16' is operated.

Receive Receipt changes the drawbar 16' position.

7.14 Filter Resonance(47H)

Message Format: BnH 47H vvH

n: MIDI Channel Number
vv: Value

Receive Receipt changes the resonance intensity.

7.15 Drawbar Position 5 1/3'(47H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 47H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 5 1/3' is operated.

Receive Receipt changes the drawbar 5 1/3' position.

7.16 Release Time (48H)

Message Format: BnH 48H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt makes a relative change in the time it takes for a note to decay to zero after a key is released.

7.17 Drawbar Position 8'(48H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 48H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 8' is operated.

Receive Receipt changes the drawbar 8' position.

7.18 Attack Time (49H)

Message Format: BnH 49H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 –64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt makes a relative change in the time it takes for a note to rise to its maximum level.

7.19 Drawbar Position 4'(49H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 49H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 4' is operated.

Receive Receipt changes the drawbar 4' position.

7.20 Filter Cut Off (4AH)

Message Format: BnH 4AH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 –64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes how the cut-off filter is applied.

7.21 Drawbar Position 2 2/3'(4AH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 4AH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 2 2/3' is operated.

Receive Receipt changes the drawbar 2 2/3' position.

7.22 Drawbar Position 2'(4BH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 4BH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 2' is operated.

Receive Receipt changes the drawbar 2' position.

7.23 Vibrato Rate (4CH)

Message Format: BnH 4CH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the note vibrato rate.

7.24 Drawbar Position 1 3/5'(4CH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 4CH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 1 3/5' is operated.

Receive Receipt changes the drawbar 1 3/5' position.

7.25 Vibrato Depth (4DH)

Message Format: BnH 4DH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 –64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the degree of pitch modulation.

7.26 Drawbar Position 1 1/3'(4DH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 4DH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 1 1/3' is operated.

Receive Receipt changes the drawbar 1 1/3' position.

7.27 Vibrato Delay (4EH)

Message Format: BnH 4EH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 –64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the time it takes until note vibrato starts.

7.28 Drawbar Position 1'(4EH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 4DH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.5 Drawbar Position Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a drawbar 1' is operated.

Receive Receipt changes the drawbar 1' position.

7.29 Drawbar Organ Type(4FH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 4FH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.6 Sine/Vintage Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the drawbar parameter type.

7.30 Drawbar Organ 2nd Percussion(54H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 54H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when the 2nd percussion button is operated.

Receive Receipt changes the drawbar parameter 2nd percussion.

7.31 Drawbar Organ 3rd Percussion(55H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 55H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when the 3rd percussion button is operated.

Receive Receipt changes the drawbar parameter 3rd percussion.

7.32 Drawbar Organ Percussion Decay Time(56H)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 56H vvH

n: MIDI Channel Number
vv: Value

Receive Receipt changes the percussion decay time.

7.33 Drawbar Organ Key On Click(57H)(Drawbar tone selected.)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 57H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the drawbar key on click.

7.34 Drawbar Organ Key Off Click(58H)(Drawbar tone selected.)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 58H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the drawbar key off click.

7.35 Vibrato Rate (59H)(Drawbar tone selected.)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 59H vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the note vibrato rate.

7.36 Vibrato Depth (5AH)(Drawbar tone selected)

Note : This message is valid only when a drawbar tone is selected for the MIDI channel.

Message Format: BnH 5AH vvH

n: MIDI Channel Number
vv: Value (Note1)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.2 –64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the degree of pitch modulation.

7.37 Reverb Send (5BH)

Message Format: BnH 5BH vvH

n: MIDI Channel Number
vv: Value

Send Sent when the reverb send of any part is changed.

Receive Receipt changes the reverb send of the corresponding part.

7.38 Chorus Send (5DH)

Message Format: BnH 5DH vvH

n: MIDI Channel Number
vv: Value

Send Sent when the chorus send of any part is changed.

Receive Receipt changes the chorus send of the corresponding part.

7.39 NRPN (62H,63H)

Message Format: BnH 62H 11H (LSB)
BnH 63H mmH (MSB)

n: MIDI Channel Number
11: LSB Value
mm: MSB Value

7.39.1 Part Enable

Message Format: BnH 62H 00H
BnH 63H 22H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
11: (Send:00H, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a mixer part on/off setting is changed.

Receive Receipt changes the mixer part on/off setting.

7.39.2 DSP Enable

Message Format: BnH 62H 01H
BnH 63H 22H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send Sent when a mixer part DSP on/off setting is changed.

Receive Receipt changes the applicable mixer part DSP on/off setting.

7.39.3 Performance Number Select

Message Format: BnH 62H 00H
BnH 63H 24H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (00H - 63H)
ll: (00H:Preset, 40H:User)

Send Sent when the performance number is changed while Perform NRPN is enabled by Instrument settings.

Receive Receipt while Perform NRPN is enabled by Instrument settings changes the performance number.

7.39.4 Step Sequencer Number Select

Message Format: BnH 62H 00H
BnH 63H 25H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (00H - 63H)
ll: (00H:Preset, 40H:User)

Send Sent when the Step Sequencer number is changed while S.Seq NRPN is enabled by Instrument settings.

Receive Receipt while S.Seq NRPN is enabled by Instrument settings changes the Step Sequencer number.

7.39.5 Step Sequencer Pattern Number Select

Message Format: BnH 62H 01H
BnH 63H 25H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Send Sent when the Step Sequencer pattern is changed while S.Seq NRPN is enabled by Instrument settings.

Receive Receipt while S.Seq NRPN is enabled by Instrument settings changes the Step Sequencer pattern is changed.

7.39.6 Step Sequencer Start/Stop

Message Format: BnH 62H 02H
BnH 63H 25H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Send Sent when the Step Sequencer is started or stopped while S.Seq NRPN is enabled by Instrument settings.

Receive Receipt while S.Seq NRPN is enabled by Instrument settings starts or stops the Step Sequencer.

7.39.7 Phrase Sequencer Number Select

Message Format: BnH 62H 00H
BnH 63H 26H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Send Sent when the Phrase Sequencer number is changed while Phrase NRPN is enabled by Instrument settings.

Receive Receipt while Phrase NRPN is enabled by Instrument settings changes the Phrase Sequencer number.

7.39.8 Phrase Sequencer Start/Stop

Message Format: BnH 62H 01H
BnH 63H 26H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Send Sent when the Phrase Sequencer is started or stopped while Phrase NRPN is enabled by Instrument settings.

Receive Receipt while Phrase NRPN is enabled by Instrument settings starts or stops the Phrase Sequencer.

7.39.9 Arpeggio Number Select

Message Format: BnH 62H 00H
BnH 63H 27H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Send Sent when the Arpeggio number is changed while Arp NRPN is enabled by Instrument settings.

Receive Receipt while Arp NRPN is enabled by Instrument settings changes the Arpeggio number.

7.39.10 Drawbar Position

Message Format: BnH 62H ffH
BnH 63H 40H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
ff: Drawbar Foot(Feet) (Note1)
mm: Value (Note2)
ll: (Send:00H, Receive:Ignored)

Note1 : The following shows the relationship between the Drawbar Foot value and the actual foot bar.

ff	Foot Bar
00	Ft16'
01	Ft5 1/3'
02	Ft8'
03	Ft4'
04	Ft2 2/3'
05	Ft2'
06	Ft1 3/5'
07	Ft1 1/3'
08	Ft1'

Note2 : For information about the relationship between setting values and send/receive values, see the "39.5 Drawbar Position Setting Value Table" in "VIII Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the drawbar position in accordance with the message contents (XW-P1 only).

7.39.11 Drawbar Organ Key On Click

Message Format: BnH 62H 09H
BnH 63H 40H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Not sent, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the "39.1 Off/On Setting Value Table" in "VIII Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the drawbar key on click (XW-P1 only).

7.39.12 Drawbar Organ 2nd Percussion

Message Format: BnH 62H 0AH
BnH 63H 40H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the "39.1 Off/On Setting Value Table" in "VIII Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the drawbar parameter 2nd percussion (XW-P1 only).

7.39.13 Drawbar Organ 3rd Percussion

Message Format: BnH 62H 0BH
 BnH 63H 40H
 BnH 06H mmH
 BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Send:00H, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the drawbar parameter 3rd percussion (XW-P1 only).

7.39.14 Percussion Decay Time

Message Format: BnH 62H 0CH
 BnH 63H 40H
 BnH 06H mmH
 BnH 26H 11H

n: MIDI Channel Number
mm: Value
ll: (Not sent, Receive:Ignored)

Receive Receipt changes the percussion decay time (XW-P1 only).

7.39.15 Drawbar Organ Type

Message Format: BnH 62H 0DH
 BnH 63H 40H
 BnH 06H mmH
 BnH 26H 11H

n: MIDI Channel Number
mm: Value (Note1)
ll: (Not sent, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.6 Sine/Vintage Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the drawbar parameter type (XW-P1 only).

7.39.16 Drawbar Organ Key Off Click

Message Format: BnH 62H 0EH
 BnH 63H 40H
 BnH 06H mmH
 BnH 26H 11H

n: MIDI Channel Number
 mm: Value (Note1)
 ll: (Not sent, Receive:Ignored)

Note1 : For information about the relationship between setting values and send/receive values, see the “39.6 Sine/Vintage Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the drawbar key off click (XW-P1 only).

7.39.17 Solo Synth Parameter

Each of the Solo Synthesizer tone parameters can be changed by NRPN.

The relationship between parameters and their NRPN numbers is shown in the table below. How to read the table is described below.

Parameter	Block Name 1	Block Name 2	...	Notes
Parameter Name 1	MSB LSB	MSB LSB	...	
Parameter Name 2	MSB LSB	MSB LSB	...	
:	:	:	...	:

- Parameter Name

This is the name of the parameter. This name is different from the name displayed by the Instrument. For details about each parameter, see the Instrument’s User’s Guide.

- Block Name

This is the name of the block. Solo Synthesizer tones have a total of nine blocks. For details about each block, see the Instrument’s User’s Guide.

- MSB LSB

These are the MSB and LSB of the NRPN. These values specify the block and the parameter.

Solo Synth Osc Edit

Parameter	Synth1 OSC	Synth2 OSC	PCM1 OSC	PCM2 OSC	EXT OSC	Noise OSC	Notes
onoff	30H 00H	31H 00H	32H 00H	33H 00H	34H 00H	35H 00H	Note1
split ui number	30H 01H	31H 01H	32H 01H	33H 01H	34H 01H	35H 01H	
portamento onoff	30H 02H	31H 02H	32H 02H	33H 02H	34H 02H	35H 02H	Note1
portamento time	30H 03H	31H 03H	32H 03H	33H 03H	34H 03H	35H 03H	
legato onoff	30H 04H	31H 04H	32H 04H	33H 04H	34H 04H	35H 04H	Note1
pitch lfo depth 1	30H 05H	31H 05H	32H 05H	33H 05H	34H 05H	35H 05H	
pitch lfo depth 2	30H 06H	31H 06H	32H 06H	33H 06H	34H 06H	35H 06H	
pitch offset pitch	30H 07H	31H 07H	32H 07H	33H 07H	34H 07H	35H 07H	Note2
pitch detune	30H 08H	31H 08H	32H 08H	33H 08H	34H 08H	35H 08H	Note2
pitch envelope init level	30H 09H	31H 09H	32H 09H	33H 09H	34H 09H	35H 09H	
pitch envelope attack time	30H 0AH	31H 0AH	32H 0AH	33H 0AH	34H 0AH	35H 0AH	

Parameter	Synth1 OSC	Synth2 OSC	PCM1 OSC	PCM2 OSC	EXT OSC	Noise OSC	Notes
pitch envelope attack level	30H 0BH	31H 0BH	32H 0BH	33H 0BH	34H 0BH	35H 0BH	
pitch envelope decay time	30H 0CH	31H 0CH	32H 0CH	33H 0CH	34H 0CH	35H 0CH	
pitch envelope sustain level	30H 0DH	31H 0DH	32H 0DH	33H 0DH	34H 0DH	35H 0DH	
pitch envelope release1 time	30H 0EH	31H 0EH	32H 0EH	33H 0EH	34H 0EH	35H 0EH	
pitch envelope release1 level	30H 0FH	31H 0FH	32H 0FH	33H 0FH	34H 0FH	35H 0FH	
pitch envelope release2 time	30H 10H	31H 10H	32H 10H	33H 10H	34H 10H	35H 10H	
pitch envelope release2 level	30H 11H	31H 11H	32H 11H	33H 11H	34H 11H	35H 11H	
pitch envelope clock trigger	30H 12H	31H 12H	32H 12H	33H 12H	34H 12H	35H 12H	Note3
pitch envelope depth	30H 13H	31H 13H	32H 13H	33H 13H	34H 13H	35H 13H	
pitch key follow	30H 15H	31H 15H	32H 15H	33H 15H	34H 15H	35H 15H	Note4
pitch key follow base	30H 16H	31H 16H	32H 16H	33H 16H	34H 16H	35H 16H	
filter cutoff	30H 17H	31H 17H	32H 17H	33H 17H	34H 17H	35H 17H	Note5
filter gain	30H 18H	31H 18H	32H 18H	33H 18H	34H 18H	35H 18H	Note6
filter touch sensitivity	30H 19H	31H 19H	32H 19H	33H 19H	34H 19H	35H 19H	
filter key follow	30H 1AH	31H 1AH	32H 1AH	33H 1AH	34H 1AH	35H 1AH	Note4
filter key follow base	30H 1BH	31H 1BH	32H 1BH	33H 1BH	34H 1BH	35H 1BH	
filter lfo depth 1	30H 1CH	31H 1CH	32H 1CH	33H 1CH	34H 1CH	35H 1CH	
filter lfo depth 2	30H 1DH	31H 1DH	32H 1DH	33H 1DH	34H 1DH	35H 1DH	
filter envelope init level	30H 1EH	31H 1EH	32H 1EH	33H 1EH	34H 1EH	35H 1EH	
filter envelope attack time	30H 1FH	31H 1FH	32H 1FH	33H 1FH	34H 1FH	35H 1FH	
filter envelope attack level	30H 20H	31H 20H	32H 20H	33H 20H	34H 20H	35H 20H	
filter envelope decay time	30H 21H	31H 21H	32H 21H	33H 21H	34H 21H	35H 21H	
filter envelope sustain level	30H 22H	31H 22H	32H 22H	33H 22H	34H 22H	35H 22H	
filter envelope release1 time	30H 23H	31H 23H	32H 23H	33H 23H	34H 23H	35H 23H	
filter envelope release1 level	30H 24H	31H 24H	32H 24H	33H 24H	34H 24H	35H 24H	
filter envelope release2 time	30H 25H	31H 25H	32H 25H	33H 25H	34H 25H	35H 25H	
filter envelope release2 level	30H 26H	31H 26H	32H 26H	33H 26H	34H 26H	35H 26H	
filter envelope clock trigger	30H 27H	31H 27H	32H 27H	33H 27H	34H 27H	35H 27H	Note3
filter envelope depth amp level	30H 28H	31H 28H	32H 28H	33H 28H	34H 28H	35H 28H	
amp touch sensitivity	30H 29H	31H 29H	32H 29H	33H 29H	34H 29H	35H 29H	
amp key follow	30H 2BH	31H 2BH	32H 2BH	33H 2BH	34H 2BH	35H 2BH	
amp key follow base	30H 2CH	31H 2CH	32H 2CH	33H 2CH	34H 2CH	35H 2CH	Note4
amp key follow base	30H 2DH	31H 2DH	32H 2DH	33H 2DH	34H 2DH	35H 2DH	
amp lfo depth 1	30H 2EH	31H 2EH	32H 2EH	33H 2EH	34H 2EH	35H 2EH	
amp lfo depth 2	30H 2FH	31H 2FH	32H 2FH	33H 2FH	34H 2FH	35H 2FH	
amp envelope init level	30H 30H	31H 30H	32H 30H	33H 30H	34H 30H	35H 30H	
amp envelope attack time	30H 31H	31H 31H	32H 31H	33H 31H	34H 31H	35H 31H	

Parameter	Synth1 OSC	Synth2 OSC	PCM1 OSC	PCM2 OSC	EXT OSC	Noise OSC	Notes
amp envelope attack level	30H 32H	31H 32H	32H 32H	33H 32H	34H 32H	35H 32H	
amp envelope decay time	30H 33H	31H 33H	32H 33H	33H 33H	34H 33H	35H 33H	
amp envelope sustain level	30H 34H	31H 34H	32H 34H	33H 34H	34H 34H	35H 34H	
amp envelope release1 time	30H 35H	31H 35H	32H 35H	33H 35H	34H 35H	35H 35H	
amp envelope release1 level	30H 36H	31H 36H	32H 36H	33H 36H	34H 36H	35H 36H	
amp envelope release2 time	30H 37H	31H 37H	32H 37H	33H 37H	34H 37H	35H 37H	
amp envelope release2 level	30H 38H	31H 38H	32H 38H	33H 38H	34H 38H	35H 38H	
amp envelope clock trigger	30H 39H	31H 39H	32H 39H	33H 39H	34H 39H	35H 39H	Note3
pwm pulse width	30H 3AH	31H 3AH	-	-	-	-	
pwm lfo depth 1	30H 3CH	31H 3CH	-	-	-	-	
pwm lfo depth 2	30H 3DH	31H 3DH	-	-	-	-	
Synth sync osc	-	31H 3EH	-	-	-	-	Note1
Synth ext osc original key	-	-	-	-	34H 3FH	-	
Synth ext osc pitch eg trigger	-	-	-	-	34H 40H	-	Note1
Synth ext osc filter eg trigger	-	-	-	-	34H 41H	-	Note1
Synth ext osc amp eg trigger	-	-	-	-	34H 42H	-	Note1
Synth ext osc total filter eg trigger	-	-	-	-	34H 43H	-	Note1
Synth ext osc mic inst level	-	-	-	-	34H 44H	-	
Synth ext osc noise gate threshold	-	-	-	-	34H 45H	-	
Synth ext osc noise gate release	-	-	-	-	34H 46H	-	
Synth ext osc pitch shifter mode	-	-	-	-	34H 47H	-	Note7
Synth ext osc pitch shifter mix	-	-	-	-	34H 48H	-	Note8

Note1 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.22 -256 - 0 - +255 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see the “39.23 Envelope Clock Trigger Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note4 : For information about the relationship between setting values and send/receive values, see the “39.21 -128 - 0 - +127 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note5 : For information about the relationship between setting values and send/receive values, see the “39.24 Filter Cutoff Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note6 : For information about the relationship between setting values and send/receive values, see the “39.25 Filter Gain Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note7 : For information about the relationship between setting values and send/receive values, see the “39.26 Synth Ext Osc Pitch Shifter Mode Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note8 : For information about the relationship between setting values and send/receive values, see the “39.27 Synth Ext Osc Pitch Shifter Mix Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Solo Synth LFO Edit

Parameter	LF01	LF02	Notes
wave	36H 00H	37H 00H	Note1
sync	36H 01H	37H 01H	Note2
rate	36H 02H	37H 02H	
depth	36H 03H	37H 03H	
delay	36H 04H	37H 04H	
rise	36H 05H	37H 05H	
clock trigger	36H 06H	37H 06H	Note3
modulation depth	36H 07H	37H 07H	

Note1 : For information about the relationship between setting values and send/receive values, see the “39.28 Synth LFO Wave Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.29 Synth LFO Sync Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see the “39.30 Synth LFO Clock Sync Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Solo Synth Total Edit

Parameter	TOTAL	Notes
type	38H 00H	Note1
cutoff	38H 01H	
resonance	38H 02H	
touch sensitivity	38H 03H	
key follow	38H 04H	Note2
key follow base	38H 05H	
lfo depth 1	38H 06H	
lfo depth 2	38H 07H	
envelope init level	38H 08H	
envelope attack time	38H 09H	
envelope attack level	38H 0AH	
envelope decay time	38H 0BH	
envelope sustain level	38H 0CH	
envelope release1 time	38H 0DH	
envelope release1 level	38H 0EH	
envelope release2 time	38H 0FH	
envelope release2 level	38H 10H	
envelope clock trigger	38H 11H	Note3
envelope depth	38H 12H	
eg retrigger	38H 13H	Note4

Note1 : For information about the relationship between setting values and send/receive values, see the “39.31 Synth Total Filter Type Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.21 –128 - 0 - +127 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see the “39.23 Envelope Clock Trigger Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note4 : For information about the relationship between setting values and send/receive values, see the “39.1 Off/On Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

7.39.18 Tone Parameter

Parameters assigned to each type of Instrument controller can be changed by NRPN.

The relationship between parameters and their NRPN numbers is shown in the table below.

Tone Etc Edit

Parameter	MSB	LSB	Notes
synth all osc amp env attack time	3EH	00H	
synth all osc amp env release time	3EH	01H	
hex layer layer1 level	3EH	10H	XW-P1 only, Note1
hex layer layer2 level	3EH	11H	XW-P1 only, Note1
hex layer layer3 level	3EH	12H	XW-P1 only, Note1
hex layer layer4 level	3EH	13H	XW-P1 only, Note1
hex layer layer5 level	3EH	14H	XW-P1 only, Note1
hex layer layer6 level	3EH	15H	XW-P1 only, Note1
hex layer all layer cutoff frequency	3EH	16H	XW-P1 only, Note1
hex layer detune	3EH	17H	XW-P1 only, Note2
hex layer all layer attack time	3EH	18H	XW-P1 only, Note1
hex layer all layer release time	3EH	19H	XW-P1 only, Note1
pcm melody cutoff frequency	3EH	20H	
pcm melody attack time	3EH	21H	
pcm melody release time	3EH	22H	

Note1 : For information about the relationship between setting values and send/receive values, see the “39.21 –128 - 0 - +127 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.32 Hex Layer Detune Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Tone Common Edit

Parameter	MSB	LSB	Notes
level	3FH	00H	
reverb send	3FH	01H	
chorus send	3FH	02H	

7.40 RPN (64H,65H)

Message Format: BnH 64H 11H (LSB)
BnH 65H mmH (MSB)

n: MIDI Channel Number
ll: LSB Value
mm: MSB Value

7.40.1 Pitch Bend Sensitivity

Message Format: BnH 64H 00H
BnH 65H 00H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: MSB Value(00H - 18H)
ll: LSB Value(Send:00H, Receive:Ignored)

Send Sent when Bend Range of any part is changed.

Receive Receipt changes Bend Range of the corresponding part.

7.40.2 Fine Tune

Message Format: BnH 64H 01H
BnH 65H 00H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: MSB Value
ll: LSB Value

Send Sent when the fine tune of any part is changed.

Receive Receipt changes the fine tune of the corresponding part.

7.40.3 Coarse Tune

Message Format: BnH 64H 02H
BnH 65H 00H
BnH 06H mmH
BnH 26H 11H

n: MIDI Channel Number
mm: MSB Value(28H - 58H)
ll: LSB Value(Not sent, Receive:Ignored)

Send Sent when the coarse tune of any part is changed.

Receive Receipt changes the coarse tune of the corresponding part. Does not affect sound source operation when the Timbre Type (see “About the Timbre Type” in “8 Program Change”) is Drum.

7.40.4 Null

Message Format: BnH 64H 7FH
BnH 65H 7FH

n: MIDI Channel Number

Send Sent when an RPN, NRPN message send operation is performed.

Receive Receipt de-selects RPN, NRPN.

7.41 All Sound Off (78H)

Message Format: BnH 78H 00H

n: MIDI Channel Number

Receive Receipt stops all voices that are sounding.

7.42 Reset All Controllers (79H)

Message Format: BnH 79H 00H

n: MIDI Channel Number

Send Sent when MIDI send related settings are changed.

Receive Receipt initializes each performance controller.

7.43 All Notes Off (7BH)

Message Format: BnH 7BH 00H

n: MIDI Channel Number

Send Sent when MIDI send related settings are changed.

Receive Receipt releases (key release) all voices that are sounding.

7.44 Omni Off (7CH)

Message Format: BnH 7CH 00H

n: MIDI Channel Number

Receive Receipt performs the same operation as when All Notes Off is received.

7.45 Omni On (7DH)

Message Format: BnH 7DH 00H

n: MIDI Channel Number

Receive Receipt performs the same operation as when All Notes Off is received.

7.46 Mono (7EH)

Message Format: BnH 7EH 00H

n: MIDI Channel Number

Receive Receipt performs the same operation as when All Notes Off is received.

7.47 Poly (7FH)

Message Format: BnH 7FH 00H

n: MIDI Channel Number

Receive Receipt performs the same operation as when All Notes Off is received.

8 Program Change

Message Format: CnH ppH

n: MIDI Channel Number
pp: Program Number (Note1)

Note1 : For details about the relationship between the program number and the tone, see the Tone List that comes with the Instrument.

Send Sent when tone, performance number, or Step Sequencer number is selected.

Receive Receipt changes the ton of the corresponding part. The selected tone is determined by the program value of this message and the Bank Select message value received prior to this message. Also note that receipt of this message also may change the Timbre Type that corresponds to the selected tone. For more information, see “About the Timbre Type” below.

The performance number and Step Sequencer number can also be changed by the bank program. For details, see “8 Performance Number/Step Sequencer Number Switching by Bank Select Message and Program Change Message” below.

About the Timbre Type Tones that are selected by each Instrument part have an attribute that depends on the sound source operation type. This attribute is called the “timbre type,” which is one of the types described below.

- Melody

This timbre type optimizes for normal melody tones. The damper pedal performs on/off operations.

- **Drum**
This setting optimizes for drum sounds. The damper pedal does not function. The Hold1, Channel Coarse Tune, and Master Coarse Tune messages are ignored if they are received.
- **Drawbar(XW-P1 only)**
This setting optimizes for drawbar tones. The damper pedal performs on/off operations.
- **Hex Layer(XW-P1 only)**
This setting optimizes for hex layer tones. The damper pedal performs on/off operations.
- **Solo Synth**
This setting optimizes for solo synth tones. The damper pedal performs on/off operations.
- **User Wave(XW-G1 only)**
This setting optimizes for user wave tones. The damper pedal performs on/off operations.

Performance Number/Step Sequencer Number Switching by Bank Select Message and Program Change Message The bank select message and program change message can be used to switch the performance number and/or sequencer number.

The change target can be switched by the bank select MSB. The change target is specified by the program change number. The bank select LSB is ignored.

The following shows the relationship between the bank select MSB and the change target.

Change Target	Bank Select MSB
Preset Performance	70H
User Performance	71H
Preset Step Sequencer	72H
User Step Sequencer	73H

When Perform NRPN and S.Seq NRPN are enabled by Instrument settings, number switching by bank select and program change is ignored. For details about performance and the Step Sequencer, see the User's Guide.

9 Channel After Touch

Message Format: DnH vvH

n: MIDI Channel Number
vv: Value

Receive Receipt adds, to the tone being sounded, modulation of a depth specified by the value. In the case of a tone that already has modulation applied, receipt of this message increases the modulation depth. The modulation effect differs according to the tone being used.

10 Pitch Bend

Message Format: EnH 11H mmH

n: MIDI Channel Number
11: Value LSB
mm: Value MSB

Send Sent when the bender is operated.

Receive Receipt changes the pitch of the currently sounding note. The range of the pitch change depends on the Bend Range value setting.

Part III

System Message

11 Timing Clock

Message Format: F8H

Send Sent periodically when the MIDI syn mode is master.

Receive Receipt while the MIDI sync mode is slave causes tempo to be synced based in timing clock information.

12 Start

Message Format: FAH

Send Sent when the Step Sequencer is started while the MIDI sync mode is master.

Receive Receipt while the MIDI sync mode is slave starts Auto Accompaniment play upon receipt of the next sent timing clock (F8H).

13 Stop

Message Format: FCH

Send Sent when the Step Sequencer is stopped while the MIDI sync mode is master.

Receive Receipt while the MIDI sync mode is slave stops Auto Accompaniment play.

14 Active Sensing

Message Format: FEH

Send Sent periodically when the MIDI syn mode is master.

Receive Once this message is received, the Active Sensing mode is entered. If no MIDI message is received for a specified amount of time, voices being sounded by this Instrument's sound source are released, the controller is reset, and the Active Sensing mode is exited.

15 System Exclusive Message

Message Format: FOH iiH ddH...F7H

ii: ID Number
dd: Device ID

The Instrument sends and receives standard universal system exclusive messages, and system exclusive messages that have Instrument-specific formats.

ID Number The ID numbers handed by this Instrument are shown below.

ID Number	ID Name
44H	Casio Computer Co. Ltd
7EH	Non Real Time System Exclusive Message
7FH	Real Time System Exclusive Message

Device ID The device ID is used mainly for individual control of multiple devices. When a System Exclusive message is sent, the sending device sends messages that include a value that matches the device ID of the sending device. When a System Exclusive message is received, the receiving device receives only messages that include a value that matches the receiving device ID.

The device ID 7FH is a special value, and receipt is always performed whenever the device ID of either the receiving device or the message is 7FH.

Settings can be configured to change the Instrument's device ID.

15.1 Universal Real Time System Exclusive Message

Message Format: FOH 7FH ddH...F7H

dd: Device ID

15.1.1 Master Volume

Message Format: FOH 7FH ddH 04H 01H 11H mmH F7H

dd: Device ID
11: LSB Value(Receive:Ignored)
mm: MSB Value

Send Sent when the Master Volume is changed.

Receive Receipt changes the Master Volume.

15.1.2 Master Pan

Message Format: FOH 7FH ddH 04H 02H 11H mmH F7H

dd: Device ID
11: LSB Value(Receive:Ignored)
mm: MSB Value(Note1)

Note1 : For information about the relationship between setting values and send/receive values, see "39.3 Pan Setting Value Table" in "VIII Setting Values and Send/Receive Values" of this document.

Send Sent when the Master Pan is changed.

Receive Receipt changes the Master Pan.

15.1.3 Master Fine Tuning

Message Format: FOH 7FH ddH 04H 03H 11H mmH F7H

dd: Device ID
ll: LSB Value(Note1)
mm: MSB Value(Note1)

Note1 : For information about the relationship between setting values and send/receive values, see “39.4 Fine Tuning Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Send This message is sent when the tuning setting is changed.

Receive Receipt changes the tuning setting.

15.1.4 Master Coarse Tuning

Message Format: FOH 7FH ddH 04H 04H 11H mmH F7H

dd: Device ID
ll: LSB Value(Send:00H, Receive:Ignored)
mm: MSB Value(28H - 58H)

Send This message is sent when the Master Coarse Tune setting is changed.

Receive Receipt changes the Patch Master Coarse Tune parameter.

15.1.5 Reverb Time

Message Format: FOH 7FH ddH 04H 05H 01H 01H 01H 01H 01H 01H vvH F7H

dd: Device ID
vv: Value

Receive Receipt changes the Reverb duration.

Message Format: FOH 7FH ddH 04H 05H 01H 01H 01H 01H 02H 01H vvH F7H

dd: Device ID
vv: Value

Receive Receipt changes the Chorus Rate.

15.1.6 Send To Reverb

Message Format: FOH 7FH ddH 04H 05H 01H 01H 01H 01H 02H 04H vvH F7H

dd: Device ID
vv: Value

Receive Receipt changes the Chorus Sent To Reverb setting.

15.2 Universal Non Real Time System Exclusive Message

Message Format: F0H 7EH ddH...F7H

dd: Device ID

15.2.1 GM System On

Message Format: F0H 7EH ddH 09H 01H F7H

dd: Device ID

Receive Receipt puts the sound source into a GM sound source mode.

15.2.2 GM System Off

Message Format: F0H 7EH ddH 09H 02H F7H

dd: Device ID

Receive Receipt changes the sound source setting to the Instrument presetting.

15.2.3 GM2 System On

Message Format: F0H 7EH ddH 09H 03H F7H

dd: Device ID

Receive Though the Instrument does not support GM2, receipt of the GM2 System On message has the same result as receipt of the GM System On message.

15.3 Instrument-Specific System Exclusive Message

Message Format: F0H 44H 16H 02H ... F7H

This message can be used to send the Instrument memory status, for two-way transfer of special operation commands and user data, to perform sound source parameter operations, etc. For more information, see “IV Instrument-Specific System Exclusive Messages”.

Part IV

Instrument-Specific System Exclusive Messages

16 Format

This section explains the format of the Instrument-specific System Exclusive Messages. See “V Parameter List” and “VI Parameter Set List” for information about how parameter sets actually are transferred.

16.1 Message Classifications

Basically, the operation that corresponds to Instrument-specific system exclusive messages is parameter data transfer.

The following operations can be performed from an external device using this parameter transfer message.

- Modification of an individual Instrument parameter
- Batch modification of a particular Instrument parameter set
- Import of an individual Instrument parameter value
- Batch import of a particular Instrument parameter set

In addition to parameters being used as device setting values, some parameters act as commands when received by the Instrument and as device status information when sent from the Instrument.

The following table shows the parameter category for each type of transfer.

Function Section	Parameter Category	Description
System	System	Commands to the Instrument, Instrument stats
	All	All user data
Performance Controller	Step Sequencer	User Step Sequencer
	Step Sequencer Chain	User Step Sequencer Chain
	Arpeggio	User Arpeggio
	Phrase	User Phrase
	Spec	Global settings, settings of each music engine
Sound Generator	Patch	Sound source common settings (system effects, master settings, etc.) Instrument part settings (tone selection, mixer channel setting, tuning, etc.)
	Tone	Tone Setting
	Melody	Melody Setting
	Drum	Drum Setting
	Drawbar	Drawbar Setting(XW-P1 only)
	Hex Layer	Hex Layer Setting(XW-P1 only)
	Solo Synth	Solo Synth Setting
	User Wave	User Wave Setting(XW-G1 only)
DSP	DSP Parameter Setting	

16.2 Basic Message Structure

Instrument-specific system exclusive message operation can be broadly divided between two methods: Individual Parameter Transfer (single parameter send/receive) and Bulk Parameter Set Transfer (batch parameter send/receive). Each method includes a number of different messages.

The field in the system exclusive message that specifies the message type is the action (*act*) field. The format of the *body* part of the message depends on the *act* value.

The table below shows the body format for each action of Instrument-specific system exclusive messages. An actual message consists of the items indicated by Y, from left to right.

	<- <i>body</i> (Depends on <i>act</i>) ->															
	SX	MAN	MOD	<i>dev</i>	<i>act</i>	<i>cat</i>	<i>mem</i>	<i>pset</i>	<i>blk</i>	<i>prm</i>	<i>idx</i>	<i>len</i>	<i>data</i>	<i>img</i>	<i>crc</i>	EOX
IPR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y
IPS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	Y
OBR	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
OBS	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y	-	Y	Y	Y
HBR	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
HBS	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y	-	Y	Y	Y
EXI	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	Y
SBS	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y	-	-	Y
ACK	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
RJC	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
ESS	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
EBS	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
ERR	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y	-	-	Y

16.3 Format of Each Field

16.3.1 SX : System Exclusive message Status

Format: 11110000B (F0H)

This is the System Exclusive Message status byte established by the MIDI standard.

16.3.2 MAN : Manufacturer's ID

Format: 01000100B (CASIO = 44H)

Indicates this Instrument's manufacturer ID.

16.3.3 MOD : Model ID

Format: MSB 00010110B (16H)

LSB 00000011B (03H)

These two successive bytes (MSB, LSB) indicate the XW-P1/XW-G1 model ID.

16.3.4 *dev* : MIDI Device ID 00H - 7FH

Format: 0oddddddB

The contents of this field in a received message are compared with the Model's MIDI Device ID, and receipt of the incoming message is allowed only when the two IDs match. When a message containing 7FH is received, receipt of the message is always allowed, regardless of the Instrument's ID setting.

16.3.5 *act* : Action

Format: 0aaaaaaaaB

This field indicates the operation of the Instrument-specific System Exclusive Message.

aaaaaaaaB	Action	Function
00H	IPR	Individual Parameter Request
01H	IPS	Individual Parameter Send
02H	OBR	One-way Bulk Parameter Set Request
03H	OBS	One-way Bulk Parameter Set Send
04H	HBR	Handshake Bulk Parameter Set Request
05H	HBS	Handshake Bulk Parameter Set Send
08H	SBS	Start of Bulk Dump Session Session
09H	EXI	Extend Interval
0AH	ACK	Acknowledge
0BH	RJC	Reject
0DH	ESS	End of Sub-session
0EH	EBS	End of Bulk Dump Session
0FH	ERR	Error

IPR:Individual Parameter Request Indicates an individual parameter value send request message. When the Instrument receives this action, it uses an IPS message to return the specified parameter value.

IPS:Individual Parameter Send Indicates an individual parameter value send message. When the Instrument receives this action, it rewrites the value specified by the *data* field with the specified parameter value.

OBR:One-way Bulk Parameter Set Request Indicates a send request message using parameter set image one-way mode. When the Instrument receives this action, it uses an OBS message to return the specified parameter set.

OBS:One-way Bulk Parameter Set Bulk Send Indicates a parameter set image send message using one-way mode. When the parameter set to be transferred is greater than a preset size, it is divided into multiple packets and transferred at prescribed time intervals. The time interval is set in accordance with the Oneway Current Interval parameter described under "20.2 System Exclusive Protocol Parameter".

HBR:Handshake Bulk Parameter Set Request Indicates a send request message using the parameter set image handshake mode. When the Instrument receives this action, it uses an HBS message to return the specified parameter set.

HBS:Handshake Bulk Parameter Set Send Indicates a parameter set image send message using handshake mode. The parameter set to be transferred is divided into multiple packets when it is greater than a prescribed size. The packets are transferred in accordance with handshake mode.

EXI:Extend Interval During a dump session, message sent by a devices that should send the next message to tell a device waiting for the next message to extend the message interval. Receipt of this message causes the message wait elapsed time to reset to 0.

SBS:Start of Bulk Dump Session This message is sent to both devices to start a session to transfer a series of parameter sets using one-way protocol or handshake protocol. The protocol used during the session and the data transfer direction is determined in accordance with the value of the data field. For details, see the explanation about the data field. When there is a request to start a handshake protocol session, the devices that receive this message return ACK after setting up to enable a session. This message is ignored if the outlook is that a session cannot be enabled.

ACK:Acknowledge Indicates a message used by the receiver during parameter set handshake mode transfer to convey to the sender that it is ready for send of the next packet. The *cat*, *mem*, and *pset* fields indicate the value carried by the last received message.

RJC:Reject Indicates a message to convey to the other side that an ongoing parameter set one-way mode or handshake mode send or receive session was interrupted. The *cat*, *mem*, and *pset* fields indicate the value carried by the last received message.

ESS:End of Sub-session Indicates there is a message to convey to the receiving device that a one-way mode or handshake mode serial packet transfer for sending a sub-session (one parameter set) is complete. The *cat*, *mem*, and *pset* fields indicate the values in the last received message.

EBS:End of Bulk Dump Session Indicates there is a message to convey to the receiving device that a one-way mode or handshake mode serial parameter set transfer session send, which was launched by some operation, is complete. The *cat*, *mem*, and *pset* fields indicate the values in the last received message.

ERR:Error This message is sent to a device that sent a message during a parameter set transfer session using handshake protocol bulk dump, when the device that received the message encounters some communication problem. The generated error type depends on the value in the data field. For details, see the explanation about the data field.

16.3.6 *cat* : Category

Format: 0ccccccB

The category indicates the categories of data handled by the System Exclusive Message. The ID number (ID) of the Category is indicated on the left, while the communication operation (Action) is indicated on the right.

Category		Transfer		
ID (c)	Parameter Set	Individual Parameter	One-way Bulk	Handshake Bulk
00H	System	A	-	-
02H	Patch	A	A	A
03H	Tone	A	A	A
05H	Melody	A	A	A
06H	Drum	A	A	A
07H	Drawbar(XW-P1 only)	A	A	A
08H	Hex Layer(XW-P1 only)	A	A	A
09H	Solo Synth	A	A	A
0AH	User Wave(XW-G1 only)	A	A	A
13H	DSP	A	A	A
1FH	All	F	A	A
26H	Step Sequencer	F	A	A
27H	Step Sequencer Chain	F	A	A
28H	Arpeggio	F	A	A
29H	Phrase	F	A	A
2AH	Spec	A	A	A

A ... Available (Also including when only some parameters are available.)

F ... File Information (Not the data itself. Name, size, and other file information only.)

- ... Not Available

16.3.7 *mem* : Memory Area ID

Format: 0mmmmmmB

Specifies the memory area that is the object of the parameter transfer. The following are defined for this Instrument.

<i>mem</i>	Data Type	Meaning
0	User area	Read/write enabled
1	Preset area	Read/write disabled
2	Store area	Read/write enabled

16.3.8 *pset* : Parameter Set Number

Format: LSB 0nnnnnnnB
MSB 0mmmmmmmmB

This field is a 2-byte (LSB, MSB) value indicating the number of the parameter set (mmmmmmnnnnnnnB, Binary) being transferred.

16.3.9 *blk* Block Number

The block number is a supplementary number that specifies which block parameter is to be accessed when there are multiple blocks (instrument parts, etc.) that include parameters with the same ID within a single parameter set. The array structure of a block can be expressed up to 4 dimensions, and the size of a 1-dimensional array is expressed as 14 bits.

```

Format:  index3 LSB  0iiiiiiiB
         index3 MSB  0jjjjjjjB
         index2 LSB  0kkkkkkkB
         index2 MSB  0l111111B
         index1 LSB  0mmmmmmB
         index1 MSB  0nnnnnnnB
         index0 LSB  0oooooooB
         index0 MSB  0pppppppB

```

Note : Arranged in high dimension sequence.

1-dimension array block [index0]

Value	Meaning
00jjjjjjjiiiiiiiB	0000H
00l111111kkkkkkkB	0000H
00nnnnnnnmmmmmmB	0000H
00pppppppoooooooB	index0

2-dimension array block [index1][index0]

Value	Meaning
00jjjjjjjiiiiiiiB	0000H
00l111111kkkkkkkB	0000H
00nnnnnnnmmmmmmB	index1
00pppppppoooooooB	index0

3-dimension array block [index2][index1][index0]

Value	Meaning
00jjjjjjjiiiiiiiB	0000H
00l111111kkkkkkkB	index2
00nnnnnnnmmmmmmB	index1
00pppppppoooooooB	index0

4-dimension array block [index3][index2][index1][index0]

Value	Meaning
00jjjjjjjiiiiiiiB	index3
00l111111kkkkkkkB	index2
00nnnnnnnmmmmmmB	index1
00pppppppoooooooB	index0

16.3.10 *prm* : Parameter ID

```

Format:  LSB  0pppppppB
         MSB  0qqqqqqqB

```


The Parameter ID indicates the parameter type. When transferring parameters (see “V Parameter List” below) individually (as opposed to bulk transfer), this field is used to identify the parameter being transferred by its parameter ID.

16.3.11 *idx* : Data Index Number

Format: LSB 0iiiiiiiB
 MSB 0jjjjjjjB

The data index number indicates the first array number of the array from which transfer starts.

16.3.12 *len* : Data Length

Format: LSB 01111111B
 MSB 0mmmmmmB

As shown below, the meaning of this field differs depending on whether an individual transfer or a bulk parameter set transfer is being performed.

Individual Parameter Transfer The value of this field specifies the size of the parameter value stored in the data field. Data length indicates the length of the array being transferred minus 1 when the parameter contains a character string or other similar array structure.

Bulk Parameter Set Transfer The value of this field specifies the size of the parameter set memory image stored in the img field. Data length indicates the number of bytes of data included within a packet. When this value is zero, it means the data itself does not exist.

16.3.13 *data* : Parameter Data

Individual Parameter Transfer

Format: index0 0dddddddB (0eeeeeeeB) (0ffffffB) (0gggggggB) (0hhhhhhhB)
 index1 0dddddddB (0eeeeeeeB) (0ffffffB) (0gggggggB) (0hhhhhhhB)
 index2 0dddddddB (0eeeeeeeB) (0ffffffB) (0gggggggB) (0hhhhhhhB)
 : :
 indexN 0dddddddB (0eeeeeeeB) (0ffffffB) (0gggggggB) (0hhhhhhhB)

Parameter data indicates the parameter value. Data is repeatedly placed in an array of the size equivalent to len+1. For the structure of one data item, the length depends on the data bit width(Parameter List Size), as shown below.

Size	Number of Data
1 - 7	1
8 - 14	2
15 - 21	3
22 - 28	4
29 - 32	5

Each block of data is packed from the lowest order byte first. In the case of multiple-byte data, the lowest weighted bit is the least significant digit of the first data byte, and the highest weighted bit is the most significant digit of the final data byte. The following shows an example of how data would be divided for transfer in the case of 32-bit data.

	7	6	5	4	3	2	1	0
data0:	0	[bit06]	[bit05]	[bit04]	[bit03]	[bit02]	[bit01]	[bit00]
data1:	0	[bit13]	[bit12]	[bit11]	[bit10]	[bit09]	[bit08]	[bit07]
data2:	0	[bit20]	[bit19]	[bit18]	[bit17]	[bit16]	[bit15]	[bit14]
data3:	0	[bit27]	[bit26]	[bit25]	[bit24]	[bit23]	[bit22]	[bit21]
data4:	0	0	0	0	[bit31]	[bit30]	[bit29]	[bit28]

SBS (Start of Bulk Dump Session)

Format: 0bbbbbbbB

The relationship between the data value and error 0bbbbbbbB is defined as shown below.

- Data = 0 : Start OBR Session
Start session to request data using one-way protocol.
- Data = 1 : Start OBS Session
Start session to send data using one-way protocol.
- Data = 2 : Start HBR Session
Start session to request data using handshake protocol. If a device that receives this message accepts the session, it needs to return ACK.
- Data = 3 : Start HBS Session
Start session to send data using handshake protocol. If a device that receives this message accepts the session, it needs to return ACK.

ERR (Error)

Format: 0eeeeeeeB

The relationship between the data value and error 0eeeeeeeB is defined as shown below.

- Data = 0 : Time Out Error
This error message is generated when a preset amount of time elapses without a receiving device receiving an expected message. This error is also generated when an unexpected message is received instead of the expected message. The preset time is set in accordance with the Handshake Max Interval parameter described under “20.2 System Exclusive Protocol Parameter”.
- Data = 1 : Format Error
This error message is issued in the case of an invalid format in an Instrument System Exclusive message received by a receiving device.
- Data = 2 : CRC Error
This error message is issued in the case of an invalid CRC value in an HBS message received by the data receiving device.

Single Parameter Data Size Limit Under initial default settings for the Instrument’s System Exclusive message format, the size of a single message cannot exceed 256 bytes in the case of bulk dump using handshake protocol, and cannot exceed 48 bytes in all other cases. The data size and the array size, however, can cause a packet to exceed 48 bytes when transferring a single parameter array. In this case, the IPS and IPR message data length and data index number values can be modified to enable division of a single parameter value into multiple messages so it can be sent that way. These message sizes can be changed with the system parameter.

16.3.14 *img* : Parameter Set Memory Image

```

Format:  Data0  0aaaaaaaaB
         Data1  0bbbbbbbaB
         Data2  0ccccccbB
         Data3  0ddddcccB
         :      :

```

During data transfer, the memory image data of the parameter set to be sent is read sequentially in 1-byte units starting from the first address. That value is transformed starting from the lower bit to a 7-bit wide data string.

Example: 33-byte data transfer In the case of memory image transfer of the 33 bytes such as Table 1, for example, the transfer image is transformed to 38 bytes as shown in Table 2.

Table 1

	7	6	5	4	3	2	1	0
Memory data 00:	[00.7]	[00.6]	[00.5]	[00.4]	[00.3]	[00.2]	[00.1]	[00.0]
Memory data 01:	[01.7]	[01.6]	[01.5]	[01.4]	[01.3]	[01.2]	[01.1]	[01.0]
Memory data 02:	[02.7]	[02.6]	[02.5]	[02.4]	[02.3]	[02.2]	[02.1]	[02.0]
:								
Memory data 32:	[32.7]	[32.6]	[32.5]	[32.4]	[32.3]	[32.2]	[32.1]	[32.0]

(Bit M of the NNth byte is indicated at [NN.M].)

Table 2

	7	6	5	4	3	2	1	0
Send data 00:	0	[00.6]	[00.5]	[00.4]	[00.3]	[00.2]	[00.1]	[00.0]
Send data 01:	0	[01.5]	[01.4]	[01.3]	[01.2]	[01.1]	[01.0]	[00.7]
Send data 02:	0	[02.4]	[02.3]	[02.2]	[02.1]	[02.0]	[01.7]	[01.6]
:								
Send data 37:	0	0	0	[32.7]	[32.6]	[32.5]	[32.4]	[32.3]

Though transferred data always sequentially uses from bit 0 through bit 7, unused upper bit fields in the final transfer data are filled in with 0.

Parameter Set Packet Splitting When a parameter set is transferred, a single parameter set memory image can be split so it can fit into the preset transfer message size, and transferred as multiple packets. Even when a packet is split, the memory image must be transferred from the beginning in the sequence it is arranged without interruption. When sending a parameter set to the Instrument, the size of a System Exclusive message for a single packet must fit within a preset size. The parameter set memory image to be transferred can be split into 1-byte units, and it does not matter whether the length of each packet is different. When a packet receive error is generated, the sending device needs to resend, but the size of the packet sent does not necessarily need to be the same size as the packet sent when the error was generated. Even the sizes of parameter sets are small, using a single packet to send multiple parameter sets is not supported. With this Instrument, the data size, transfer time interval, and other communication parameters for split packets can be adjusted using the parameters described under “20.2 System Exclusive Protocol Parameter”. For details, see “20.2 System Exclusive Protocol Parameter.”

16.3.15 *crc* : Cyclic Redundancy Check

Format: LSB 0aaaaaaaaB
 0bbbbbbbaB
 0ccccccbB
 0ddddcccB
 MSB 0000ddd dB

CRC32 (in accordance with ISO 8802-3 or IEEE803.2 regulations) 32-bit value (dddddddccccccc-cbbbbbbbaaaaaaaB) calculated for the byte string from “MAN: Manufacturer’s ID” to the last byte of “img: Parameter Set Memory Image” is stored in this “*crc*: Cyclic Redundancy Check”. The receiving unit checks the value, and if it is not correct sends an error as a re-request.

16.3.16 *EOX* : End of System Exclusive Message

Format: 11110111B (F7H)

This is the End of System Exclusive Message status byte established by the MIDI standard.

17 Individual Parameter Operations

There are two parameter unit operations: Individual Parameter Transfer and Individual Parameter Request. For one session, in response to an IPR (Individual Parameter Request) from an external device, this Instrument returns an IPS (Individual Parameter Send) or the session is concluded when the external device or this Instrument spontaneously sends an IPS. If this Instrument received an IPS, the value of the applicable parameter is changed. Depending on the function of a parameter, Individual Parameter Send may be used to issue a command to the Instrument and Individual Parameter Request may be used to check Instrument status information.

<u>Data Receiver</u>	<u>Data Sender</u>	<u>Operation</u>
IPR		Send Request(Optional)
	IPS	Data Transfer

18 Parameter Set Transfer

18.1 Communication Modes

18.1.1 One-way and Handshake

In order to ensure maximum speed for bulk dumping of Parameter Sets, the data format is different from the data format used for Individual Parameter Send. Data is transferred as-is, using the Model’s memory image. Parameter Sets can be transferred by bulk dump using the message exchange types described below.

- One-way mode Parameter Set send/receive
- One-way mode Parameter Set send request send/receive
- Handshake mode Parameter Set send/receive
- Handshake mode Parameter Set send request, receive rejected, error notification send/receive

With the one-way mode, the sending device sends data and ends the session without regard to the response of the receiving device. This mode is best for one-way transfers from a sequencer or similar device.

With the handshake mode, the sending device sends the data and then waits for a response from the receiving device before advancing to the next session. This is a high-speed mode in which there is no time wasted waiting.

See “VI Parameter Set List” for details about Instrument parameter sets.

18.1.2 Session and Subsession

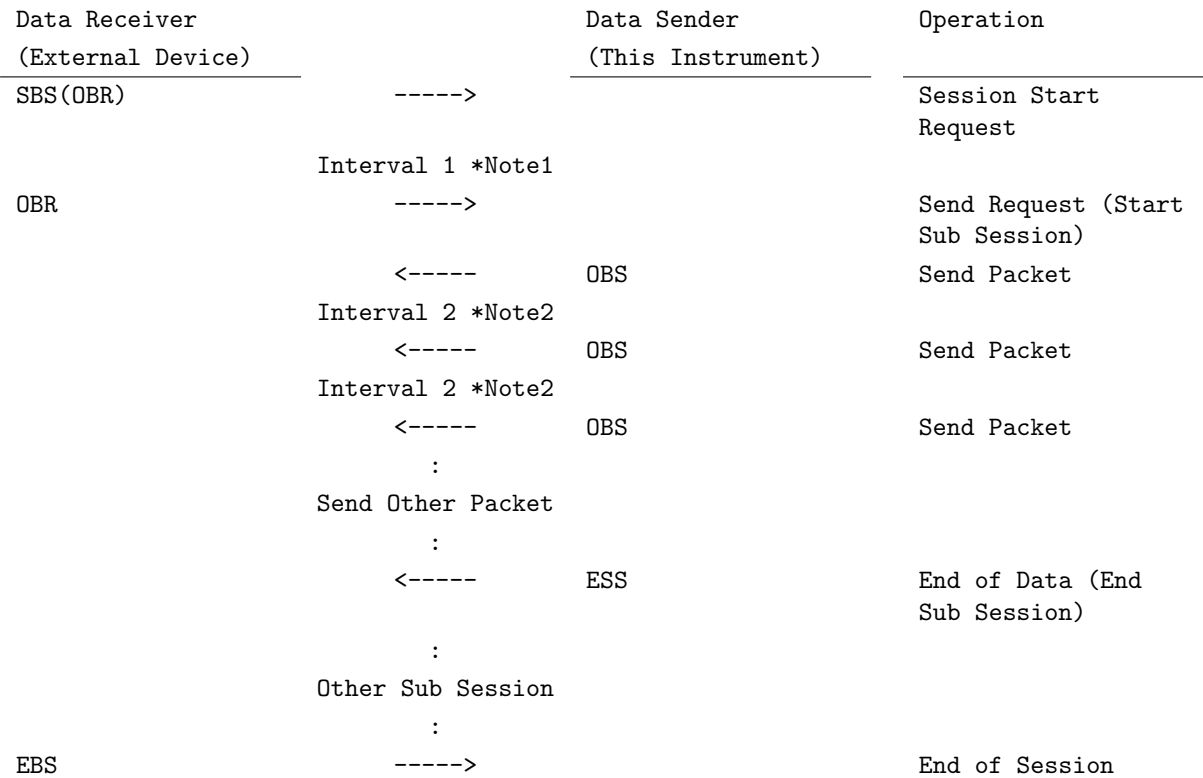
Subsession “One subsession” refers to transfer of one parameter set. A subsession transfers one parameter set or a parameter set that has been divided into multiple packets for transfer, with ESS (End of Sub-session) at the end to terminate the send. Division of a parameter set into multiple packets is used when the size of the parameter set is greater than a prescribed size. The packet number in the packet index field indicates the sequential position of a packet relative to the other packets. A single packet cannot be used to transfer multiple small parameter sets. A parameter set delimiter always must be transferred as a packet delimiter.

Session “One session” refers to a series of processes that occur for one user operation. One subsession or multiple subsessions make up a session. The sender sends EBS (End of Bulk Dump Session) to end a session. Regardless of whether there is a single parameter set or multiple parameter sets being transferred, a bulk dump always takes the form of a session, never a subsession only.

18.2 One-way Mode Communication Flow

A single session starts when an external device, which wants to start communication for data send/receive using one-way protocol, sends an SBS (Start of Bulk Dump Session) message to this Instrument, which is its communication partner. The external device starts a request send using OBR or a data send using OBS. The sub session ends when one parameter set that needs to be transferred by the data send device is complete. After the send of all the parameter sets is complete, the external device that started the communication sends an EBS to inform the Instrument that the session is ended. The transfer messages of a single parameter set cannot exceed a preset size. To do this, messages are split into multiple packets that are less than the preset size, and transfer is performed according to a preset interval. The preset size and preset time are determined in accordance with the parameters described under “20.2 System Exclusive Protocol Parameter”.

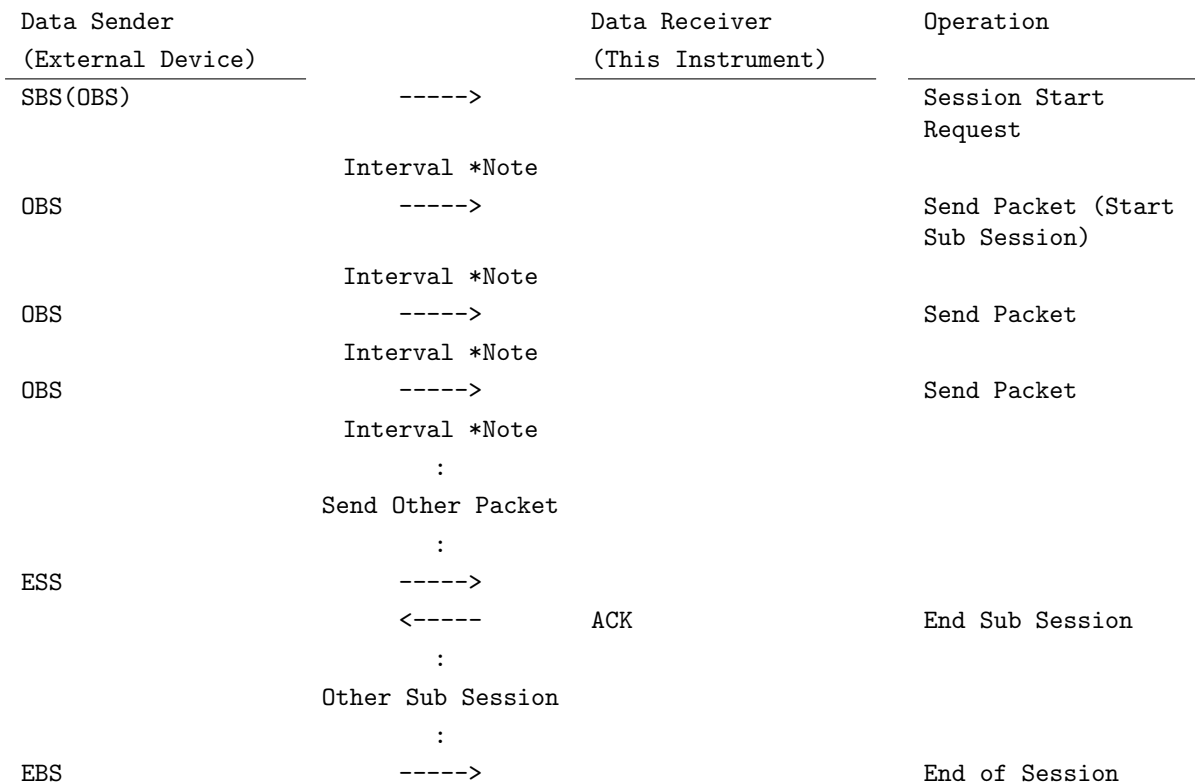
18.2.1 Example: Sending Data from the Instrument to an External Device in Response to a Request from the External Device



Note1 : Interval 1 is no less than Oneway Min Interval and no more than Oneway Max Interval, which are explained under “20.2 System Exclusive Protocol Parameter”. If the interval exceeds these values, the partner device will issue a timeout error.

Note2 : Interval 1 is a Oneway Current Interval, which is explained under “20.2 System Exclusive Protocol Parameter”.

18.2.2 Example: Data send to Instrument from external device



Note : The interval is no less than Oneway Min Interval and less than Oneway Max Interval, which are explained under “20.2 System Exclusive Protocol Parameter”. If the interval exceeds these values, the partner device will issue a timeout error.

18.3 Handshake Mode Communication Flow

18.3.1 Session Start

A single session starts when an external device, which wants to start communication for sending or receiving data using handshake protocol, sends an SBS (Start of Bulk Dump Session) message to this Instrument, which is its communication partner. The external device cannot send an HBS or HBR until this Instrument receives ACK.

18.3.2 Message Timeout Processing

Failure of the next message expected for receipt to arrive within a preset amount of time is viewed as a timeout error, and ERR (Data = Time Out Error) is sent to the partner device, which then returns to the message standby state. The device that received the ERR sends the message it believes the partner device that is in the message receive standby state. If the desired message does not arrive after a preset number of retries, RJC is sent and the session is terminated. The standby time and number of retries are determined in accordance with the parameters described under “20.2 System Exclusive Protocol Parameter”.

18.3.3 Message Format Error Processing

The message receive device returns ERR (Format Error) if it discovers an illegal format in the received message. When the message sending device receives ERR (Format Error) from the receiving device, it resends the last data sent. If the correct message does not arrive after a preset number of retries,

RJC is sent and the session is terminated. The number of retries is determined in accordance with the parameters described under “20.2 System Exclusive Protocol Parameter”.

18.3.4 Message CRC Error Processing

The message receive device returns ERR (CRC Error) if it discovers an illegal format in the received message. When the sending device receives ERR (CRC Error) from the receiving device, it resends the last data sent. If the correct CRC message does not arrive after a preset number of retries, RJC is sent and the session is terminated. The number of retries is determined in accordance with the parameters described under “20.2 System Exclusive Protocol Parameter”.

18.3.5 Processing when Multiple Errors are Generated

While communication retry is in progress following generation of a timeout error, format error, or CRC error, the retry count is not reset even if another error is generated. Also the error code of the last send error message is determined by the cause of the last error generated.

18.3.6 Session End

When the data send device is an external device, the session is concluded when the external device sends ESS and EBS in response to an ACK by this Instrument after the external device finishes sending all of the Parameter Sets that need to be transferred. When the data send device is an this Instrument, the session is concluded when the external device sends EBS after this Instrument finishes sending all of the Parameter Sets that need to be transferred. The maximum interval until one device sends a message following receipt of a message from another device is no greater than the Handshake Max Interval explained under “20.2 System Exclusive Protocol Parameter”. If the interval exceeds these values, the partner device will issue a timeout error.

18.3.7 Example: Sending Data from the Instrument to an External Device in Response to a Request from the External Device

Data Receiver (External Device)		Data Sender (This Instrument)	Operation
SBS(HBR)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBR	----->		Send Request (Start Sub Session)
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	:		
	Send Other Packet		
	:		
ACK	----->		Acknowledge
	<-----	ESS	End Data (End Sub Session)
	:		
	Other Sub Session		
	:		
EBS	----->		End of Session

18.3.8 Example: Data send to Instrument from external device

Data Sender (External Device)		Data Receiver (This Instrument)	Operation
SBS(HBS)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBS	----->		Send Packet
	<-----	ACK	Acknowledge
HBS	----->		Send Packet
	<-----	ACK	Acknowledge
HBS	----->		Send Packet
	<-----	ACK	Acknowledge
	:		
	Send Other Packet		
	:		
ESS	----->		End of Data
	:		
	Other Sub Session		
	:		
EBS	----->		End of Session

18.3.9 Example: Session Generating a Timeout Error

Data Receiver (External Device)		Data Sender (This Instrument)	Operation
SBS(HBR)	----->		Session Start Request
	Interval *Note1		
ERR(Time Out Error)	----->		Timeout Error
	<-----	ACK	Acknowledge
HBR	----->		Send Request (Optional)
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	Interval *Note1		
ERR(Time Out Error)	----->		Timeout Error
	Interval *Note1		
ERR(Time Out Error)	----->		2 consecutive timeout errors (Note2)
	<-----	HBS	Acknowledge
	Interval *Note1		
	<-----	ERR(Time Out Error)	Timeout Error
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
	:		

Note1 : Interval that exceeds the time stipulated by Handshake Max Interval explained under “20.2 System Exclusive Protocol Parameter”.

Note2 : Number of retries that exceeds the retries stipulated by Handshake Max Retry explained under “20.2 System Exclusive Protocol Parameter”.

18.3.10 Example: Session Generating a Format Error

Data Receiver (External Device)		Data Sender (This Instrument)	Operation
SBS(HBR)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBR	----->		Send Request (Optional)
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-???-	HBS	Send Packet (Note1)
ERR(Format Error)	----->		Format Error
	<-----	HBS	Resend Packet
ACK	-???->		Acknowledge
	<-----	ERR(Format Error)	Format Error
ACK	-???->		Acknowledge
	<-----	ERR(Format Error)	2 consecutive format errors(*Note2)
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
		:	

Note1 : "<-???->" or "-???->" indicates transfer failed.

Note2 : Number of retries that exceeds the retries stipulated by Handshake Max Retry explained under "20.2 System Exclusive Protocol Parameter".

18.3.11 Example: Session Generating a CRC Error

Data Receiver (External Device)		Data Sender (This Instrument)	Operation
SBS(HBR)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBR	----->		Send Request (Optional)
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-???-	HBS	Send Packet
ERR(CRC Error)	----->		CRC error
	<-???-	HBS	Resend Packet
ERR(CRC Error)	----->		2 consecutive CRC errors(*Note)
	<-----	HBS	Resend Packet
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
		:	

Note : Number of retries that exceeds the retries stipulated by Handshake Max Retry explained under “20.2 System Exclusive Protocol Parameter”.

18.3.12 Example: Session Termination by Error Generation

Data Receiver		Data Sender	Operation
SBS(HBR)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBR	----->		Send Request (Optional)
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-???-	HBS	Send Packet
	<-???-	HBS	Send Packet
ERR(CRC Error)	----->		Error
	<-???-	HBS	Resend Packet
ERR(Format Error)	----->		2 consecutive errors
	<-???-	HBS	Resend Packet
ERR(Time Out Error)	----->		3 consecutive errors
	:		
	<-???-	HBS	Resend Packet
ERR(CRC Error)	----->		N consecutive errors(*Note)
	<-???-	HBS	Resend Packet
RJC	----->		Abandon Session

Note : Number of retries that exceeds the retries stipulated by Handshake Max Retry explained under “20.2 System Exclusive Protocol Parameter”. Also, the maximum number of retries is the same, even if multiple instances of the same error are generated or if multiple different errors are generated.

18.3.13 Example: Intentional Session Termination by an External Device

Data Receiver (External Device)		Data Sender (This Instrument)	Operation
SBS(HBR)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBR	----->		Send Request
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
RJC	----->		Terminate Session

18.3.14 Example: Intentional Session Termination by This Instrument

Data Sender (External Device)		Data Receiver (This Instrument)	Operation
SBS(HBS)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBS	----->		Send Packet
	<-----	ACK	Acknowledge
HBS	----->		Send Packet
	<-----	ACK	Acknowledge
HBS	----->		Send Packet
	<-----	RJC	Terminate Session

18.3.15 Example: Session Pause

Session flow when the session is temporarily paused for some reason and then restarted is shown below. A session can be paused by sending an EXI message from an external device or this Instrument to the other device.

Data Receiver (External Device)		Data Sender (This Instrument)	Operation
SBS(HBR)	----->		Session Start Request
	<-----	ACK	Acknowledge
HBR	----->		Send Request
	<-----	HBS	Send Packet
ACK	----->		Acknowledge
	<-----	HBS	Send Packet
	Interval *Note1		
EXI	----->		Extend Interval (Pause Session)
	Interval *Note1		
EXI	----->		Extend Interval
	:		
EXI	----->		Extend Interval
	Interval *Note1		
ACK	----->		Acknowledge (Restart Session)*Note2
	<-----	HBS	Send Packet
ESS	----->		End of Data
	:		
	Other Sub Session		
	:		
EBS	----->		End of Session

Note1 : Interval less than the time stipulated by Handshake Max Interval explained under "20.2 System Exclusive Protocol Parameter". There is no limit on the number of extensions using EXI.

Note2 : The sessions can be paused by sending RJC here.

Part V

Parameter List

This section explains the parameters that actually can be transferred by the Instrument.

19 Using the Parameter List

- Parameter field
Shows the parameter name.
- ID field
Shows the parameter ID as a hexadecimal number.
- R/W field
Shows “R” to indicate that an IPR (Individual Parameter Request) read operation (Read) is possible or “W” to indicate that an IPS (Individual Parameter Send) write operation is possible.
- Block field
Shows the bit field allocation of the block number. The bit field position is shown as a decimal format number.
- Size field
Shows the parameter bit width as a decimal format value.
- Array field
Shows the parameter array size as a hexadecimal value.
- Min-Def-Max field
Shows the minimum value, default value, and maximum value for parameter acquisition as a hexadecimal value.
- Description field
Explains the meaning of parameter values. Unless otherwise specified, setting values are all indicated in decimal format.

20 System Parameters

These parameters make it possible for an external device to check the status of the Instrument and for an external device to command some operation of the Instrument.

20.1 System Information Parameter

This parameter is a container for system information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Model Name	0000	R	00000000	7	08	00-20-7F	Ascii Character XW-P1...“XW-P1” XW-G1...“XW-G1”
General Register	000D	R/W		8	01	00-00-FF	General-purpose register for communication test

20.2 System Exclusive Protocol Parameter

These parameters are related to the System Exclusive message protocol.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Oneway Min Interval	000E	R	00000000	14	01	0000-0014-3FFF	Minimum time interval time value (msec) between packets during One-way Bulk Dump receive by Instrument
Oneway Max Interval	000F	R/W		14	01	0000-0800-3FFF	Maximum allowable message wait time (msec) during One-way Bulk Dump receive by Instrument
Oneway Current Interval	0010	R/W		14	01	0000-0014-3FFF	Current time interval value between packets during One-way Bulk Dump send by Instrument
Oneway Max Data Length	0011	R		14	01	0000-0080-3FFF	Maximum memory size value (bytes) of transfer data included in one packet during One-way Bulk Dump send/receive by Instrument
Oneway Curent Data Length	0012	R/W		14	01	0000-0080-3FFF	Current memory size value (bytes) of transfer data included in one packet during One-way Bulk Dump send by Instrument
Handshake Max Interval	0013	R/W		14	01	0000-0800-3FFF	Maximum allowable message wait time (msec) during Handshake Bulk Dump receive by Instrument
Handshake Max Data Length	0014	R		14	01	0000-0080-3FFF	Maximum memory size value (bytes) of transfer data included in one packet during Handshake Bulk Dump send/receive by Instrument
Handshake Currnet Data Length	0015	R/W		14	01	0000-0080-3FFF	Maximum memory size value (bytes) of transfer data included in one packet during Handshake Bulk Dump send by Instrument
Handshake Retry Number	0016	R/W		7	01	00-03-7F	Number of retries after error generation during Handshake Bulk Dump send

20.3 Data Management Parameter

These are information acquisition and operation command parameters for this Instrument's Data Manager PC application.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Ps Category	0019	W	00000000	7	01	00-00-7F	Specifiesthe category ID of the parameter set that corresponds to an operation.
Ps Memory	001A	W		7	01	00-00-7F	Specifies the memory ID of the parameter set that corresponds to an operation.
Ps Number	001B	W		14	01	0000-0001-3FFF	Specifies the number of the parameter set that corresponds to an operation.
Ps Data Type	001C	R		8	01	00-00-FF	The data type of the parameter set in the specified category. Compatibility is providedbetween models with the same type.
Current Ps Existence	001D	R		1	01	00-00-01	Whether a parameter set exists in the specified category. 0...No 1...Yes
Current Ps Protect	001E	R		1	01	00-00-01	Protect status of a parameter set data in the specified category. 0...Off 1...On
Current Ps Size	001F	R		32	01	00000000-00000000-FFFFFFFF	Size of a parameter set in the specified category/number (bytes).

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Current Sub Ps Size	0020	R		32	01	00000000-00000000-FFFFFFFF	Total size of a parameter sets under the specified category (bytes).
Current Ps Name	0021	R		8	10	00-20-7F	Name of a parameter set in the specified category (ASCII characters).
Max Ps Size	0022	R		32	01	00000000-00000000-FFFFFFFF	Maximum size of parameter sets in the specified category (bytes).
Max Ps Number	0023	R		14	01	0000-0000-FFFF	Maximum number parameter sets in the specified category (bytes).
Area Size	0024	R		32	01	00000000-00000000-FFFFFFFF	Maximum size (bytes) of parameter sets in specified category
Available Size	0025	R		32	01	00000000-00000000-FFFFFFFF	Maximum size (bytes) writable to parameter sets in specified category/number
Free Size	0026	R		32	01	00000000-00000000-FFFFFFFF	Current size (bytes) of parameter set free space in specified category
Delete Ps	0027	W		1	01	00-00-01	Deletes parameter sets in the specified category. Values are ignored.
Bulksession Enabled	0028	R		2	01	00-00-02	Specifies whether or not bulk session is enabled. 0 ... Disabled 1 ... Enabled 2 ... Bulk session in progress

21 Patch Parameter

The main function of patch parameters is to configure the settings of the sound source of a device.

21.1 Analog Input Tune Parameter

These parameters are for analog input tuning.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Part Enable	0074	R/W	00000000	1	01	00-01-01	0...Off 1...On
Line Select	0075	R/W		1	01	00-00-01	0...System Chorus 1...DSP
Level	0076	R/W		7	01	00-64-7F	0 - 127
Pan	0077	R/W		7	01	00-40-7F	0 - 127
Rev Send	0078	R/W		7	01	00-00-7F	0 - 127
Cho Dsp Send	0079	R/W		7	01	00-00-7F	0 - 127
Noise Gate Threshold	007A	R/W		7	01	00-14-7F	0 - 127
Noise Gate Release	007B	R/W		7	01	00-40-7F	0 - 127
Auto Level Control	007C	R/W		2	01	00-00-03	0..Off 1..1 2..2 3..3

21.2 Card Audio Parameter

These parameters configure card audio output settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Level	0081	R/W	00000000	7	01	00-7F-7F	0 - 127

21.3 DSP Output Parameter

These parameters configure DSP output settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Part Enable	007D	R/W	00000000	1	01	00-01-01	0...Off 1...On
Level	007E	R/W		7	01	00-64-7F	0 - 127
Pan	007F	R/W		7	01	00-40-7F	0 - 127
Rev Send	0080	R/W		7	01	00-20-7F	0 - 127

21.4 DSP Setup Parameter

These parameters configure DSP enable/disable and type settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Disable	0082	R/W	00000000	1	01	00-00-01	0...enable DSP operation 1...disable DSP operation
Number	0083	R/W	00000000	8	01	00-00-C8	0.....Tone Dsp 1-100.....Preset Dsp 101-200...User Dsp

21.5 Master EQ Parameter

These parameters configure the Master EQ settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Low Gain	008D	R/W	00000000	8	01	00-0C-18	-12 - 0 - +12
Low Frequency	008E	R/W	00000000	8	01	00-01-02	0...200Hz 1...400Hz 2...800Hz
Lowmid Gain	008F	R/W	00000000	8	01	00-0C-18	-12 - 0 - +12
Lowmid Frequency	0090	R/W	00000000	8	01	00-01-07	0...1.0kHz 1...1.3kHz 2...1.6kHz 3...2.0kHz 4...2.5kHz 5...3.2kHz 6...4.0kHz 7...5.0kHz
Highmid Gain	0091	R/W	00000000	8	01	00-0C-18	-12 - 0 - +12
Highmid Frequency	0092	R/W	00000000	8	01	00-06-07	0...1.0kHz 1...1.3kHz 2...1.6kHz 3...2.0kHz 4...2.5kHz 5...3.2kHz 6...4.0kHz 7...5.0kHz
High Gain	0093	R/W	00000000	8	01	00-0C-18	-12 - 0 - +12
High Frequency	0094	R/W	00000000	8	01	00-01-02	0...6.0kHz 1...8.0kHz 2...10kHz
On Off	0095	R/W	00000000	1	01	00-01-01	0...OFF 1...ON

21.6 Master Tune Parameter

These parameters configure the Master Tuning settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Master Fine Tune	0000	R/W	00000000	10	01	0000-0200-03FF	-100/512 - 0 - 100/512(cent)
Master Coarse Tune	0001	R/W		7	01	28-40-58	-24 - 0 - +24(semitone)

21.7 Master Mixer Parameter

These parameters configure the Master settings of the mixer.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Master Volume	0002	R/W	00000000	7	01	00-7F-7F	0 - 127
Master Pan	0003	R/W		7	01	00-40-7F	-64 - 0 - +63
Master Line Select	0004	R/W		1	01	00-00-01	0...System Chorus 1...DSP

21.8 Part Parameter

Part parameters configure the settings of each musical instrument part.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Part Enable	0068	R/W	4-0:Part #	1	01	00-01-01	0...Off 1...On
Tone Num	0069	R/W		14	01	0000-0000-3FFF	0 - 16383
Fine Tune	006A	R/W		10	01	0000-0200-03FF	-100/512 - 0 - 100/512(cent)
Coarse Tune	006B	R/W		7	01	28-40-58	-24 - 0 - +24(semitone)
Volume	006C	R/W		7	01	00-64-7F	0 - 127
Pan	006E	R/W		7	01	00-40-7F	-64 - 00 - +63

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Cho Send	006F	R/W		7	01	00-00-7F	0 - 127
Rev Send	0070	R/W		7	01	00-28-7F	0 - 127
Bend Range	0071	R/W		7	01	00-02-18	0 - 24
Line Select	0072	R/W		1	01	00-00-01	0...System Chorus 1...DSP

21.9 System Chorus Parameter

These parameters are for configuring system chorus settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Level	008A	R/W		7	01	00-40-7F	0 - 127
Rate	008B	R/W		7	01	00-28-7F	0 - 127
Sendtorev	008C	R/W		7	01	00-00-7F	0 - 127

21.10 System Reverb Parameter

These parameters are for configuring system reverb settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Type	0086	R/W		1	01	00-01-01	0: Rectangle 1: Round
Level	0087	R/W		7	01	00-10-7F	0 - 127
Time	0088	R/W		7	01	00-58-7F	0 - 127

21.11 Patch Etc Parameter

These parameters configure other patch settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Performance Name[16]	0096	R/W		7	10	00-20-7F	
Knob Assgne Parameter	0098	R/W	2-0:Knob Number(0-3)	7	01	00-00-80	0 - 127
RPN/NRPN MSB	009A	R/W		7	01	00-00-7F	0 - 127
RPN/NRPN LSB	009B	R/W		7	01	00-00-7F	0 - 127
Data Entry MSB/LSB	009C	R/W		1	01	00-00-01	0... Data MSB 1... Data LSB
Pedal Assign	009D	R/W		4	01	00-00-08	0...Sustain 1...Soft 2...Sostenute 3...SS
Touch Curve	009E	R/W		4	01	00-01-02	0...Off 1...Normal 2...Light
Touch Off Velocity	009F	R/W		7	01	00-64-7F	0 - 127
Tempo	00A0	R/W		8	01	1E-78-FF	30 - 255
StepSeq Number	00A1	R/W		8	01	00-00-C7	0 - 199
Solo1 Ch	00A2	R/W		1	01	00-01-01	0: Off 1: On
StepSeq Change Timing	00A3	R/W		2	01	00-00-02	0: Wait 1: Real Time 2: Beat(XW-G1 only)
StepSeq Key Shift	00A4	R/W		1	01	00-00-01	0: Off 1: On
StepSeq Pattern Number	00A5	R/W		4	01	00-00-07	0 - 7
Arpeggio Key Shift	00A6	R/W		1	01	00-00-01	0...Off 1...On
Arpeggio Key Range Low	00A7	R/W		7	01	00-00-7F	0 - 127
Arpeggio Key Range Hi	00A8	R/W		7	01	00-7F-7F	0 - 127
Arpeggio Number	00A9	R/W		8	01	00-00-C7	0 - 199

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Arpeggio Hold	00AA	R/W		1	01	00-00-01	0: Off 1: On
Arpeggio StepSeq Sync	00AB	R/W		4	01	00-00-02	0: Off 1: On 2: Start/Stop
Phrase Key Play	00AC	R/W	00000000	1	01	00-00-01	0...Off 1...On
Phrase Number	00AD	R/W		8	01	00-00-C7	0 - 199
Phrase Key Range Low	00AE	R/W		7	01	00-00-7F	0 - 127
Phrase Key Range Hi	00AF	R/W		7	01	00-7F-7F	0 - 127
Looper Number	00B1	R/W		8	01	00-00-09	0 - 9
Enable	00B2	R/W	00000000	1	01	00-01-01	0...OFF 1...ON
Lowkey	00B3	R/W		7	01	48-48-60	C5-C7
Target	00B4	R/W	4-0:TargetType	4	01	00-00-0E	0 - 14
Index1	00B5	R/W	5-0:KeySetting	8	01	00-00-FF	0 - 255
Index2	00B6	R/W		8	01	00-00-FF	0 - 255
Index3	00B7	R/W		8	01	00-00-FF	0 - 255
Zone Enable	00B8	R/W	2-0:Zone(0-3)	1	01	00-01-01	0: Off 1: On
Zone Key Range Low	00B9	R/W		7	01	00-00-7F	0 - 127
Zone Key Range Hi	00BA	R/W		7	01	00-7F-7F	0 - 127
Zone Bend Range Low	00BB	R/W		7	01	00-02-18	0 - 24
Zone Bend Range Hi	00BC	R/W		7	01	00-02-18	0 - 24
Zone Octave Shift	00BD	R/W		7	01	3E-40-42	-2 - +2
Zone Transpose	00BE	R/W		7	01	34-40-4C	-12 - +12
Zone Knob1 Enable	00BF	R/W		1	01	00-01-01	0: Off 1: On
Zone Knob2 Enable	00C0	R/W		1	01	00-01-01	0: Off 1: On
Zone Knob3 Enable	00C1	R/W		1	01	00-01-01	0: Off 1: On
Zone Knob4 Enable	00C2	R/W		1	01	00-01-01	0: Off 1: On
Zone Bender Enable	00C3	R/W		1	01	00-01-01	0: Off 1: On
Zone Wheel Enable	00C4	R/W		1	01	00-01-01	0: Off 1: On
Zone Pedal Enable	00C5	R/W		1	01	00-01-01	0: Off 1: On
Zone Arpeggio Enable	00C6	R/W		1	01	00-01-01	0: Off 1: On
Zone Phrase Enable	00C7	R/W		1	01	00-01-01	0: Off 1: On
MIDI Out Ch	00C8	R/W	4-0:Part(0-15)	7	01	00-00-0F	0 - 15
MIDI In Ch	00C9	R/W		7	01	00-01-10	Off, 0 - 15
MIDI Generator Out	00CA	R/W		1	01	00-01-01	0: Off 1: On
MIDI MIDI Out	00CB	R/W		1	01	00-01-01	0: Off 1: On
MIDI USB Out	00CC	R/W		1	01	00-01-01	0: Off 1: On

22 Tone Parameter

These parameters configure global tone settings.

22.1 Basic Parameter

These parameters configure basic global tone settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Timbre Num	0002	R/W		14	01	0000-0000-3FFF	0 - 16383
Line Select	0004	R/W		1	01	00-00-01	0...System Chorus 1...DSP
Timbre Type	0006	R/W		4	01	00-00-0F	0...Melody 1...Piano 2...Drum 3...Drawbar(XW-P1 only) 4...Hex Layer(XW-P1 only) 5...Solo Synth 6...User Wave(XW-G1 only)
Name	0007	R/W		7	10	00-20-7F	Ascii Character
Level	0008	R/W		7	01	00-7F-7F	0 - 127

23 Melody Parameter

These parameters configure melody tone settings.

23.1 Melody Parameter

These parameters configure basic melody tone settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Attack Time	0017	R/W	00000000	7	01	00-40-7F	-64 - 0 - 63
Release Time	0018	R/W		7	01	00-40-7F	-64 - 0 - 63
Cutoff Freq	0019	R/W		7	01	00-40-7F	-64 - 0 - 63
Vibrato Type	001A	R/W		7	01	00-00-03	0...Sine 1...Triangle 2...Saw 3...Square
Vibrato Depth	001B	R/W		7	01	00-40-7F	-64 - 0 - 63
Vibrato Speed	001C	R/W		7	01	00-40-7F	-64 - 0 - 63
Vibrato Delay	001D	R/W		7	01	00-40-7F	-64 - 0 - +63
Octave Shift	001E	R/W		7	01	3E-40-42	-2 - 0 - +2
Volume	001F	R/W		7	01	00-7F-7F	0-127
Touch Sense	0020	R/W		7	01	00-7F-7F	-64 - 0 - 63

24 Drum Parameter

These parameters configure drum tone settings.

24.1 Instrument Parameter (x128instrument)

These parameters configure settings for each drum tone instrument.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Assign Group	0000	R/W	6-0:Inst	4	01	00-00-0F	0...None 1 - 15... 1 - 15
Rx Noteoff	0002	R/W		1	01	00-00-01	0...No 1...Yes
Volume	0003	R/W		8	01	00-80-FF	0x0... 0X 0x80... 1.0X 0xFF... 1.99X
Pan	0004	R/W		7	01	00-40-7F	-64 - 0 - +63
Reverb Send	0006	R/W		7	01	00-7F-7F	0 - 127

24.2 Velocity Split Parameter (x4velocity-split x128instrument)

These parameters are for configuring velocity split for each drum tone instrument.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Range Top	0007	R/W	13-7:Inst 2-0:Split	7	01	00-7F-7F	Velocity upper limit value
Number	0008	R/W		14	01	0000-0000-3FFF	Inst number 0-376

24.3 LFO Parameter

These parameters configure drum tone LFO settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Pitch LFO Wave Type	0009	R/W	00000000	4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3 5...Pulse 2:2 6...Pulse 3:1
Pitch LFO Rate	000A	R/W		7	01	00-40-7F	0 - 127
Pitch Auto Delay	000B	R/W		7	01	00-00-7F	0 - 127
Pitch Auto Rise	000C	R/W		7	01	00-00-7F	0 - 127
Pitch Auto Depth	000D	R/W		8	01	00-80-FF	-128 - 0 - +127
Pitch Mod Depth	000E	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Pitch After Depth	000F	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Amp LFO Wave Type	0010	R/W		4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3 5...Pulse 2:2 6...Pulse 3:1
Amp LFO Rate	0011	R/W		7	01	00-40-7F	0 - 127
Amp LFO Auto Delay	0012	R/W		7	01	00-00-7F	0 - 127
Amp LFO Auto Rise	0013	R/W		7	01	00-00-7F	0 - 127
Amp LFO Auto Depth	0014	R/W		8	01	00-80-FF	-128 - 0 - +127
Amp LFO Mod Depth	0015	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Amp LFO After Depth	0016	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)

25 Drawbar Parameter(XW-P1 only)

25.1 Drawbar Parameter

These parameters configure drawbar tone settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Position	0000	R/W	3-0:Select Bar	4	01	00-00-08	0-8
Percussion	0001	R/W	00000000	2	01	00-00-03	0...off 1...2nd 2...3rd 3...2nd+3rd
Percussion Decay Time	0002	R/W		7	01	00-00-7F	0 - 127
Keyon Click	0003	R/W		1	01	00-00-01	0...off

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Keyoff Click	0004	R/W		1	01	00-00-01	1...on 0...off
Type	0005	R/W		1	01	00-00-01	1...on 0...Normal 1...Vintage
Vibrato Rate	0006	R/W		7	01	00-00-7F	0 - 127
Vibrato Depth	0007	R/W		7	01	00-00-7F	0 - 127

26 Hex Layer Parameter(XW-P1 only)

These parameters configure hex layer tone settings.

26.1 Hex Layer Parameter (x6layer)

These parameters configure basic hex layer tone settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Onoff	0000	R/W	2-0:Layer Number	1	01	00-01-01	0...off 1...on
Split Ui Number	0002	R/W		16	01	0000-0000-FFFF	PCM Wave number 0326-1114
Pan Offset	0003	R/W		7	01	00-40-7F	-64 - 0 - +63
Pitch Key	0004	R/W		7	01	00-40-7F	Added to key number as 0x40 center
Pitch Cent	0005	R/W		16	01	0000-0000-FFFF	S-----.- ----- S:sign bit -----c ccccccc c:cent = 100/512 cent resolution 0000001.0 00000000...For +100 cent(1 semitone) 1111111.0 00000000...For -100 cent(1 semitone)
Amp Attack Rate Offset	0006	R/W		8	01	00-80-FF	-128 - 0 - 127
Amp Decay Rate Offset	0007	R/W		8	01	00-80-FF	-128 - 0 - 127
Amp Sustain Level Offset	0008	R/W		8	01	00-80-FF	-128 - 0 - 127
Amp Release Rate Offset	0009	R/W		8	01	00-80-FF	-128 - 0 - 127
Volume Offset	000A	R/W		8	01	00-80-FF	-128 - 0 - 127
Cutoff Offset	000B	R/W		8	01	00-80-FF	-128 - 0 - 127
Touch Sense Offset	000C	R/W		8	01	00-BF-FF	-128 - 0 - 127
Reverb Send Offset	000D	R/W		8	01	00-80-FF	-128 - 0 - 127
Chorus Send Offset	000E	R/W		8	01	00-80-FF	-128 - 0 - 127
Key Range Low	000F	R/W		7	01	00-00-7F	0 - 127
Key Range High	0010	R/W		7	01	00-7F-7F	0 - 127
Velocity Range Low	0011	R/W		7	01	00-00-7F	0 - 127
Velocity Range High	0012	R/W		7	01	00-7F-7F	Lower Limit of Velocity 0 - 127 Upper Limit of Velocity
Detune Number	0013	R/W	00000000	5	01	00-00-1F	0 - 31
Pitch Lock	0014	R/W	00000000	1	03	00-00-01	0...Unlocked 1...Locked

26.2 Hex Layer LFO Parameter

These parameters configure hex layer tone LFO settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Pitch LFO Wave Type	0015	R/W	00000000	4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
							5...Pulse 2:2 6...Pulse 3:1
Pitch LFO Rate	0016	R/W		7	01	00-40-7F	0 - 127
Pitch Auto Delay	0017	R/W		7	01	00-00-7F	0 - 127
Pitch Auto Rise	0018	R/W		7	01	00-00-7F	0 - 127
Pitch Auto Depth	0019	R/W		8	01	00-80-FF	-128 - 0 - +127
Pitch Mod Depth	001A	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Pitch After Depth	001B	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Amp LFO Wave Type	001C	R/W		4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3 5...Pulse 2:2 6...Pulse 3:1
Amp LFO Rate	001D	R/W		7	01	00-40-7F	0 - 127
Amp LFO Auto Delay	001E	R/W		7	01	00-00-7F	0 - 127
Amp LFO Auto Rise	001F	R/W		7	01	00-00-7F	0 - 127
Amp LFO Auto Depth	0020	R/W		8	01	00-80-FF	-128 - 0 - +127
Amp LFO Mod Depth	0021	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Amp LFO After Depth	0022	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)

27 Solo Synth Parameter

These parameters configure solo synth tone settings.

27.1 Solo Synth OSC Block Basic (x6oscillator)

These parameters configure basic settings for each Solo Synth tone block.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Onoff	0000	R/W	2-0:Oscillator Number(0-5)	1	01	00-00-01	0...off 1...on
Wave Number	0003	R/W		16	01	0000-0000-FFFF	Synth/PCM/Noise Wave number (XW-P1) 0001 - 0311 (For Synth OSC 1,2) 0312 - 0325 (For Noise OSC) 0326 - 2483 (For PCM OSC 1,2) (XW-G1) 0001 - 0766 (For Synth OSC 1,2) 0767 - 0780 (For Noise OSC) 0781 - 2826 (For PCM OSC 1,2)
Portamento Onoff	0004	R/W		1	01	00-00-01	0...off 1...on (Except Noise OSC)
Portamento Time	0005	R/W		7	01	00-00-7F	0 - 127 (Except Noise OSC)
Legato Onoff	0006	R/W		1	01	00-00-01	0...off 1...on

27.2 Solo Synth OSC Block Oscillator (x5oscillator)

These parameters configure oscillator settings for each Solo Synth tone block.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
LFO Depth	0008	R/W		7	02	00-40-7F	-64 - 0 - +63
Pitch Key Cent	0009	R/W		16	01	0000-0000-FFFF	S-----.- ----- S:sign bit -ssssss.- ----- s:semitone (semitone) -----c ccccccc c:cent = 100/512 cent resolution 0000000.0 00000000...original 0001100.0 00000000...For +1 octave 1110100.0 00000000...For -1 octave 0000001.0 00000000...For +100 cent(1 semitone) 1111111.0 00000000...For -100 cent(1 semitone) 0000000.1 00000000...For +50 cent 1111111.1 00000000...For -50 cent
Detune	000A	R/W		10	01	0000-0200-03FF	-256 - 0 - 255 10 00000000...original 00 00000000...-100 cent(1 semitone) 11 11111111...+100 cent(1 semitone)
Init Level	000B	R/W		7	01	00-00-7F	0 - 127
Attack Time	000C	R/W		7	01	00-00-7F	0 - 127
Attack Level	000D	R/W		7	01	00-00-7F	0 - 127
Decay Time	000E	R/W		7	01	00-00-7F	0 - 127
Sustain Level	000F	R/W		7	01	00-00-7F	0 - 127
Release1 Time	0010	R/W		7	01	00-00-7F	0 - 127
Release1 Level	0011	R/W		7	01	00-00-7F	0 - 127
Release2 Time	0012	R/W		7	01	00-00-7F	0 - 127
Release2 Level	0013	R/W		7	01	00-00-7F	0 - 127
Clock Trigger	0014	R/W		7	01	00-00-12	0...0FF 1...1/4 beat 2...1/3 beat 3...1/2 beat 4...2/3 beat 5...1 beat 6...3/2 beat 7...2 beat 8...3 beat 9...4 beat 10...1/4 up beat 11...1/3 up beat 12...1/2 up beat 13...2/3 up beat 14...1 up beat 15...3/2 up beat 16...2 up beat 17...3 up beat 18...4 up beat
Envelope Depth	0015	R/W		7	01	00-40-7F	-64 - 0 - +63
Key Follow	0017	R/W		8	01	00-C0-FF	-128 - 0 - 127
Key Follow Base	0018	R/W		7	01	00-3C-7F	0 - 127

27.3 Solo Synth OSC Block Filter (x5oscillator)

These parameters configure filter settings for each Solo Synth tone block.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Cutoff	0019	R/W		4	01	00-00-0F	0 - 15
Gain	001A	R/W		4	01	00-04-04	0...Flat 1...-3dB 2...-6dB 3...-12dB 4...-18dB
Touch Sensitivity	001B	R/W		7	01	00-40-7F	-64 - 0 - +63
Key Follow	001C	R/W		8	01	00-80-FF	-128 - 0 - +127
Key Follow Base	001D	R/W		7	01	00-3C-7F	0 - 127
LFO Depth	001E	R/W		7	02	00-40-7F	-64 - 0 - +63
Init Level	001F	R/W		7	01	00-00-7F	0 - 127

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Attack Time	0020	R/W		7	01	00-00-7F	0 - 127
Attack Level	0021	R/W		7	01	00-00-7F	0 - 127
Decay Time	0022	R/W		7	01	00-00-7F	0 - 127
Sustain Level	0023	R/W		7	01	00-00-7F	0 - 127
Release1 Time	0024	R/W		7	01	00-00-7F	0 - 127
Release1 Level	0025	R/W		7	01	00-00-7F	0 - 127
Release2 Time	0026	R/W		7	01	00-00-7F	0 - 127
Release2 Level	0027	R/W		7	01	00-00-7F	0 - 127
Clock Trigger	0028	R/W		7	01	00-00-12	0...OFF 1...1/4 beat 2...1/3 beat 3...1/2 beat 4...2/3 beat 5...1 beat 6...3/2 beat 7...2 beat 8...3 beat 9...4 beat 10...1/4 up beat 11...1/3 up beat 12...1/2 up beat 13...2/3 up beat 14...1 up beat 15...3/2 up beat 16...2 up beat 17...3 up beat 18...4 up beat
Envelope Depth	0029	R/W		7	01	00-40-7F	-64 - 0 - +63

27.4 Solo Synth OSC Block Amp (x5oscillator)

These parameters configure amp settings for each Solo Synth tone block.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Level	002A	R/W		7	01	00-64-7F	0 - 127
Touch Sensitivity	002C	R/W		7	01	00-60-7F	-64 - 0 - +63
Key Follow	002D	R/W		8	01	00-80-FF	-128 - 0 - +127
Key Follow Base	002E	R/W		7	01	00-3C-7F	0 - 127
LF0 Depth	002F	R/W		7	02	00-40-7F	-64 - 0 - +63
Init Level	0030	R/W		7	01	00-00-7F	0 - 127
Attack Time	0031	R/W		7	01	00-00-7F	0 - 127
Attack Level	0032	R/W		7	01	00-00-7F	0 - 127
Decay Time	0033	R/W		7	01	00-00-7F	0 - 127
Sustain Level	0034	R/W		7	01	00-00-7F	0 - 127
Release1 Time	0035	R/W		7	01	00-00-7F	0 - 127
Release1 Level	0036	R/W		7	01	00-00-7F	0 - 127
Release2 Time	0037	R/W		7	01	00-00-7F	0 - 127
Release2 Level	0038	R/W		7	01	00-00-7F	0 - 127
Clock Trigger	0039	R/W		7	01	00-00-12	0...OFF 1...1/4 beat 2...1/3 beat 3...1/2 beat 4...2/3 beat 5...1 beat 6...3/2 beat 7...2 beat 8...3 beat 9...4 beat 10...1/4 up beat 11...1/3 up beat 12...1/2 up beat 13...2/3 up beat 14...1 up beat

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
							15...3/2 up beat
							16...2 up beat
							17...3 up beat
							18...4 up beat

27.5 Solo Synth Etc (x8controller)

These parameters configure other Solo Synth settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Sync Osc	003D	R/W	00000000	1	01	00-00-01	0...Async 1...Sync OSC2 with OSC1
Ext OSC Original Key	003E	R/W		7	01	00-3C-7F	0 - 127
Pitch Eg Trigger	003F	R/W		1	01	00-00-01	0...off 1...on
Filter Eg Trigger	0040	R/W		1	01	00-00-01	0...off 1...on
Amp Eg Trigger	0041	R/W		1	01	00-00-01	0...off 1...on
Total Filter Eg Trigger	0042	R/W		1	01	00-00-01	0...off 1...on
Mic Inst Level	0043	R/W		7	01	00-7F-7F	0 - 127
Ext Trigger Threshold	0044	R/W		7	01	00-1E-7F	0 - 127
Ext Trigger Release	0045	R/W		7	01	00-00-7F	0 - 127
Pitch Shifter Mode	0046	R/W		2	01	00-02-03	0(off) - 3
Pitch Shifter Mix	0047	R/W		4	01	00-00-0F	0 - 15

27.6 Solo Synth Controller (x8controller)

These parameters configure Solo Synth controller settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Source	0063	R/W	2-0:Controller Number	7	01	00-00-7F	Refer to the separate table
Destination Parameter	0064	R/W		7	01	00-00-7F	Refer to the separate table
Destination Index	0065	R/W		7	01	00-00-7F	Refer to the separate table
Depth	0066	R/W		8	01	00-FF-FF	-128 - 0 - 127

Source

Source	Parameter Name
00H	Off
01H - 62H	Control Change Number 0H - 61H
63H	Note On Key Number
64H	Note On Velocity
65H	Channel After Touch
66H	Pitch Bend Up
67H	Pitch Bend Down
68H	Modulation
69H	LFO 1
6AH	LFO 2

Destination Parameter/Destination Index

Destination Parameter	Parameter Name	Destination Index
00H	OSC Portamento Time	2-0: Oscillator Number(0-4)
01H	OSC Pitch	
02H	OSC Detune	
03H	OSC Pitch Key Follow	
04H	OSC Pitch Key Follow Base	
05H	OSC Pitch Envelope Depth	

Destination Parameter	Parameter Name	Destination Index
06H	OSC Pitch Envelope Init Level	
07H	OSC Pitch Envelope Attack Time	
08H	OSC Pitch Envelope Attack Level	
09H	OSC Pitch Envelope Decay Time	
0AH	OSC Pitch Envelope Sustain Level	
0BH	OSC Pitch Envelope Release1 Time	
0CH	OSC Pitch Envelope Release1 Level	
0DH	OSC Pitch Envelope Release2 Time	
0EH	OSC Pitch Envelope Release2 Level	
0FH	OSC Pitch LFO1 Depth	
10H	OSC Pitch LFO2 Depth	
11H	OSC PWM Pulse Width	0: Oscillator Number(0-1)
12H	OSC PWM LFO1 Depth	
13H	OSC PWM LFO2 Depth	
14H	OSC Ext Original Key	0
15H	OSC Ext Mic/Inst Level	
16H	OSC Ext Noise Gate Threshold	
17H	OSC Ext Noise Gate Release	
18H	OSC Filter Cutoff	2-0: Oscillator Number(0-5)
19H	OSC Filter Touch Sensitivity	
1AH	OSC Filter Key Follow	
1BH	OSC Filter Key Follow Base	
1CH	OSC Filter Envelope Depth	
1DH	OSC Filter Envelope Init Level	
1EH	OSC Filter Envelope Attack Time	
1FH	OSC Filter Envelope Attack Level	
20H	OSC Filter Envelope Decay Time	
21H	OSC Filter Envelope Sustain Level	
22H	OSC Filter Envelope Release1 Time	
23H	OSC Filter Envelope Release1 Level	
24H	OSC Filter Envelope Release2 Time	
25H	OSC Filter Envelope Release2 Level	
26H	OSC Filter LFO1 Depth	
27H	OSC Filter LFO2s Depth	
28H	OSC Amp Level	
29H	OSC Amp Touch Sensitivity	
2AH	OSC Amp Key Follow	
2BH	OSC Amp Key Follow Base	
2CH	OSC Amp Envelope Init Level	
2DH	OSC Amp Envelope Attack Time	
2EH	OSC Amp Envelope Attack Level	
2FH	OSC Amp Envelope Decay Time	
30H	OSC Amp Envelope Sustain Level	
31H	OSC Amp Envelope Release1 Time	
32H	OSC Amp Envelope Release1 Level	
33H	OSC Amp Envelope Release2 Time	
34H	OSC Amp Envelope Release2 Level	
35H	OSC Amp LFO1 Depth	
36H	OSC Amp LFO2 Depth	
37H	Total Filter Cutoff	0
38H	Total Filter Resonance	
39H	Total Filter Touch Sensitivity	
3AH	Total Filter Key Follow	
3BH	Total Filter Key Follow Base	
3CH	Total Filter Envelope Depth	
3DH	Total Filter Envelope Init Level	
3EH	Total Filter Envelope Attack Time	
3FH	Total Filter Envelope Attack Level	
40H	Total Filter Envelope Decay Time	
41H	Total Filter Envelope Sustain Level	
42H	Total Filter Envelope Release1 Time	
43H	Total Filter Envelope Release1 Level	
44H	Total Filter Envelope Release2 Time	
45H	Total Filter Envelope Release2 Level	
46H	Total Filter LFO1 Depth	

Destination Parameter	Parameter Name	Destination Index
47H	Total Filter LFO2 Depth	
48H	LFO Rate	0: LFO Number(0-1)
49H	LFO Depth	
4AH	LFO Delay	
4BH	LFO Rise	
4CH	LFO Modulation Depth	
4DH	DSP Parameter1	0
4EH	DSP Parameter2	
4FH	DSP Parameter3	
50H	DSP Parameter4	
51H	DSP Parameter5	
52H	DSP Parameter6	
53H	DSP Parameter7	
54H	DSP Parameter8	
55H	OSC S1-P2 Portamento Time	2-0: Oscillator Number(0-5)
56H	OSC S1-P2 Init Level	
57H	OSC S1-P2 Attack Time	
58H	OSC S1-P2 Attack Time	
59H	OSC S1-P2 Decay Time	
5AH	OSC S1-P2 Sustain Level	
5BH	OSC S1-P2 Release1 Time	
5CH	OSC S1-P2 Release1 Level	
5DH	OSC S1-P2 Release2 Time	
5EH	OSC S1-P2 Release2 Level	

27.7 Solo Synth LFO (x2lfo)

These parameters configure the Solo Synth LFO block.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Wave	005B	R/W	0:Lfo Number	4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3 5...Pulse 2:2 6...Pulse 3:1 7...Random
Clock Sync	005C	R/W		3	01	00-00-02	0...No Sync 1...Sync to LFO1 (LFO2 only) 2...Sync to Tempo
Rate	005D	R/W		7	01	00-00-7F	0 - 127
Depth	005E	R/W		7	01	00-00-7F	0 - 127
Delay	005F	R/W		7	01	00-00-7F	0 - 127
Rise	0060	R/W		7	01	00-00-7F	0 - 127
Clock Trigger	0061	R/W		7	01	00-00-11	0...1/4 beat 1...1/3 beat 2...1/2 beat 3...2/3 beat 4...1 beat 5...3/2 beat 6...2 beat 7...3 beat 8...4 beat 9...1/4 up beat 10...1/3 up beat 11...1/2 up beat 12...2/3 up beat 13...1 up beat 14...3/2 up beat 15...2 up beat 16...3 up beat 17...4 up beat

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Modulation Depth	0062	R/W		7	01	00-00-7F	0 - 127

27.8 Solo Synth PWM

These parameters configure Solo Synth PWM settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Pulse Width	003A	R/W	0:Oscillator Number	7	01	00-00-7F	0 - 127
							Available selected PWM as Synth Wave.
LF0 Depth	003C	R/W		7	02	00-40-7F	-64 - 0 - +63

27.9 Solo Synth Total Filter

These parameters configure Solo Synth Total Filter settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Filter Type	0048	R/W	00000000	2	01	00-00-02	0...Low Pass Filter 1...Band Pass Filter 2...High Pass Filter
Cutoff	0049	R/W		7	01	00-00-7F	0 - 127
Resonance	004A	R/W		7	01	00-00-7F	0 - 127
Touch Sensitivity	004B	R/W		7	01	00-40-7F	-64 - 0 - +63
Key Follow	004C	R/W		8	01	00-80-FF	-128 - 0 - +127
Key Follow Base	004D	R/W		7	01	00-3C-7F	0 - 127
LF0 Depth	004E	R/W		7	02	00-40-7F	-64 - 0 - +63
Init Level	004F	R/W		7	01	00-00-7F	0 - 127
Attack Time	0050	R/W		7	01	00-00-7F	0 - 127
Attack Level	0051	R/W		7	01	00-00-7F	0 - 127
Decay Time	0052	R/W		7	01	00-00-7F	0 - 127
Sustain Level	0053	R/W		7	01	00-00-7F	0 - 127
Release1 Time	0054	R/W		7	01	00-00-7F	0 - 127
Release1 Level	0055	R/W		7	01	00-00-7F	0 - 127
Release2 Time	0056	R/W		7	01	00-00-7F	0 - 127
Release2 Level	0057	R/W		7	01	00-00-7F	0 - 127
Clock Trigger	0058	R/W		7	01	00-00-12	0...OFF 1...1/4 beat 2...1/3 beat 3...1/2 beat 4...2/3 beat 5...1 beat 6...3/2 beat 7...2 beat 8...3 beat 9...4 beat 10...1/4 up beat 11...1/3 up beat 12...1/2 up beat 13...2/3 up beat 14...1 up beat 15...3/2 up beat 16...2 up beat 17...3 up beat 18...4 up beat
Envelope Depth	0059	R/W		7	01	00-40-7F	-64 - 0 - +63
Eg Retrigger	005A	R/W		1	01	00-00-01	0...off 1...on

28 User Wave Parameter(XW-G1 only)

These parameters configure User Wave tone settings.

28.1 User Wave Key Splits Parameter (x10splits)

These parameters configure User Wave tone split settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Volume	0001	R/W	3-0:Split Number(0-4(L),5-9(R))	7	01	00-7F-7F	0 - 127
Pan	0002	R/W		7	01	00-40-7F	-64 - 0 - +63
Pitch Key	0003	R/W		7	01	00-40-7F	Added to key number as 0x40 center
Pitch Cent	0004	R/W		16	01	0000-0000-FFFF	S-----.- ----- S:sign bit -----c ccccccc c:cent = 100/512 cent resolution 0000001.0 00000000...For +100 cent(1 semitone) 1111111.0 00000000...For -100 cent(1 semitone)
Cutoff	0005	R/W		7	01	00-00-7F	0-127
Touch Sense	0006	R/W		7	01	00-7F-7F	-64 - 0 - +63
Key Follow	0007	R/W		8	01	00-C0-FF	-128 - 0 - +127
Key Follow Base	0008	R/W		7	01	00-3C-7F	0-127
Pitch Envelope Depth	0009	R/W		7	01	00-40-7F	-64 - 0 - +63
Init Level	000A	R/W		7	01	00-40-7F	-64 - 0 - +63
Attack Time	000B	R/W		7	01	00-00-7F	0-127
Release Time	000C	R/W		7	01	00-00-7F	0-127
Release Level	000D	R/W		7	01	00-40-7F	-64 - 0 - +63
Init Level	000E	R/W		7	01	00-00-7F	0-127
Attack Time	000F	R/W		7	01	00-00-7F	0-127
Attack Level	0010	R/W		7	01	00-00-7F	0-127
Decay Time	0011	R/W		7	01	00-00-7F	0-127
Sustain Level	0012	R/W		7	01	00-00-7F	0-127
Release1 Time	0013	R/W		7	01	00-00-7F	0-127
Release1 Level	0014	R/W		7	01	00-00-7F	0-127
Release2 Time	0015	R/W		7	01	00-00-7F	0-127
Release2 Level	0016	R/W		7	01	00-00-7F	0-127
Key Range Low	0017	R/W		7	01	00-00-7F	0 - 127
Key Range High	0018	R/W		7	01	00-7F-7F	0 - 127
Original Key	0019	R/W		7	01	00-41-7F	Default F4

28.2 User Wave LFO Parameter

These parameters configure User Wave tone LFO settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Pitch LFO Wave Type	001F	R/W	00000000	4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3 5...Pulse 2:2 6...Pulse 3:1
Pitch LFO Rate	0020	R/W		7	01	00-40-7F	0 - 127
Pitch Auto Delay	0021	R/W		7	01	00-00-7F	0 - 127
Pitch Auto Rise	0022	R/W		7	01	00-00-7F	0 - 127
Pitch Auto Depth	0023	R/W		8	01	00-80-FF	-128 - 0 - +127

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Pitch Mod Depth	0024	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Pitch After Depth	0025	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Amp LFO Wave Type	0026	R/W		4	01	00-00-0F	0...Sin 1...Tri 2...Saw Up 3...Saw Down 4...Pulse 1:3 5...Pulse 2:2 6...Pulse 3:1
Amp LFO Rate	0027	R/W		7	01	00-40-7F	0 - 127
Amp LFO Auto Delay	0028	R/W		7	01	00-00-7F	0 - 127
Amp LFO Auto Rise	0029	R/W		7	01	00-00-7F	0 - 127
Amp LFO Auto Depth	002A	R/W		8	01	00-80-FF	-128 - 0 - +127
Amp LFO Mod Depth	002B	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)
Amp LFO After Depth	002C	R/W		7	01	00-40-7F	0 - 127 (effective:-64 - 0 - +63)

28.3 User Wave Looper Parameter

These parameters configure Looper settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Loop	002D	R/W	00000000	1	01	00-01-01	0...OFF 1...ON
Hold	002E	R/W		1	01	00-01-01	0...OFF 1...ON

29 DSP Parameter

29.1 DSP Basic

These parameters store DSP data.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R/W	00000000	7	10	00-20-7F	Ascii Character
Algorithm	0002	R/W		14	01	0000-000A-3FFF	ID (Notel)
Parameter7	0003	R/W		7	08	00-40-7F	0 - 127
Rotary Sw Onoff	0004	R/W		1	01	00-00-01	0...Off 1...On
Parameter Index	0005	R/W	0:Button Selection	4	01	00-00-08	0....No Assign 1-8...Parameter 1-8 Block: Button Selection 1...Rotary Slow/Fast Button
On Value	0006	R/W		7	01	00-00-7F	0 - 127
Off Value	0007	R/W		7	01	00-00-7F	0 - 127

Note1 : For details about the relationship between the Algorithm ID and the DSP Type Number, see "37 DSP Type List".

30 All Data Parameter

30.1 All Directory Info

The All data parameter stores all data directory information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Size	0001	R	000000	32	01	00000000-00000000-00FFFFFF	0 - 0xFFFFFFFF

31 Step Sequencer Parameter

31.1 Step Sequencer Directory Info

The Step Sequencer parameter stores Step Sequencer data directory information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R	00000000	7	10	20-20-7F	Ascii Character
Size	0002	R	000000	32	01	00000000-00000000-00FFFFFF	0 - 0xFFFFFFFF

32 Step Sequencer Chain Parameter

32.1 Step Sequencer Chain Directory Info

The Step Sequencer Chain parameter stores Step Sequencer Chain data directory information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R	00000000	7	10	20-20-7F	Ascii Character
Size	0002	R	000000	32	01	00000000-00000000-00FFFFFF	0 - 0xFFFFFFFF

33 Arpeggio Parameter

33.1 Arpeggio Directory Info

The Arpeggio parameter stores Arpeggio data directory information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R	00000000	7	10	20-20-7F	Ascii Character
Size	0002	R	000000	32	01	00000000-00000000-00FFFFFF	0 - 0xFFFFFFFF

34 Phrase Parameter

34.1 Phrase Directory Info

The Phrase parameter stores Phrase data directory information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R	00000000	7	10	20-20-7F	Ascii Character
Size	0002	R	000000	32	01	00000000-00000000-00FFFFFF	0 - 0xFFFFFFFF

35 Spec Parameter

These parameters configure global settings and other settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Perform Number	0000	R/W	00000000	8	01	00-00-C7	0 - 199

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Perform Filter	0001	R/W		16	01	0000-0030-FFFF	bit0: Step Seq bit1: Arpeggio bit2: Phrase bit3: Tempo bit4: System Reverb bit5: System Chorus bit6: System Master EQ
Setting Start Up Select	0002	R/W		2	01	00-00-02	0...Patch 1...Tone 2...Step Seq
Chain Number	0003	R/W		8	01	00-00-63	0 - 99
Setting Fine Tune	0004	R/W		10	01	010B-0200-0303	-245 - 259 (415.5Hz 465.9Hz)
Setting Coarse Tune	0005	R/W		7	01	28-40-58	-24 - 0 - +24(semitone)
Panel Transpose	000C	R/W		7	01	34-40-4C	-12 - +12
Panel Octave Shift	000D	R/W		7	01	3D-40-43	-3 - +3
Setting Local Control	000F	R/W		1	01	00-01-01	0...Off 1...On
Setting LCD Contrast	0012	R/W		7	01	01-09-11	1 - 17
Setting APO Modex	0013	R/W		1	01	00-01-01	0...Off 1...On
Setting MIDI Out Select	003B	R/W		4	01	00-00-02	0...Keyboard 1...MIDI IN(MIDI Thru) 2...USB
Setting USB Out Select	003C	R/W		4	01	00-00-01	0...Keyboard 1...MIDI IN(MIDI Thru)
Setting MIDI In	003D	R/W		1	01	00-01-01	0...Off 1...On
Setting USB In	003E	R/W		1	01	00-01-01	0...Off 1...On
Setting Sync Mode	003F	R/W		4	01	00-00-02	0...Off 1...Master 2...Slave
Setting Performance NRPN	0040	R/W		1	01	00-00-01	0...Off 1...On
Setting StepSeq NRPN	0041	R/W		1	01	00-00-01	0...Off 1...On
Setting Phrase NRPN	0042	R/W		1	01	00-00-01	0...Off 1...On
Setting Arpeggio NRPN	0043	R/W		1	01	00-00-01	0...Off 1...On
Setting Device ID	0044	R/W		7	01	00-7F-7F	0 - 127 127: All
Setting Basic Ch	0045	R/W		7	01	00-00-0F	0 - 15
Phrase Guide	0048	R/W	00000000	1	01	00-01-01	0: Off 1: On
Phrase Precount	0049	R/W		2	01	00-00-02	0: Off 1: 1 Measure 2: 2 Measure
Phrase Beat	004A	R/W		5	01	01-03-16	0: Nop 1-7: 2/4 8/4 8-22: 2/8 16/8
Phrase End Quantize	004B	R/W		2	01	00-02-03	0: Off 1: 1 Measure 2: 4 Note 3: 8 Note
Phrase Note Quantize	004C	R/W		3	01	00-00-04	0: Off 1: 8 Note 2: 8 ³ Note 3: 16 Note 4: 16 ³ Note
Looper Precount	004D	R/W	00000000	4	01	00-03-07	0: Off 2-8 Count
Looper Threshold	004E	R/W		7	01	00-14-7F	0-127
Looper Reverse Rec	004F	R/W		1	01	00-00-01	0: Off 1: On

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Looper Channel	0050	R/W		1	01	00-00-01	0: Mono 1: Stereo
Looper Fs	0051	R/W		1	01	00-01-01	0: 21kHz 1: 42kHz
Looper Auto Overdub	0052	R/W		1	01	00-00-01	0: Off 1: On

Part VI

Parameter Set List

This section explains actually how parameter sets can be transferred by the Instrument with bulk dump.

36 Parameter Set Table

Field Contents

- *cat* field
Shows the category value.(Note1)
- *mem* field
Shows the memory area ID value.(Note1)
- *pset* field
Shows the parameter set number value. Applicable parameter set numbers are those in the user area where the top number is zero, and are not the same numbers as those displayed by the Instrument.
(Note1)

Note1 : Operation is not guaranteed for values other than those noted here.

36.1 XW-P1

Parameter Set Category	<i>cat</i>	<i>mem</i>	<i>pset</i>	description
Patch	02H	02H	0000H - 0063H	(User Patch 0 - 99)
Tone	03H	02H	0000H - 0063H	(User Solo Synth 0 - 99)
			0064H - 0095H	(User Hex Layer 0 - 49)
			0096H - 00C7H	(User Drawbar 0 - 49)
			00C8H - 00DBH	(User Piano Melody 0 - 19)
			00DCH - 00EFH	(User Strings Melody 0 - 19)
			00F0H - 0103H	(User Guitar Melody 0 - 19)
			0104H - 0117H	(User Lead Melody 0 - 19)
			0118H - 0121H	(User Drum Melody 0 - 9)
			0122H - 0135H	(User Various Melody 0 - 19)
Melody	05H	02H	0000H - 0013H	(User Piano Melody 0 - 19)
			0014H - 0027H	(User Strings Melody 0 - 19)
			0028H - 003BH	(User Guitar Melody 0 - 19)
			003CH - 004FH	(User Lead Melody 0 - 19)
			0050H - 0063H	(User Various Melody 0 - 19)
Drum	06H	02H	0000H - 000AH	(User Drum Melody 0 - 9)
Drawbar	07H	02H	0000H - 0032H	(User Drawbar 0 - 49)
Hex Layer	08H	02H	0000H - 0032H	(User Hex Layer 0 - 49)
Solo Synth	09H	02H	0000H - 0063H	(User Solo Synth 0 - 99)
DSP	13H	02H	0000H - 0063H	(User DSP 0 - 99)
All	1FH	02H	0000H - 0006H	(All Data)
Step Sequencer	26H	02H	0000H - 0063H	(User Step Sequencer 0 - 99)
Step Sequencer Chain	27H	02H	0000H - 0063H	(User Step Sequencer Chain 0 - 99)
Arpeggio	28H	02H	0000H - 0063H	(User Apreggio 0 - 99)
Phrase	29H	02H	0000H - 0063H	(User Phrase 0 - 99)
Spec	2AH	02H	0000H	(various setting)

36.2 XW-G1

Parameter Set Category	<i>cat</i>	<i>mem</i>	<i>pset</i>	description
Patch	02H	02H	0000H - 0063H	(User Patch 0 - 99)
Tone	03H	02H	0000H - 0063H	(User Tone 0 - 99)
			0064H - 00C7H	(User Tone 100 - 199)
			00C8H - 00D1H	(User Tone 200 - 209)
			00D2H - 00DBH	(User Tone 300 - 309)
Melody	05H	02H	0000H - 0063H	(User Tone 100 - 199)
Drum	06H	02H	0000H - 000AH	(User Tone 300 - 309)
Solo Synth	09H	02H	0000H - 0063H	(User Tone 0 - 99)
User Wave	0AH	02H	0000H - 000AH	(User Tone 200 - 209)
DSP	13H	02H	0000H - 0063H	(User DSP 0 - 99)
All	1FH	02H	0000H - 0006H	(All Data)
Step Sequencer	26H	02H	0000H - 0063H	(User Step Sequencer 0 - 99)
Step Sequencer Chain	27H	02H	0000H - 0063H	(User Step Sequencer Chain 0 - 99)
Arpeggio	28H	02H	0000H - 0063H	(User Arpeggio 0 - 99)
Phrase	29H	02H	0000H - 0063H	(User Phrase 0 - 99)
Spec	2AH	02H	0000H	(various setting)

Part VII

DSP Parameter List

37 DSP Type List

This is a list of DSP types built into the Instrument.

37.1 Solo Synth DSP

Solo Synth DSP Number	DSP ID	Type
01	80H	Solo Synth Bypass
02	81H	Solo Synth Auto Pan
03	82H	Solo Synth Distortion
04	83H	Solo Synth Flanger
05	84H	Solo Synth Chorus
06	85H	Solo Synth Delay
07	86H	Solo Synth Ring Modulator

37.2 Normal DSP

37.2.1 Single DSP

Normal DSP Number	DSP ID	Type
01	01H	Wah
02	02H	Compressor
03	03H	Distortion
04	04H	Enhancer
05	05H	Auto Pan
06	06H	Tremolo
07	07H	Phaser
08	08H	Flanger
09	09H	Chorus
10	0AH	Delay
11	0BH	Reflection
12	0CH	Rotary
13	0DH	Ring Modulator
14	0EH	Lo-Fi

37.2.2 Dual DSP

Normal DSP Number	DSP ID	Type
15	41H	Wah-Comp
16	42H	Wah-Dist
17	43H	Wah-Cho
18	44H	Wah-Flan
19	45H	Wah-Ref
20	46H	Wah-Trem
21	47H	Wah-Pan
22	48H	Comp-Wah
23	49H	Comp-Dist
24	4AH	Comp-Cho
25	4BH	Comp-Flan
26	4CH	Comp-Ref
27	4DH	Comp-Trem
28	4EH	Comp-Pan
29	50H	Dist-Wah
20	51H	Dist-Comp
31	53H	Dist-Cho
32	54H	Dist-Flan
33	55H	Dist-Ref
34	56H	Dist-Trem
35	57H	Dist-Pan
36	5DH	Cho-Ref
37	5FH	Cho-Pan
38	65H	Flan-Ref
39	67H	Flan-Pan
30	6AH	Ref-Dist
41	6BH	Ref-Cho
42	6FH	Ref-Pan
43	72H	Trem-Dist
44	73H	Trem-Cho
45	74H	Trem-Flan
46	75H	Trem-Ref

38 DSP Parameter Set Type

38.1 Solo Synth Bypass

There are no parameters that can be set by Solo Synth Bypass.

38.2 Solo Synth Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFOWaveform	00 - 7F	Note1
Parameter7[2]	LFO Rate	00 - 7F	
Parameter7[3]	LFO Depth	00 - 7F	
Parameter7[4]	Manual	00 - 7F	Note2

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.3 Solo Synth Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Gain	00 - 7F	
Parameter7[2]	Level	00 - 7F	

38.4 Solo Synth Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFOWaveform	00 - 7F	Note1
Parameter7[2]	LFO Rate	00 - 7F	
Parameter7[3]	LFO Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.5 Solo Synth Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFOWaveform	00 - 7F	Note1
Parameter7[2]	LFO Rate	00 - 7F	
Parameter7[3]	LFO Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.6 Solo Synth Delay

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Delay Time	00 - 7F	
Parameter7[2]	Feedback	00 - 7F	
Parameter7[3]	Damp	00 - 7F	Note1
Parameter7[4]	Wet Level	00 - 7F	Note2
Parameter7[5]	Tempo Sync	00 - 7F	Note3

Note1 : For information about the relationship between setting values and send/receive values, see “39.8 0-3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.9 0-5 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see “39.7 Tempo Sync Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.7 Solo Synth Ring Modulator

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Frequency	00 - 7F	
Parameter7[2]	Dry Level	00 - 7F	
Parameter7[3]	Wet Level	00 - 7F	

38.8 Wah

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Resonance	00 - 7F	
Parameter7[2]	Manual	00 - 7F	
Parameter7[3]	LFO Rate	00 - 7F	
Parameter7[4]	LFO Depth	00 - 7F	
Parameter7[5]	LFOWaveform	00 - 7F	Note1

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.9 Compressor

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Attack	00 - 7F	
Parameter7[2]	Release	00 - 7F	
Parameter7[3]	Level	00 - 7F	
Parameter7[4]	Threshold	00 - 7F	

38.10 Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Gain	00 - 7F	
Parameter7[2]	Level	00 - 7F	

38.11 Enhancer

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Low Freq	00 - 7F	
Parameter7[2]	Low Phase	00 - 7F	
Parameter7[3]	High Freq	00 - 7F	
Parameter7[4]	High Phase	00 - 7F	

38.12 Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFO Rate	00 - 7F	
Parameter7[2]	LFO Depth	00 - 7F	
Parameter7[3]	LFOWaveform	00 - 7F	Note1
Parameter7[4]	Manual	00 - 7F	Note2

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.13 Tremolo

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFO Rate	00 - 7F	
Parameter7[2]	LFO Depth	00 - 7F	
Parameter7[3]	LFOWaveform	00 - 7F	Note1

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.14 Phaser

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Resonance	00 - 7F	
Parameter7[2]	LFO Rate	00 - 7F	
Parameter7[3]	LFO Depth	00 - 7F	
Parameter7[4]	LFOWaveform	00 - 7F	Note1

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.15 Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFO Rate	00 - 7F	
Parameter7[2]	LFO Depth	00 - 7F	
Parameter7[3]	LFOWaveform	00 - 7F	Note1
Parameter7[4]	Feedback	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.16 Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	LFO Rate	00 - 7F	
Parameter7[2]	LFO Depth	00 - 7F	
Parameter7[3]	LFOWaveform	00 - 7F	Note1
Parameter7[4]	Feedback	00 - 7F	
Parameter7[5]	Type	00 - 7F	Note2

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.10 Chorus Mode Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.17 Delay

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Delay Time	00 - 7F	Note1
Parameter7[2]	Feedback	00 - 7F	
Parameter7[3]	Ratio Lch	00 - 7F	
Parameter7[4]	Ratio Rch	00 - 7F	
Parameter7[5]	Wet Level	00 - 7F	Note2
Parameter7[6]	Type	00 - 7F	Note3
Parameter7[7]	Tempo Sync	00 - 7F	Note4

Note1 : For information about the relationship between setting values and send/receive values, see “39.11 Delay Level Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.12 Delay Type Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see “39.7 Tempo Sync Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.18 Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Type	00 - 7F	Note1
Parameter7[2]	Feedback	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.17 Reflection Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.19 Rotary

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Od Gain	00 - 7F	Note1
Parameter7[2]	Od Level	00 - 7F	
Parameter7[3]	Speed	00 - 7F	Note2
Parameter7[4]	Brake	00 - 7F	Note3
Parameter7[5]	Fall Accel	00 - 7F	
Parameter7[6]	Rise Accel	00 - 7F	
Parameter7[7]	Slow Rate	00 - 7F	
Parameter7[8]	Fast Rate	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.8 0-3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.20 Slow/Fast Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see “39.19 Rotate/Brake Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.20 Ring Modulator

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	OSC Freq	00 - 7F	
Parameter7[2]	LFO Rate	00 - 7F	
Parameter7[3]	LFO Depth	00 - 7F	
Parameter7[4]	Type	00 - 7F	Note1

Note1 : For information about the relationship between setting values and send/receive values, see “39.18 Ring Type Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.21 LoFi

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	W&F Rate	00 - 7F	
Parameter7[2]	W&F Depth	00 - 7F	
Parameter7[3]	Noise1Level	00 - 7F	Note1
Parameter7[4]	Noise2Level	00 - 7F	Note2
Parameter7[5]	Density	00 - 7F	Note3
Parameter7[6]	Bit	00 - 7F	Note4

Note1 : For information about the relationship between setting values and send/receive values, see “39.16 LoFi Noise Level Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.16 LoFi Noise Level Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see “39.9 0-5 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note4 : For information about the relationship between setting values and send/receive values, see “39.8 0-3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.22 Wah Compressor

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	Cmp Thresh	00 - 7F	
Parameter7[5]	Cmp Level	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.23 Wah Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	Dst Gain	00 - 7F	
Parameter7[5]	Dst Level	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.24 Wah Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	ChoWaveform	00 - 7F	Note2
Parameter7[5]	Cho Rate	00 - 7F	
Parameter7[6]	Cho Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.25 Wah Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	FlnWaveform	00 - 7F	Note2
Parameter7[5]	Fln Rate	00 - 7F	
Parameter7[6]	Fln Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.26 Wah Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	RefFeedback	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.27 Wah Tremolo

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	TrmWaveform	00 - 7F	Note2
Parameter7[5]	Trm Rate	00 - 7F	
Parameter7[6]	Trm Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.28 Wah Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	WahWaveform	00 - 7F	Note1
Parameter7[2]	Wah Rate	00 - 7F	
Parameter7[3]	Wah Depth	00 - 7F	
Parameter7[4]	PanWaveform	00 - 7F	Note2
Parameter7[5]	Pan Rate	00 - 7F	
Parameter7[6]	Pan Depth	00 - 7F	
Parameter7[7]	Pan Manual	00 - 7F	Note3

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.29 Compressor Wah

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	WahWaveform	00 - 7F	Note1
Parameter7[4]	Wah Rate	00 - 7F	
Parameter7[5]	Wah Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.30 Compressor Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	Dst Gain	00 - 7F	
Parameter7[4]	Dst Level	00 - 7F	

38.31 Compressor Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	ChoWaveform	00 - 7F	Note1
Parameter7[4]	Cho Rate	00 - 7F	
Parameter7[5]	Cho Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.32 Compressor Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	FlnWaveform	00 - 7F	Note1
Parameter7[4]	Fln Rate	00 - 7F	
Parameter7[5]	Fln Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.33 Compressor Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	RefFeedback	00 - 7F	

38.34 Compressor Tremolo

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	TrmWaveform	00 - 7F	Note1
Parameter7[4]	Trm Rate	00 - 7F	
Parameter7[5]	Trm Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.35 Compressor Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Cmp Thresh	00 - 7F	
Parameter7[2]	Cmp Level	00 - 7F	
Parameter7[3]	PanWaveform	00 - 7F	Note1
Parameter7[4]	Pan Rate	00 - 7F	
Parameter7[5]	Pan Depth	00 - 7F	
Parameter7[6]	Pan Manual	00 - 7F	Note2

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.36 Distortion Wah

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	WahWaveform	00 - 7F	Note1
Parameter7[4]	Wah Rate	00 - 7F	
Parameter7[5]	Wah Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.13 LFO Wave Form1 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.37 Distortion Compressor

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	Cmp Thresh	00 - 7F	
Parameter7[4]	Cmp Level	00 - 7F	

38.38 Distortion Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	ChoWaveform	00 - 7F	Note1
Parameter7[4]	Cho Rate	00 - 7F	
Parameter7[5]	Cho Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.39 Distortion Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	FlnWaveform	00 - 7F	Note1
Parameter7[4]	Fln Rate	00 - 7F	
Parameter7[5]	Fln Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.40 Distortion Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	RefFeedback	00 - 7F	

38.41 Distortion Tremolo

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	TrmWaveform	00 - 7F	Note1
Parameter7[4]	Trm Rate	00 - 7F	
Parameter7[5]	Trm Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.42 Distortion Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	Dst Gain	00 - 7F	
Parameter7[2]	Dst Level	00 - 7F	
Parameter7[3]	PanWaveform	00 - 7F	Note1
Parameter7[4]	Pan Rate	00 - 7F	
Parameter7[5]	Pan Depth	00 - 7F	
Parameter7[6]	Pan Manual	00 - 7F	Note2

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.43 Chorus Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	ChoWaveform	00 - 7F	Note1
Parameter7[2]	Cho Rate	00 - 7F	
Parameter7[3]	Cho Depth	00 - 7F	
Parameter7[4]	RefFeedback	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.44 Chorus Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	ChoWaveform	00 - 7F	Note1
Parameter7[2]	Cho Rate	00 - 7F	
Parameter7[3]	Cho Depth	00 - 7F	
Parameter7[4]	PanWaveform	00 - 7F	Note2
Parameter7[5]	Pan Rate	00 - 7F	
Parameter7[6]	Pan Depth	00 - 7F	
Parameter7[7]	Pan Manual	00 - 7F	Note3

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.45 Flanger Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	FlnWaveform	00 - 7F	Note1
Parameter7[2]	Fln Rate	00 - 7F	
Parameter7[3]	Fln Depth	00 - 7F	
Parameter7[4]	RefFeedback	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.46 Flanger Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	FlnWaveform	00 - 7F	Note1
Parameter7[2]	Fln Rate	00 - 7F	
Parameter7[3]	Fln Depth	00 - 7F	
Parameter7[4]	PanWaveform	00 - 7F	Note2
Parameter7[5]	Pan Rate	00 - 7F	
Parameter7[6]	Pan Depth	00 - 7F	
Parameter7[7]	Pan Manual	00 - 7F	Note3

Note1 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note3 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.47 Reflection Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	RefFeedback	00 - 7F	
Parameter7[2]	Dst Gain	00 - 7F	
Parameter7[3]	Dst Level	00 - 7F	

38.48 Reflection Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	RefFeedback	00 - 7F	
Parameter7[2]	ChoWaveform	00 - 7F	Note1
Parameter7[3]	Cho Rate	00 - 7F	
Parameter7[4]	Cho Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.49 Reflection Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	RefFeedback	00 - 7F	
Parameter7[2]	PanWaveform	00 - 7F	Note1
Parameter7[3]	Pan Rate	00 - 7F	
Parameter7[4]	Pan Depth	00 - 7F	
Parameter7[5]	Pan Manual	00 - 7F	Note2

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see the “39.2 -64 - 0 - +63 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.50 Tremolo Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	TrmWaveform	00 - 7F	Note1
Parameter7[2]	Trm Rate	00 - 7F	
Parameter7[3]	Trm Depth	00 - 7F	
Parameter7[4]	Dst Gain	00 - 7F	
Parameter7[5]	Dst Level	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.51 Tremolo Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	TrmWaveform	00 - 7F	Note1
Parameter7[2]	Trm Rate	00 - 7F	
Parameter7[3]	Trm Depth	00 - 7F	
Parameter7[4]	ChoWaveform	00 - 7F	Note2
Parameter7[5]	Cho Rate	00 - 7F	
Parameter7[6]	Cho Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.52 Tremolo Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	TrmWaveform	00 - 7F	Note1
Parameter7[2]	Trm Rate	00 - 7F	
Parameter7[3]	Trm Depth	00 - 7F	
Parameter7[4]	FlnWaveform	00 - 7F	Note2
Parameter7[5]	Fln Rate	00 - 7F	
Parameter7[6]	Fln Depth	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Note2 : For information about the relationship between setting values and send/receive values, see “39.14 LFO Wave Form2 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

38.53 Tremolo Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[1]	TrmWaveform	00 - 7F	Note1
Parameter7[2]	Trm Rate	00 - 7F	
Parameter7[3]	Trm Depth	00 - 7F	
Parameter7[4]	RefFeedback	00 - 7F	

Note1 : For information about the relationship between setting values and send/receive values, see “39.15 LFO Wave Form3 Setting Value Table” in “VIII Setting Values and Send/Receive Values” of this document.

Part VIII

Setting Values and Send/ Receive Values

39 Setting Value Tables

39.1 Off/On Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	Off
7FH	40H - 7FH	On

39.2 -64 - 0 - +63 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	-64
:	:	:
40H	40H	0
:	:	:
7FH	7FH	+63

39.3 Pan Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Left
:	:	:
40H	40H	Center
:	:	:
7FH	7FH	Right

39.4 Fine Tune Setting Value Table

Transmit Value	Receive Value	Parameter
(LSB, MSB)		
(43H, 00H)	(00H, 00H) - (5FH, 00H)	415.5 Hz
(65H, 00H)	(60H, 00H) - (7FH, 00H)	415.6 Hz
(07H, 01H)	(00H, 01H) - (1FH, 01H)	415.7 Hz
(29H, 01H)	(20H, 01H) - (3FH, 01H)	415.8 Hz
:	:	:
(40H, 3FH)	(30H, 3FH) - (4FH, 3FH)	439.8 Hz
(60H, 3FH)	(50H, 3FH) - (6FH, 3FH)	439.9 Hz
(00H, 40H)	(70H, 3FH) - (1FH, 40H)	440.0 Hz
(20H, 40H)	(20H, 40H) - (3FH, 40H)	440.1 Hz
(40H, 40H)	(40H, 40H) - (5FH, 40H)	440.2 Hz
:	:	:
(54H, 7EH)	(50H, 7EH) - (6FH, 7EH)	465.6 Hz
(73H, 7EH)	(70H, 7EH) - (0FH, 7FH)	465.7 Hz
(11H, 7FH)	(10H, 7FH) - (2FH, 7FH)	465.8 Hz
(30H, 7FH)	(30H, 7FH) - (7FH, 7FH)	465.9 Hz

39.5 Drawbar Position 設定値テーブル

Transmit Value	Receive Value	Parameter
00H	00H - 0EH	0
14H	0FH - 1CH	1
28H	1DH - 2AH	2
32H	2BH - 38H	3
3cH	39H - 47H	4
50H	48H - 55H	5
5AH	56H - 63H	6
6EH	64H - 71H	7
7FH	72H - 7FH	8

39.6 Sine/Vintage Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	Sine
7FH	40H - 7FH	Vintage

39.7 Tempo Sync Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 0AH	Off
0CH	0BH - 16H	1/4
19H	17H - 21H	1/3
26H	22H - 2DH	3/8
33H	2EH - 39H	1/2
40H	3AH - 44H	2/3
4CH	45H - 50H	3/4
59H	51H - 5CH	1
66H	5DH - 67H	4/3
73H	68H - 73H	3/2
7FH	74H - 7FH	2

39.8 0-3 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 1FH	0
2AH	20H - 3FH	1
55H	40H - 5FH	2
7FH	60H - 7FH	3

39.9 0-5 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 14H	0
19H	15H - 29H	1
33H	2AH - 3FH	2
4CH	40H - 54H	3
66H	55H - 69H	4
7FH	6AH - 7FH	5

39.10 Chorus Mode Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 29H	mono
40H	2AH - 54H	stereo
7FH	55H - 7FH	tri

39.11 Delay Level Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 14H	0
19H	15H - 29H	1
33H	2AH - 3FH	2
4CH	40H - 54H	3
66H	55H - 69H	4
7FH	6AH - 7FH	5

39.12 Delay Type Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	determined by Delay Time
7FH	40H - 7FH	determined by Delay Time and Ratio L/R

39.13 LFO Wave Form1 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 1FH	off
2AH	20H - 3FH	sin
55H	40H - 5FH	tri
7FH	60H - 7FH	random

39.14 LFO Wave Form2 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 29H	sin
40H	2AH - 54H	tri
7FH	55H - 7FH	random

39.15 LFO Wave Form3 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	sin
7FH	40H - 7FH	tri

39.16 LoFi Noise Level Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 14H	0
19H	15H - 29H	1
33H	2AH - 3FH	2
4CH	40H - 54H	3
66H	55H - 69H	4
7FH	6AH - 7FH	5

39.17 Reflection Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 0FH	1
12H	10H - 1FH	2
24H	20H - 2FH	3
36H	30H - 3FH	4
49H	40H - 4FH	5
5BH	50H - 5FH	6
6DH	60H - 6FH	7
7FH	70H - 7FH	8

39.18 Ring Type Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 29H	ring modulated signal only
40H	2AH - 54H	ring modulated signal and input signal
7FH	55H - 7FH	ring modulated signal and input signal, applied chorus effect

39.19 Rotate/Brake Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	rotate
7FH	40H - 7FH	stop

39.20 Slow/Fast Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	slow
7FH	40H - 7FH	fast

39.21 -128 - 0 +127 Setting Value Table

Transmit Value	Receive Value	Parameter
(LSB, MSB)		
-	(00H, 00H) - (3FH, 00H)	-128
-	(40H, 00H) - (7FH, 00H)	-127
-	(00H, 01H) - (3FH, 01H)	-126
:	:	:
-	(00H, 40H) - (3FH, 40H)	0
:	:	:
-	(40H, 7EH) - (7FH, 7EH)	+125
-	(00H, 7FH) - (3FH, 7FH)	+126
-	(40H, 7FH) - (7FH, 7FH)	+127

39.22 -256 - 0 +255 Setting Value Table

Transmit Value	Receive Value	Parameter
(LSB, MSB)		
-	(00H, 00H) - (1FH, 00H)	-256
-	(20H, 00H) - (3FH, 00H)	-255
-	(40H, 00H) - (5FH, 00H)	-254
-	(60H, 00H) - (7FH, 00H)	-253
-	(00H, 01H) - (1FH, 01H)	-252
:	:	:
-	(00H, 40H) - (1FH, 40H)	0
:	:	:
-	(60H, 7EH) - (7FH, 7EH)	+251
-	(00H, 7FH) - (1FH, 7FH)	+252
-	(20H, 7FH) - (3FH, 7FH)	+253
-	(40H, 7FH) - (5FH, 7FH)	+254
-	(60H, 7FH) - (7FH, 7FH)	+255

39.23 Envelope Clock Trigger Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 05H	off
-	06H - 0CH	1/4 beat
-	0DH - 13H	1/3 beat
-	14H - 19H	1/2 beat
-	1AH - 20H	2/3 beat
-	21H - 27H	1 beat
-	28H - 2EH	3/2 beat
-	2FH - 34H	2 beat
-	35H - 3BH	3 beat
-	3CH - 42H	4 beat
-	43H - 49H	1/4 upbeat
-	4AH - 4FH	1/3 upbeat
-	50H - 56H	1/2 upbeat
-	57H - 5DH	2/3 upbeat
-	5EH - 64H	1 upbeat
-	65H - 6AH	3/2 upbeat
-	6BH - 71H	2 upbeat
-	72H - 78H	3 upbeat
-	79H - 7EH	4 upbeat

39.24 Filter Cutoff Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 07H	0
-	08H - 0FH	1
-	10H - 17H	2
-	18H - 1FH	3
-	20H - 27H	4
-	28H - 2FH	5
-	30H - 37H	6
-	38H - 3FH	7
-	40H - 47H	8
-	48H - 4FH	9
-	50H - 57H	10
-	58H - 5FH	11
-	60H - 67H	12
-	68H - 6FH	13
-	70H - 77H	14
-	78H - 7EH	15

39.25 Filter Gain Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 18H	Flat
-	19H - 32H	-3dB
-	33H - 4BH	-6dB
-	4CH - 65H	-12dB
-	66H - 7EH	-18dB

39.26 Synth Ext Osc Pitch Shifter Mode Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 1FH	off
-	20H - 3FH	1
-	40H - 5FH	2
-	60H - 7EH	3

39.27 Synth Ext Osc Pitch Shifter Mix Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 07H	0
-	08H - 0FH	1
-	10H - 17H	2
-	18H - 1FH	3
-	20H - 27H	4
-	28H - 2FH	5
-	30H - 37H	6
-	38H - 3FH	7
-	40H - 47H	8
-	48H - 4FH	9
-	50H - 57H	10
-	58H - 5FH	11
-	60H - 67H	12
-	68H - 6FH	13
-	70H - 77H	14
-	78H - 7EH	15

39.28 Synth LFO Wave Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 0FH	Sin
-	10H - 1FH	Tri
-	20H - 2FH	Saw Up
-	30H - 3FH	Saw Down
-	40H - 4FH	Pulse 1:3
-	50H - 5FH	Pulse 2:2
-	60H - 6FH	Pulse 3:1
-	70H - 7EH	Random

39.29 Synth LFO Sync Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 3FH	off
-	40H - 7EH	Tempo

39.30 Synth LFO Clock Sync Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 06H	1/4 beat
-	07H - 0DH	1/3 beat
-	0EH - 14H	1/2 beat
-	15H - 1BH	2/3 beat
-	1CH - 22H	1 beat
-	23H - 29H	3/2 beat
-	2AH - 30H	2 beat
-	31H - 37H	3 beat
-	38H - 3FH	4 beat
-	40H - 46H	1/4 upbeat
-	47H - 4DH	1/3 upbeat
-	4EH - 54H	1/2 upbeat
-	55H - 5BH	2/3 upbeat
-	5CH - 62H	1 upbeat
-	63H - 69H	3/2 upbeat
-	6AH - 70H	2 upbeat
-	71H - 77H	3 upbeat
-	78H - 7EH	4 upbeat

39.31 Synth Total Filter Type Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 29H	LPF
-	2AH - 54H	BPF
-	55H - 7EH	HPF

39.32 Hex Layer Detune Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 03H	0
-	04H - 07H	1
:	:	:
-	78H - 7BH	30
-	7CH - 7FH	31

Part IX

MIDI Implementation Notation

40 Value Notation

40.1 Hexadecimal Notation

MIDI implementation sometimes requires that data be expressed in hexadecimal format. Hexadecimal values are indicated by the letter “H” after the value. The hexadecimal equivalents of decimal values 10 through 15 are expressed as the letters A through F.

The table below shows the hexadecimal equivalents for decimal values 0 through 127, which are often used in MIDI messages.

Decimal	Hexadecimal	Decimal	Hexadecimal	Decimal	Hexadecimal	Decimal	Hexadecimal
0	00H	32	20H	64	40H	96	60H
1	01H	33	21H	65	41H	97	61H
2	02H	34	22H	66	42H	98	62H
3	03H	35	23H	67	43H	99	63H
4	04H	36	24H	68	44H	100	64H
5	05H	37	25H	69	45H	101	65H
6	06H	38	26H	70	46H	102	66H
7	07H	39	27H	71	47H	103	67H
8	08H	40	28H	72	48H	104	68H
9	09H	41	29H	73	49H	105	69H
10	0AH	42	2AH	74	4AH	106	6AH
11	0BH	43	2BH	75	4BH	107	6BH
12	0CH	44	2CH	76	4CH	108	6CH
13	0DH	45	2DH	77	4DH	109	6DH
14	0EH	46	2EH	78	4EH	110	6EH
15	0FH	47	2FH	79	4FH	111	6FH
16	10H	48	30H	80	50H	112	70H
17	11H	49	31H	81	51H	113	71H
18	12H	50	32H	82	52H	114	72H
19	13H	51	33H	83	53H	115	73H
20	14H	52	34H	84	54H	116	74H
21	15H	53	35H	85	55H	117	75H
22	16H	54	36H	86	56H	118	76H
23	17H	55	37H	87	57H	119	77H
24	18H	56	38H	88	58H	120	78H
25	19H	57	39H	89	59H	121	79H
26	1AH	58	3AH	90	5AH	122	7AH
27	1BH	59	3BH	91	5BH	123	7BH
28	1CH	60	3CH	92	5CH	124	7CH
29	1DH	61	3DH	93	5DH	125	7DH
30	1EH	62	3EH	94	5EH	126	7EH
31	1FH	63	3FH	95	5FH	127	7FH

40.2 Binary Notation

When a MIDI implementation data value is expressed in binary, the letter “B” (for “binary”) is affixed at the end of the value. The table below shows the binary equivalents for the decimal values 0 through 127, which are often used for settings.

Decimal	Hexadecimal	Binary
0	00H	00000000B
1	01H	00000001B
2	02H	00000010B
3	03H	00000011B
4	04H	00000100B
5	05H	00000101B
6	06H	00000110B
7	07H	00000111B
8	08H	00001000B
9	09H	00001001B
10	0AH	00001010B
11	0BH	00001011B
12	0CH	00001100B
13	0DH	00001101B
14	0EH	00001110B
15	0FH	00001111B
16	10H	00010000B
:	:	
125	7DH	01111101B
126	7EH	01111110B
127	7FH	01111111B