

PX-3/PX-3S MIDI Implementation

CASIO COMPUTER CO., LTD.

Contents

Part I MIDI Message Overview

1	Product Configuration as a MIDI Device.....	6
1.1	System Section.....	6
1.2	Sound Generator Section.....	6
1.2.1	Sound generator common section.....	7
1.2.2	Sound Generator Parts.....	7
1.2.3	MIDI Receive and Registration.....	8
1.3	Performance Controller Section.....	8
1.3.1	Auto Performance MIDI Send.....	8
1.3.2	MIDI Send by Registration.....	8
1.3.3	MIDI Send by Assignable Buttons.....	9
2	Conditions that Disable Message Send and Receive.....	9
3	Timbre Type Specific Operation.....	9

Part II Channel Message

4	Send Channel.....	10
5	Receive Channel.....	10
6	Note Off.....	10
7	Note On.....	11
8	Polyphonic Key Pressure.....	11
9	Control Change.....	11
9.1	Bank Select (00H, 20H).....	12
9.2	Modulation (01H).....	12
9.3	Portamento Time (05H).....	12
9.4	Data Entry (06H, 26H).....	13
9.5	Volume (07H).....	13
9.6	Pan (0AH).....	13
9.7	Expression (0BH).....	14
9.8	General Use Controllers 1 through 8 (10H through 13H, 50H through 53H).....	14
9.9	Hold1 (40H).....	15
9.10	Portamento Switch (41H).....	15
9.11	Sostenuto (42H).....	16
9.12	Soft (43H).....	16
9.13	Filter Resonance (47H).....	17

9.14	Release Time (48H)	17
9.15	Attack Time (49H)	17
9.16	Filter Cut Off (4AH)	18
9.17	Vibrato Rate (4CH)	18
9.18	Vibrato Depth (4DH)	18
9.19	Vibrato Delay (4EH)	19
9.20	Portamento Control (54H)	19
9.21	Reverb Send (5BH)	19
9.22	Chorus Send (5DH)	20
9.23	NRPN (62H, 63H)	20
9.23.1	Functions Assigned to NRPN	20
9.24	RPN (64H, 65H)	20
9.24.1	Pitch Bend Sensitivity	21
9.24.2	Fine Tune	21
9.24.3	Coarse Tune	21
9.24.4	Modulation Depth	22
9.24.5	Null	22
10	Mode Messages	22
10.1	All Sound Off (78H)	22
10.2	Reset All Controllers (79H)	22
10.3	All Notes Off (7BH)	23
10.4	Omni Off (7CH)	23
10.5	Omni On (7DH)	23
10.6	Mono (7EH)	23
10.7	Poly (7FH)	24
11	Program Change	24
11.1	About Timbre Type	24
11.2	About DSP	25
11.2.1	DSP Line Structure and Assignment	25
12	Channel Aftertouch	25
13	Pitch Bend Change	25

Part III System Messages

14	Active Sensing	26
15	System Exclusive Message	26
15.1	Universal Realtime System Exclusive Message	26
15.1.1	Master Volume	26
15.1.2	Master Balance	27
15.1.3	Master Fine Tuning	27
15.1.4	Master Coarse Tuning	27
15.1.5	Reverb Parameter	28
15.1.6	Chorus Parameter	28
15.1.7	GM System Message	30
15.1.8	GS Message	30
15.2	Instrument-Specific System Exclusive Messages	30

Part IV Instrument-Specific System Exclusive Messages

16	Format	31
16.1	Message Classifications	31
16.2	Basic Message Structure.....	31
16.3	Field Formats.....	32
16.3.1	SX : System Exclusive Message Status	32
16.3.2	MAN : Manufacturer's ID.....	32
16.3.3	MOD : Model ID.....	32
16.3.4	<i>dev</i> : MIDI Device ID 00H - 7FH	32
16.3.5	<i>act</i> : Action	32
16.3.6	<i>cat</i> : Category	33
16.3.7	<i>mem</i> : Memory Area ID	33
16.3.8	<i>pset</i> : Parameter Set Number.....	33
16.3.9	<i>blk</i> : Block Number	33
16.3.10	<i>prm</i> : Parameter ID.....	34
16.3.11	<i>idx</i> : Data Index Number	34
16.3.12	<i>len</i> : Data Length	34
16.3.13	<i>data</i> : Parameter Data.....	35
16.3.14	EOX : End of System Exclusive Message.....	35
17	Parameter Transfer.....	36
17.1	Two-way Communication	36
17.1.1	Example : Data send in response to send request to this Instrument	36
17.2	One-way Communication	36
17.2.1	Example : Data send to Instrument from external source	36
17.2.2	Example : Data send resulting from Instrument operation	36

Part V Parameter List

18	System Parameters	37
18.1	System Information Parameter.....	37
19	Setup Parameter.....	38
19.1	Panel Parameter.....	38
19.2	MIDI Parameter	38
20	Patch Parameters	38
20.1	Master Tune Parameters.....	38
20.2	Master Mixer Parameters	38
20.3	System Chorus Parameter	39
20.4	System Reverb Parameters	39
20.5	System Acoustic Resonance Parameters	39
20.6	Master Equalizer Parameter.....	40
20.7	Part Parameters	40
20.8	Part Registration Parameter	41
21	Tone Parameters	42
21.1	Basic Parameters	42
21.2	LFO Parameters	43
21.3	DSP Parameters.....	43

22	Scale Tune.....	44
23	Registration Parameter.....	44
23.1	Assignable Button 1 Parameter.....	44
23.2	Assignable Button 2 Parameter.....	44
23.3	Common Parameter.....	45
23.4	Equalizer Parameter.....	46
24	Registration Bank Parameter.....	46
24.1	Bank Common.....	46

Part VI DSP Parameter List

25	DSP Algorithm ID Tables.....	47
25.1	Stereo Tone DSP.....	47
26	DSP Parameter Set Types.....	48
26.1	Equalizer.....	48
26.2	Compressor.....	48
26.3	Limiter.....	48
26.4	Enhancer.....	48
26.5	Chorus.....	49
26.6	Tremolo.....	49
26.7	Early Reflection.....	49
26.8	Rotary.....	49
26.9	Drive Rotary.....	50
26.10	3-Phase Chorus.....	50
26.11	Auto Pan.....	50
26.12	Stereo Phaser.....	50
26.13	Phaser.....	51
26.14	Distortion.....	51
26.15	Auto Wah.....	51
26.16	LFO Wah.....	51
26.17	Flanger.....	51
26.18	Multi01 (Enhancer - Chorus).....	52
26.19	Multi02 (Chorus - Tremolo).....	52
26.20	Multi03 (Compressor - Enhancer).....	52
26.21	Multi04 (Compressor - Chorus).....	53
26.22	Multi05 (Phaser - Chorus).....	53
26.23	Multi06 (Phaser - Auto Pan).....	54
26.24	Multi07 (Chorus - Flanger).....	54
26.25	Multi08 (Auto Wah - Phaser).....	55
26.26	Multi09 (Distortion - Phaser).....	55
26.27	Multi10 (Distortion - Chorus).....	56
26.28	Multi11 (Compressor - Auto Wah).....	56
26.29	Multi12 (Compressor - LFO Wah).....	57
26.30	Multi13 (Distortion - Auto Pan).....	57
26.31	Multi14 (Distortion - Tremolo).....	57
26.32	Multi15 (Compressor - Auto Pan).....	58
26.33	Multi16 (Compressor - Tremolo).....	58

26.34	Multi17 (Compressor - Phaser)	58
26.35	Multi18 (Phaser - Distortion)	59
26.36	Multi19 (Phaser - Chorus - Auto Pan)	59
26.37	Multi20 (LFO Wah - Chorus)	60
26.38	Multi21 (Auto Wah - Chorus)	60
26.39	Multi22 (Compressor - Distortion - Chorus)	61
26.40	Multi23 (LFO Wah - Distortion - Chorus)	61
26.41	Multi24 (Auto Wah - Distortion - Chorus)	62
26.42	Multi25 (Compressor - Distortion - Auto Pan)	62
26.43	Multi26 (Compressor - Distortion - Tremolo)	63

Part VII Setting Values and Send/Receive Values

27	Setting Value Tables	64
27.1	Off/On Setting Value Table	64
27.2	-/+ Setting Value Table	64
27.3	Slow/Fast Setting Value Table	64
27.4	Rotate/Brake Setting Value Table	64
27.5	Routing Setting Value Table	64
27.6	-64 - 0 - +63 Setting Value Table	64
27.7	-100 - 0 - +99 Setting Value Table	64
27.8	Pan Setting Value Table	64
27.9	Reverb Type Setting Value Table	65
27.10	Chorus Type Setting Value Table	65
27.11	Equalizer Low Frequency Setting Value Table	65
27.12	Equalizer Mid Frequency Setting Value Table	65
27.13	Equalizer High Frequency Setting Value Table	65
27.14	Equalizer Gain Setting Value Table	66
27.15	DSP Equalizer Gain Setting Value Table	66

Part VIII MIDI Implementation Notation

28	Value Notation	67
28.1	Hexadecimal Notation	67
28.2	Binary Notation	67

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 sends and receives specific MIDI Messages in accordance with its function.

- System Section
 - Device settings
 - Function status
- Sound Generator Section
 - Common
 - * Sound generator common section
 - * System effects
 - * Equalizer and brilliance adjustment function
 - * Mixer master
 - Parts
 - * Sound generator Instrument parts
 - * DSP (insertion effects)
 - * Mixer channel
- Performance Controller Section
 - Keyboard
 - Real-time controllers
 - * Pedals
 - * Bender
 - * Registration
 - * Assignable buttons
 - Auto play function

1.1 System Section

The System Section consists of a sound generator (sound source), a performance controller part (performance), and functions that are not directly related to Instrument play. In addition to manipulating Instrument setting parameters, this section is also used to exchange information.

1.2 Sound Generator Section

The Sound Generator Section consists of a common part that does not depend on the channel and a part that is specific to each channel. Mainly it receives performance information and performs operations.

1.2.1 Sound generator common section

The common section consists of sound generator setting blocks that do not depend on the sound generator part, such as system effects, mixer master control, etc.

These can be controlled by system exclusive messages that are basically exclusive to this particular Instrument, but several parameters also can be controlled by general universal system exclusive messages.

1.2.2 Sound Generator Parts

The settings of the sound generator parts can be changed using Instrument-specific system exclusive messages.

This Instrument consists of 36 parts. Of these, channel messages can be used to perform note on operations and to change settings of only the C Group (C01 through C16).

The relationships between the channel message receive channel and part number are fixed, as shown below.

Group A parts A01 through A04 are referred to as “zones”. See the Instruments User’s Guide for details about zones.

Part Number	Part Name	MIDI Receive Ch	MIDI Send Ch	Assigned Function	DSP Priority (Note 2)	Description
00	A01	-	01-16 (Note1)	Keyboard (Main)	1	Upper1
01	A02	-	01-16 (Note1)	Keyboard (Layer)	3	Upper2
02	A03	-	01-16 (Note1)	Keyboard (Split)	2	Lower1
03	A04	-	01-16 (Note1)	Keyboard (Layer Split)	4	Lower2
16	B01	-	01	MIDI file playback	5	Song01
17	B02	-	02	MIDI file playback	5	Song02
18	B03	-	03	MIDI file playback	5	Song03
19	B04	-	04	MIDI file playback	5	Song04
20	B05	-	05	MIDI file playback	5	Song05
21	B06	-	06	MIDI file playback	5	Song06
22	B07	-	07	MIDI file playback	5	Song07
23	B08	-	08	MIDI file playback	5	Song08
24	B09	-	09	MIDI file playback	5	Song09
25	B10	-	10	MIDI file playback	5	Song10
26	B11	-	11	MIDI file playback	5	Song11
27	B12	-	12	MIDI file playback	5	Song12
28	B13	-	13	MIDI file playback	5	Song13
29	B14	-	14	MIDI file playback	5	Song14
30	B15	-	15	MIDI file playback	5	Song15
31	B16	-	16	MIDI file playback	5	Song16
32	C01	01	-	MIDI IN	5	Ext.01
33	C02	02	-	MIDI IN	5	Ext.02
34	C03	03	-	MIDI IN	5	Ext.03
35	C04	04	-	MIDI IN	5	Ext.04
36	C05	05	-	MIDI IN	5	Ext.05
37	C06	06	-	MIDI IN	5	Ext.06
38	C07	07	-	MIDI IN	5	Ext.07
39	C08	08	-	MIDI IN	5	Ext.08
40	C09	09	-	MIDI IN	5	Ext.09
41	C10	10	-	MIDI IN	5	Ext.10
42	C11	11	-	MIDI IN	5	Ext.11
43	C12	12	-	MIDI IN	5	Ext.12
44	C13	13	-	MIDI IN	5	Ext.13
45	C14	14	-	MIDI IN	5	Ext.14
46	C15	15	-	MIDI IN	5	Ext.15
47	C16	16	-	MIDI IN	5	Ext.16

Note 1:

Can be changed by zone editing.

Note 2:

This is the DSP line assignment priority. A smaller value indicates a higher priority. For details, see “11.2.1 DSP Line Structure and Assignment”.

1.2.3 MIDI Receive and Registration

The registration (setup) can be switched by MIDI message. For details about messages, see “19.1 Panel Parameter”. When switching the registration by MIDI message, the parts reflected by the zone parameters are determined in accordance with the MIDI send channel setting values of the zone parameters. The following describes an example of how this works.

	Registration Settings (MIDI Send Ch)	Part Setting After MIDI Receive (Note 1)
01	Zone1 (3)	-
02	Zone2 (4)	-
03	Zone3 (14)	Zone1
04	Zone4 (8)	Zone2
05	-	-
06	-	-
07	-	-
08	-	Zone4
09	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	Zone3
15	-	-
16	-	-

Note 1:

Zone parameters are reflected by Group B parts during playback of MIDI files by this Instrument, and by Group C parts during MIDI receipt from an external device.

Common parameters are not affected. Use this Instrument’s registration function to change common parameters. Also note that Group A parts are given priority for DSP line assignment. If Group A parts use up all the DSP lines, the DSP settings of part reflected by the zones are ignored. For details about DSP line assignments, see “11.2.1 DSP Line Structure and Assignment”.

1.3 Performance Controller Section

The Performance Controller Section consists of keyboard, pedal, and other real-time controllers, as well as blocks that generate auto performance and other performance information. These messages are transmitted to the sound generator in accordance with operations, while they are also being sent out as MIDI messages. The channel number of the sent message is in accordance with part settings, etc.

1.3.1 Auto Performance MIDI Send

This document covers what operations are sent by messages for each message type. However, since there is wide variation in the messages that can be sent during an auto performance operation, messages are not covered here.

1.3.2 MIDI Send by Registration

The final MIDI messages sent during a registration operation are system exclusive messages that are specific to this Instrument, which can switch the registration during MIDI receipt. For details about messages, see “19.1 Panel Parameter”. Also, messages that can be sent during a registration operation are so diverse and wide-ranging, messages are not covered in detail here.

1.3.3 MIDI Send by Assignable Buttons

The message(s) sent when an assignable button is pressed depends on the function assigned to the button. Also, any control change message can be assigned to an assignable button. Since messages that can be sent by an assignable button operation are so diverse and wide-ranging, messages are not covered in detail here.

2 Conditions that Disable Message Send and Receive

All MIDI message send and receive is temporarily disabled in all of the following cases.

- During Instrument startup
- During SD card formatting
- During storage of registration data
- While “STORAGE” is selected as the “USB DEVICE MODE”.

3 Timbre Type Specific Operation

The operation that is performed for a received message depends on the current Timbre Type setting (see “11.1 About Timbre Type”), which is the operation mode of each sound generator part. Applicable information is provided in the explanations for each message.

Part II

Channel Message

4 Send Channel

For information about the MIDI channels of the channel messages that are sent when this Instrument is played, see “1.2.2 Sound Generator Parts”. Note, however, that the MIDI channel of the performance information that corresponds to the keyboard main part can be changed by zone editing.

5 Receive Channel

For information about the MIDI channel numbers of channel messages received by each part, see “1.2.2 Sound Generator Parts”.

The MIDI channel number of a channel message that changes DSP settings also coincides with the MIDI channel of the part using the DSP. A channel message is not received by a part that is turned off by the Part Enable Parameter value explained under “20.7 Part Parameters”.

6 Note Off

Format

	Send	Receive
Message Format :	8nH kkH vvH	8nH kkH vvH 9nH kkH 00H
n :	MIDI Channel Number	
kk :	Key Number	
vv :	40H	Ignored

Send

Sent when a key is released.

Receive

Recognized as key release information. The velocity value is ignored.

7 Note On

Format

Message Format :	9nH kkH vvH
n :	MIDI Channel Number
kk :	Key Number
vv :	Velocity

Send

Sent when a key is pressed.

Receive

Recognized as key press information.

8 Polyphonic Key Pressure

Format

Message Format :	AnH kkH vvH
n :	MIDI Channel Number
kk :	Key Number
vv :	Pressure Value

Send

This message is not sent by this Instrument.

Receive

This message is not received by this Instrument.

9 Control Change

Format

Message Format :	BnH ccH vvH
n :	MIDI Channel Number
cc :	Control Number
vv :	Value

Send

Sent when a pedal or another controller operation is performed, when settings are changed, when the tone is changed, or when an auto performance, or other operation is performed.

Receive

Receipt changes the controller and settings that correspond to the control number.

9.1 Bank Select (00H, 20H)

Format

Message Format :	BnH 00H mmH (MSB) BnH 20H llH (LSB)
n :	MIDI Channel Number
mm :	Value
ll :	Value

Send

Sent in the following cases.

- When a tone selection is made
- When a program change message is specified by a zone edit operation

For information about numbers, see the Tone List in the User's Guide.

Receive

Receipt switches the tone bank number stored in Instrument memory. Note, however, that the tone is not changed until a Program Change message is received.

For details, see "11 Program Change".

For information about numbers, see the Tone List in the User's Guide.

9.2 Modulation (01H)

Format

Message Format :	BnH 01H vvH
n :	MIDI Channel Number
vv :	Value

Send

See "1.3.3 MIDI Send by Assignable Buttons".

Receive

Receipt adds, to the voice 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.

9.3 Portamento Time (05H)

Format

Message Format :	BnH 05H vvH
n :	MIDI Channel Number
vv :	Value

Send

Sent when the portamento time is specified by a zone edit operation.

Receive

Receipt changes the time it takes until pitch reaches the target portamento effect pitch.

9.4 Data Entry (06H, 26H)

Format

Message Format :	BnH 06H vvH (MSB) BnH 26H vvH (LSB)
n :	MIDI Channel Number
vv :	Value

Send

Sent when there is a change in the parameters assigned to NRPN and RPN.

For details about information assigned to parameters that correspond to NRPN and RPN, see “9.23 NRPN (62H, 63H)” and “9.24 RPN (64H, 65H)”.

Receive

Receipt changes the parameter assigned to RPN. This Instrument does not have a parameter that corresponds to NRPN.

9.5 Volume (07H)

Format

Message Format :	BnH 07H vvH
n :	MIDI Channel Number
vv :	Value

Send

Sent when the volume level is specified by a zone edit operation.

Receive

Receipt changes the volume level of the corresponding part. Changes the Volume setting of the Part Parameter.

9.6 Pan (0AH)

Format

Message Format :	BnH 0AH vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.8 Pan Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when pan is specified by a zone edit operation.

Receive

Receipt changes the pan setting of the Pan Part Parameter.

9.7 Expression (0BH)

Format

Message Format :	BnH 0BH vvH
n :	MIDI Channel Number
vv :	Value

Send

See “1.3.3 MIDI Send by Assignable Buttons”.

Receive

Receipt changes the part volume level.

How this message differs from Volume (07H)

Though this message is operationally identical to that of “9.5 Volume (07H),” the purposes of the two messages are different. This message is used, for example, for crescendo/decrescendo, and other forms of expression while playing. “9.5 Volume (07H)” is normally used when you want to make a fixed change in volume level.

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

These messages are used to control DSP operation.

Format

Message Format :	BnH 10H vvH BnH 11H vvH BnH 12H vvH BnH 13H vvH BnH 50H vvH BnH 51H vvH BnH 52H vvH BnH 53H vvH	DSP Parameter7 [0] DSP Parameter7 [1] DSP Parameter7 [2] DSP Parameter7 [3] DSP Parameter7 [4] DSP Parameter7 [5] DSP Parameter7 [6] DSP Parameter7 [7]
	n: MIDI Channel Number	
	vv: Value (Note1)	

Send

Sent when a DSP parameter value is specified by a zone edit operation.

Receive

Receipt changes the value of DSP Parameter 7 [0 to 7] (7-bit parameter) assigned to the part specified by the MIDI Channel Number. For details about parameters, see “21.3 DSP Parameters”.

Any message received that corresponds to the parameter of a number not being used by the currently selected DSP is ignored.

Note 1:

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.

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

For details about Parameter 7 of each DSP, see the explanations under “VI DSP Parameter List”.

9.9 Hold1 (40H)

Format

Message Format :	BnH 40H vvH
n :	MIDI Channel Number
vv :	Value

Send

Sent in the following cases.

- When a pedal that has a sustain (damper) function is operated
- Sent when a MIDI channel is specified by a zone edit operation.

Receive

Receipt performs an operation equivalent to a sustain (damper) pedal operation.

Timbre Type Specific Operation

This operation differs in accordance with the Timbre Type (see “11.1 About Timber Type”) setting.

- Timbre Type: Melody
Sustain off/on control is performed in accordance with the value of the received message. For information about the relationship between setting values and send/receive values, see the “27.1 Off/On Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.
- Timbre Type: Piano or LM Piano
Continuous control of the following is performed in accordance with the value of the received message.
 - Piano note decay rate
 - Resonance characteristics and decay rate of Acoustic Resonance effect resonance note
- Timbre Type: Drum
The received message does not affect sound source operation.

9.10 Portamento Switch (41H)

Format

Message Format :	BnH 41H vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see the “27.1 Off/On Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when the portamento on/off setting is specified by a zone edit operation.

Receive

Receipt switches portamento between enabled (On) and disabled (Off).

Range of Pitch Change

The range of pitch change for this Instrument’s portamento function is limited. With some tones or keys, portamento may not be able to drop down to the note assigned to the keys being played.

9.11 Sostenuto (42H)

Format

Message Format :	BnH 42H vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see the “27.1 Off/On Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent in the following cases.

- When a pedal assigned the sostenuto function is operated
- When a MIDI channel is specified by a zone edit operation

Receive

Receipt performs an operation equivalent to a sostenuto pedal operation.

9.12 Soft (43H)

Format

Message Format :	BnH 43H vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see the “27.1 Off/On Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent in the following cases.

- When a pedal assigned the soft function is operated
- When a MIDI channel is specified by a zone edit operation

Receive

Receipt performs an operation equivalent to a soft pedal operation.

9.13 Filter Resonance (47H)

Format

Message Format :	BnH 47H vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

See “1.3.3 MIDI Send by Assignable Buttons”.

Receive

Receipt changes the strength of filter resonance.

9.14 Release Time (48H)

Format

Message Format :	BnH 48H vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when the release time is specified by a zone edit operation.

Receive

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

9.15 Attack Time (49H)

Format

Message Format :	BnH 49H vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when the attack time is specified by a zone edit operation.

Receive

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

9.16 Filter Cut Off (4AH)

Format

Message Format :	BnH 4AH vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when filter is specified by a zone edit operation.

Receive

Receipt changes how the cut-off filter is applied.

9.17 Vibrato Rate (4CH)

Format

Message Format :	BnH 4CH vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when the vibrato rate is specified by a zone edit operation.

Receive

Receipt changes Vib Rate of the LFO Parameter.

9.18 Vibrato Depth (4DH)

Format

Message Format :	BnH 4DH vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when the vibrato depth is specified by a zone edit operation.

Receive

Receipt changes Vib Auto Depth of the LFO Parameter.

9.19 Vibrato Delay (4EH)

Format

Message Format :	BnH 4EH vvH
n :	MIDI Channel Number
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.6 –64 - 0 - +63 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

Sent when the vibrato delay is specified by a zone edit operation.

Receive

Receipt changes Vib Auto Delay of the LFO Parameter.

9.20 Portamento Control (54H)

Format

Message Format :	BnH 54H vvH
n :	MIDI Channel Number
kk :	Source Note Number

Send

See “1.3.3 MIDI Send by Assignable Buttons”.

Receive

Receipt of this message first stores the Source Note Number for the next note. When the next Note On is received, the portamento effect is applied to the note using this Source Note Number as the pitch start point and the Note On event key number as the end point. If there already is a note being sounded by Source Note Number at this time, the new note on is not performed and the portamento effect is applied to the pitch of the note being sounded. That is to say that legato play is performed.

9.21 Reverb Send (5BH)

Format

Message Format :	BnH 5BH vvH
n :	MIDI Channel Number
vv :	Value

Send

Sent when reverb send is specified by a zone edit operation.

Receive

Receipt changes the Rev Send Part Parameter.

9.22 Chorus Send (5DH)

Format

Message Format :	BnH 5DH vvH
n :	MIDI Channel Number
vv :	Value

Send

Sent when the portamento on/off setting is specified by a zone edit operation.

Receive

Receipt changes the Cho Send Part Parameter.

9.23 NRPN (62H, 63H)

Format

Message Format :	BnH 62H vvH (LSB) BnH 63H vvH (MSB)
n :	MIDI Channel Number
vv :	Value

Send

This message is not sent by this Instrument.

Receive

This message is not received by this Instrument.

9.23.1 Functions Assigned to NRPN

This Instrument does not assign any parameters to NRPN.

9.24 RPN (64H, 65H)

Format

Message Format :	BnH 64H vvH (LSB) BnH 65H vvH (MSB)
n :	MIDI Channel Number
vv :	Value

The following are the parameters assigned to RPN by this Instrument.

9.24.1 Pitch Bend Sensitivity

Format

Message Format :	BnH 64H 00H 65H 00H 06H mmH 26H 11H
n :	MIDI Channel Number
mm :	Value 0 - 24
ll :	Send: 00H, Receive: Ignored

Send

Sent when the pitch bend range is changed.

Receive

Receipt changes Pitch Bend Sensitivity.

9.24.2 Fine Tune

Format

Message Format :	BnH 64H 01H 65H 00H 06H mmH 26H 11H
n :	MIDI Channel Number
mm :	Value MSB
ll :	Value LSB

Send

Sent when fine tuning is specified by a zone edit operation.

Receive

Receipt changes the Fine Tune Part Parameter.

9.24.3 Coarse Tune

Format

Message Format :	BnH 64H 02H 65H 00H 06H mmH 26H 00H
n :	MIDI Channel Number
mm :	Value

Send

Sent when coarse tuning is specified by a zone edit operation.

Receive

Receipt changes the Coarse Tune Part Parameter.

9.24.4 Modulation Depth

Format

Message Format :	BnH 64H 05H 65H 00H 06H mmH 26H 00H
n :	MIDI Channel Number
mm :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt changes Vib Mod Depth of the LFO Parameter.

9.24.5 Null

Format

Message Format :	BnH 64H 7FH 65H 7F
n :	MIDI Channel Number

Send

This message is not sent by this Instrument.

Receive

Receipt deselects RPN.

10 Mode Messages

10.1 All Sound Off (78H)

Format

Message Format :	BnH 78H 00H
n :	MIDI Channel Number

Send

Sent when an SD card is inserted or removed, and when an SD card operation is performed.

Receive

Receipt stops all voices that are sounding.

10.2 Reset All Controllers (79H)

Format

Message Format :	BnH 79H 00H
n :	MIDI Channel Number

Send

This message is not sent by this Instrument.

Receive

Receipt initializes each performance controller.

10.3 All Notes Off (7BH)

Format

Message Format :	BnH 7BH 00H
n :	MIDI Channel Number

Send

Sent when a MIDI channel is specified by a zone edit operation.

Receive

Receipt of this message releases the currently sounding voice (same as releasing the keyboard key).

10.4 Omni Off (7CH)

Format

Message Format :	BnH 7CH 00H
n :	MIDI Channel Number

Send

This message is not sent by this Instrument.

Receive

Receipt of this message releases the currently sounding voice (same as releasing the keyboard key).

10.5 Omni On (7DH)

Format

Message Format :	BnH 7DH 00H
n :	MIDI Channel Number

Send

This message is not sent by this Instrument.

Receive

Receipt of this message releases the currently sounding voice (same as releasing the keyboard key).

10.6 Mono (7EH)

Format

Message Format :	BnH 7EH 00H
n :	MIDI Channel Number

Send

This message is not sent by this Instrument.

Receive

Receipt of this message stops the currently sounding voice.

10.7 Poly (7FH)

Format

Message Format :	BnH 7FH 00H
n :	MIDI Channel Number

Send

This message is not sent by this Instrument.

Receive

Receipt of this message stops the currently sounding voice.

11 Program Change

Format

Message Format :	CnH ppH
n :	MIDI Channel Number
pp :	Program Number

Send

Sent in the following cases.

- When a tone selection is made
- When a program change message is specified by a zone edit operation

For information about numbers, see the Tone List in the User's Guide.

Receive

Receipt changes the tone.

Tone selection is determined by the program value of this message and the Bank Select message value received prior to this message.

For information about the program number of the actually selected tone, see the Tone List in the User's Guide.

Also note that receipt of this message may also change the Timbre Type parameter at the same time. For more information, see "11.1 About Timbre Type" below.

11.1 About Timbre Type

The tone selected by each part of this Instrument has a "Timbre Type" parameter that specifies the type of sound source for the tone. As explained under "21.1 Basic Parameters", there are four Timbre Types settings: Melody, LM Piano, Piano, and Drum. The operation for a received channel message differs according to the Timbre Type.

- Timbre Type: Melody
This Timbre Type is for normal melody tones. The damper pedal performs on/off operations.
- Timbre Type: Piano or LM (Linear Morphing) Piano
This Timbre Type is for piano tones. The decay rate of the voice being sounded and Acoustic Resonance effect characteristics are continually altered in accordance with the damper pedal position. The method for producing sound in response to the note messages also is different from that of the melody Timbre Type, and operation is optimized for piano.
- Timbre Type: Drum
This Timbre Type is for drum sounds. The method for producing sound is optimized for drums. The damper pedal and sostenuto pedal do not work for sounds that do not recognize Note Off. The tuning setting also does not affect this Timbre Type.

11.2 About DSP

11.2.1 DSP Line Structure and Assignment

This Instrument has two DSP lines that can be used simultaneously.

Selecting multiple tones with DSP at the same time creates the possibility that there will not be enough DSP lines. If this happens, DSP lines will be assigned in accordance with the DSP line assignment priority specified for each part.

When two or more parts have the same priority, the assignment that was made last is given priority.

For details about DSP line assignment priority, see the table under “1.2.2 Sound Generator Parts”.

12 Channel Aftertouch

Format

Message Format :	DnH vvH
n :	MIDI Channel Number
vv :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt of this message adds modulation to the voice that is sounding.

The modulation effect differs according to the tone being used.

13 Pitch Bend Change

Format

Message Format :	EnH llH mmH
n :	MIDI Channel Number
ll :	Value LSB
mm :	Value MSB

Send

Sent in the following cases.

- When the bend wheel is operated
- When a MIDI channel is specified by a zone edit operation

Receive

Receipt of this message changes the pitch of the currently sounding voice. Pitch bend change sensitivity depends on the setting configured with “9.24.1 Pitch Bend Sensitivity”.

Part III

System Messages

14 Active Sensing

Format

Message Format:	FEH
-----------------	-----

Send

This message is not sent by this Instrument.

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

Format

Message Format:	F0H...F7H
-----------------	-----------

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

15.1 Universal Realtime System Exclusive Message

Format

Message Format:	F0H 7FH...F7H
-----------------	---------------

15.1.1 Master Volume

Format

Message Format:	F0H 7FH 7FH 04H 01H 11H mmH F7H
11:	Value LSB
mm:	Value MSB

Send

This message is not sent by this Instrument.

Receive

Receipt changes the Master Volume parameter. Note that the Master Volume parameter cannot be changed with an Instrument operation.

15.1.2 Master Balance

Format

Message Format :	F0H 7FH 7FH 04H 02H 11H mmH F7H
ll :	Value LSB (Note1)
mm :	Value MSB (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.8 Pan Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

This message is not sent by this Instrument.

Receive

Receipt changes the Master Pan parameter. Note that the Master Pan parameter cannot be changed with an Instrument operation.

15.1.3 Master Fine Tuning

Format

Message Format :	F0H 7FH 7FH 04H 03H 11H mmH F7H
ll :	Value LSB (Note1)
mm :	Value MSB (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.7 –100 - 0 - +99 Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

This message is sent when the tuning setting is changed.

Receive

Receipt changes the Master Fine Tune8 parameter of Patch.

Acoustic Resonance Actions

Acoustic Resonance acoustic characteristics also alter Fine Tune of the strings that simulate resonance in accordance with the Master Fine Tune8 value. Because of this, receipt of this message may cause the resonance interval to change temporarily.

15.1.4 Master Coarse Tuning

Format

Message Format :	F0H 7FH 7FH 04H 04H 11H mmH F7H
ll :	Send: 00H, Receive: Ignored
mm :	Value MSB

Send

This message is not sent by this Instrument.

Receive

Receipt changes the Patch Master Coarse Tune parameter.

15.1.5 Reverb Parameter

Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 01H ppH vvH F7H
pp :	Parameter
vv :	Value

Type Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 01H 00H vvH F7H
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.9 Reverb Type Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

This message is sent when the System Reverb Type setting is changed.

Receive

Receipt changes the Reverb Type parameter.

Time Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 01H 01H vvH F7H
vv :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt changes the Reverb Time parameter.

15.1.6 Chorus Parameter

Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H ppH vvH F7H
pp :	Parameter
vv :	Value

Type Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 00H vvH F7H
vv :	Value (Note1)

Note 1:

For information about the relationship between setting values and send/receive values, see “27.10 Chorus Type Setting Value Table” in “Part VII Setting Values and Send/Receive Values”.

Send

This message is sent when the System Chorus Type setting is changed.

Receive

Receipt changes the System Chorus Type parameter.

Rate Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 01H vvH F7H
vv :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt changes the System Chorus Rate parameter.

Depth Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 02H vvH F7H
vv :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt changes the System Chorus Depth parameter.

Feedback Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 03H vvH F7H
vv :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt changes the System Chorus Feedback parameter.

Send To Reverb Format

Message Format :	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 04H vvH F7H
vv :	Value

Send

This message is not sent by this Instrument.

Receive

Receipt changes the Chorus Send To Reverb parameter.

15.1.7 GM System Message

GM System On Format

1 Message Format:	F0H 7EH 7FH 09H 01H F7H
-------------------	-------------------------

Send

This message is not sent by this Instrument.

Receive

Receipt puts the sound source into a GM sound source mode. Also, the Scale Tune Enable setting shown under “20.7 Part Parameters” for parts C01 through C16 become zero, which disables the temperament (scale) function.

GM System Off Format

Message Format:	F0H 7EH 7FH 09H 02H F7H
-----------------	-------------------------

Send

This message is not sent by this Instrument.

Receive

Receipt returns the sound source to its power on default settings.

GM2 System On Format

Message Format:	F0H 7EH 7FH 09H 03H F7H
-----------------	-------------------------

Send

This message is not sent by this Instrument.

Receive

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

15.1.8 GS Message

Message Format:	F0H 41H ddH 42H 12H 40H 00H 7FH 00H 41H F7H
Note:	dd (Device ID) is ignored.

Send

This message is not sent by this Instrument.

Receive

Receipt performs the same operation as when the GM System On message is received.

15.2 Instrument-Specific System Exclusive Messages

Format

Message Format:	F0H 44H 15H 01H...F7H
-----------------	-----------------------

Most Instrument parameters and user data, and some operation commands can be controlled using this message. For more information, see “Part 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 “Part V Parameter List” for information about what type of data can actually be sent.

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
- Import of an individual Instrument parameter value

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

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

FunctionSection	Parameter Category	Description
System	System	Commands, Instrument status
	Setup	Instrument basic settings
Sound Generator	Patch	Soundsourcecommonsettings (systemeffects, master settings, etc.) Soundsourcepart settings (tone selection, mixing, tuning, etc.)
	Tone	Tone parameter, DSP settings
	Scale Tune	Scale Tune Table
	Registration	Registration settings
	Registration Bank	Registration bank settings

16.2 Basic Message Structure

Since Instrument-specific System Exclusive messages are sent and received on an individual parameter basis, the Individual Parameter Transfer method is used, and a number of message types are provided to suit specific operations. The field in the SysEx 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.

act	SX	MAN	MOD	dev	act	body (Depends on act.)									EOX	
						cat	mem	pset	blk	pkt	prm	idx	len	data		
IPR	Y	Y	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	Y	Y

16.3 Field Formats

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	00010101B (15H)
	LSB	00000010B (02H)

These two successive bytes (MSB, LSB) indicate the PX-130/135/330/3/3S/730/735/7/830, AP-220/420/620/6 model ID.

16.3.4 dev : MIDI Device ID 00H - 7FH

Format:	0dddddddB
---------	-----------

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. The default value for this field is 10H. When a message containing 7FH is received, receipt of the message is always allowed, regardless of this Instrument's ID setting.

MIDI Device ID is a Patch Parameter, and it can be changed with a System Exclusive Message. In this case, the Device ID of the MIDI System Exclusive Message must be set to 7FH before it is sent.

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

IPR : Individual Parameter Request

Indicates an individual parameter value send request message. When this 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 this Instrument receives this action, it rewrites the value specified by the data field with the specified parameter value.

16.3.6 *cat* : Category

Format:	0cccccccB
---------	-----------

0cccccccB = Category (7bit)

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
00H	System	A
01H	Setup	A
02H	Patch	A
03H	Tone	A
12H	Scale Tune	A
14H	Registration	A
15H	Registration Bank	A

A.. Available (Also including when only some parameters are 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. Basically, Instrument-specific System Exclusive messages are valid for user area data only.

mem	Data Type	Meaning
0	User area	Read/write enabled
1	Preset area	Read/write disabled

16.3.8 *pset* : Parameter Set Number

Format:	LSB	0nnnnnnnB
	MSB	0mmmmmmB

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

16.3.9 *blk* : Block Number

This supplementary number specifies which block is the object when there are multiple blocks within the same parameter set.

Format:	0iiiiiiiB (LSB)	0jjjjjjjB	0kkkkkkkB (MSB)
---------	-----------------	-----------	-----------------

When there are multiple parameters with the same ID inside the same category, as with the mixer channel volume setting for example, the block number required to specify to which block data belongs is specified as: kkkkkkjjjjjjiiiiiiB (Binary).

When the parameter block has a multi-dimensional array structure, the 21 bits of the block number are divided into prescribed bit fields based on the rules explained below.

Block Bit Field Division

- Case 1
When an array has three or fewer nesting levels and the number of arrays in each dimension is 128 or less, they are assigned below the three 7-bit fields. Unused regions are filled with zeros.

Example:

parameter [A][B][C]

With a 3-dimensional array parameter that consists of A=8 (3 bits), B=5 (3 bits) and C=10 (4 bits), the block bit fields are allocated as: Block = 0000aaa 000bbb ccccccc (Binary).

- Case 2
When Case 1 conditions are not satisfied, the minimal number of fields required for each number of arrays is reserved from the lower bit of the block. Unused regions are filled will zeros.

Example 1:

parameter [A][B][C][D]

With a 4-dimensional array parameter that consists of A=3 (2 bits), B=4 (2 bits), C=3 (2 bits) and D=4 (2 bits) like the one shown above, the block bit fields are allocated as: Block = 0000000 00000a abbccdd (Binary).

Example 2:

parameter [A][B]

With an A=3 (2 bits), B=200 (8 bits) 2-dimensional array parameter, the block bit fields are allocated as: Block = 0000000 000aab bbbbbbb (Binary).

16.3.10 prm : Parameter ID

Format:	LSB	0ppppppppB
	MSB	0qqqqqqqqB

The Parameter ID indicates the parameter type. (See “Part V Parameter List”.)

When transferring parameters individually (as opposed to bulk transfer), this field is used to identify the parameter by its parameter ID.

16.3.11 idx : Data Index Number

Format:	0iiiiiiiB
---------	-----------

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

16.3.12 len : Data Length

Format:	0l1111111B
---------	------------

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.

16.3.13 data : Parameter Data

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

Parameter data indicates the parameter value.

The data array is a list of $len + 1$ data items.

For a one data item structure, the length depends on the data bit width, as shown below.

dddddB + 1	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]

Single Message Size Limit

With this Instrument's system exclusive message format, the size of a single message cannot exceed 48 bytes.

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.

16.3.14 EOX : End of System Exclusive Message

Format:	11110111B
---------	-----------

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

17 Parameter Transfer

There are two parameter operations: Individual Parameter Transfer and Individual Parameter Request.

A single session is concluded only when this Instrument returns an IPS (Individual Parameter Send) in response to an IPR (Individual Parameter Request) from an external device, or when an 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 this Instrument or Individual Parameter Request may be used to check Instrument status information.

17.1 Two-way Communication

17.1.1 Example : Data send in response to send request to this Instrument

<u>Data Receiver</u>	<u>Data Sender</u>	<u>Operation</u>
	IPR →	Send Request
	← IPS	Data Transfer

17.2 One-way Communication

17.2.1 Example : Data send to Instrument from external source

<u>Data Sender</u>	<u>Data Receiver</u>	<u>Operation</u>
	→ IPS	Data Transfer

17.2.2 Example : Data send resulting from Instrument operation

<u>Data Receiver</u>	<u>Data Sender</u>	<u>Operation</u>
	← IPS	Data Transfer

Part V

Parameter List

How to Read the Tables

Number Base Notation

“Size” indicates the parameter value bit width as a decimal value.

The bit field position of “Block” as a decimal value.

Values used in the explanations under “Description” are all decimal values, unless specified otherwise.

Values other than those described above are all hexadecimal.

R/W field

The R/W field indicates whether an IPR (Individual Parameter Request) read operation or IPS (Individual Parameter Send) write operation is enabled.

18 System Parameters

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

18.1 System Information Parameter

This parameter is a container for system information.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Model	0000	R	000000	7	01	00-00-7F	0...PX-130 1...PX-330 2...PX-730/PX-7 3...PX-830 4...reserved 5...AP-220 6...AP-420 7...AP-620/AP-6 8...PX-3

19 Setup Parameter

Setup Parameters put a device into the setup mode.

19.1 Panel Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Registration Number For Midi	0024	R/W	000000	8	01	00-00-FF	0...Bank1 Registration1 1...Bank1 Registration2 : 8...Bank2 Registration1 9...Bank2 Registration2 : 63...Bank8 Registration8 (Notel)

Note 1:

Operation is not guaranteed for values of 64 (40H) or greater.

19.2 MIDI Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Midi Device Id	006D	R/W	000000	7	01	00-7F-7F	0-127

20 Patch Parameters

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

20.1 Master Tune Parameters

These parameters configure the Master Tuning Settings.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Master Fine Tune8	0001	R/W	000000	8	01	00-80-FF	-100 - 0 - +99 (cent)
Master Coarse Tune	0002	R/W	↑	7	01	00-40-7F	-24 - 0 - +24 (semitone)
Stretch Tune Enable	0003	R/W	↑	1	01	00-01-01	0...Disable 1...Enable

20.2 Master Mixer Parameters

These parameters configure the Master settings of the mixer.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Master Volume	0012	R/W	000000	7	01	00-7F-7F	0-127
Master Pan	0013	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Acou Reso To Chorus	0016	R/W	↑	7	01	00-00-7F	0-127
Acou Reso To Reverb	0018	R/W	↑	7	01	00-00-7F	0-127
Acou Reso Return	0019	R/W	↑	7	01	00-40-7F	0-127
Chorus To Reverb	001D	R/W	↑	7	01	00-00-7F	0-127
Chorus Return	001E	R/W	↑	7	01	00-40-7F	0-127
Reverb Return	0025	R/W	↑	7	01	00-40-7F	0-127
Dsp Cancel	0028	R/W	↑	1	01	00-00-01	0...Normal 1...Cancel

20.3 System Chorus Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Cancel	0050	R/W	000000	1	01	00-00-01	0...Normal 1...Cancel
Type	0051	R/W	↑	7	01	00-02-0F	1-16 (Note1)
Rate	0052	R/W	↑	7	01	00-0B-7F	0-127
Depth	0053	R/W	↑	7	01	00-21-7F	0-127
Feedback	0054	R/W	↑	7	01	00-00-7F	0-127
Tone	0055	R/W	↑	7	01	00-4B-7F	0-127

Note 1:

Selects the System Chorus preset type. Receipt of GM/GS Reset selects Chorus3. The value of this type is also linked to System Chorus parameters, and to the Chorus Send to Reverb and System Chorus Return Level parameters, and its setting causes these parameters to change to prescribed values. For details about the preset type list, see “27.10 Chorus Type Setting Value Table”.

20.4 System Reverb Parameters

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Cancel	0080	R/W	000000	1	01	00-00-01	0...Normal 1...Cancel
Type	0081	R/W	↑	7	01	00-04-0F	1-16 (Note1)
Feedback	0082	R/W	↑	7	01	00-40-7F	0-127
Er Level	0083	R/W	↑	7	01	00-40-7F	0-127
Damp	0084	R/W	↑	7	01	00-67-7F	0-127
Tone	0085	R/W	↑	7	01	00-65-7F	0-127

Note 1:

Selects the System Reverb preset type. Receipt of GM/GS Reset selects Hall2. This is the value of this Type is also linked to each of the System Reverb parameters and to the System Reverb Return Level parameter, and changes them to prescribed values. For details about the preset type list, see “27.9 Reverb Type Setting Value Table”.

20.5 System Acoustic Resonance Parameters

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Cancel	0030	R/W	000000	1	01	00-00-01	0...Normal 1...Cancel
Tuning	0031	R/W	↑	7	01	00-40-7F	-100-0-+99 (cent) (Note1)
Damper Pedal	0032	R/W	↑	7	01	00-00-7F	0-127 (Note2)
Wet Level Max	003B	R/W	↑	16	01	0000-0800-7FFF	0x0000-0x7FFF (Note3)
Low Boost Freq	003C	R/W	↑	16	01	0000-0A00-4000	0x0000-0x4000
Low Boost Level	003D	R/W	↑	16	01	0000-7FFF-7FFF	0x0000-0x7FFF
High Cut Freq	003E	R/W	↑	16	01	0000-2F00-7FFF	0x0000-0x7FFF

Note 1:

Changing this parameter configures the Tuning setting of System Acoustic Resonance. When this Instrument’s Master Fine Tune8 setting is changed, this parameter is reset to the Master Fine Tune8 value.

Note 2:

Changing this parameter performs a Damper Pedal operation on System Acoustic Resonance. When the damper pedal of the part being used by System Acoustic Resonance is operated, this parameter is reset to the depth of the damper pedal operation.

Note 3:

The value is set when the damper pedal is completely depressed.

20.6 Master Equalizer Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Low Freq	00A1	R/W	000000	7	01	00-00-02	0-2 (Note1)
Low Gain	00A2	R/W	↑	7	01	00-0C-18	-12 - 0 - +12 (Note2)
Mid1 Freq	00A3	R/W	↑	7	01	00-04-07	0-7 (Low-Mid) (Note3)
Mid1 Gain	00A4	R/W	↑	7	01	00-0C-18	-12 - 0 - +12 (Low-Mid) (Note2)
Mid2 Freq	00A5	R/W	↑	7	01	00-04-07	0-7 (High-Mid) (Note3)
Mid2 Gain	00A6	R/W	↑	7	01	00-0C-18	-12 - 0 - +12 (High-Mid) (Note2)
Mid6 Gain	00AE	R/W	↑	7	01	00-0C-18	-12 - 0 - +12 (Brilliance) (Note2)
High Freq	00AF	R/W	↑	7	01	00-02-02	0-2 (Note4)
High Gain	00B0	R/W	↑	7	01	00-0C-18	-12 - 0 - +12 (Note2)

Note 1:

Selects the Master EQ low-range cutoff frequency. See “27.11 Equalizer Low Frequency Setting Value Table”.

Note 2:

Selects the Master EQ gain. See “27.14 Equalizer Gain Setting Value Table”.

Note 3:

Selects the Master EQ mid frequency. See “27.12 Equalizer Mid Frequency Setting Value Table”.

Note 4:

Selects the Master EQ high-range cutoff frequency. See “27.13 Equalizer High Frequency Setting Value Table”.

20.7 Part Parameters

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Part Enable	00E0	R/W	20-6: 0 5-0: Part #	1	01	00-01-01	0...Off 1...On
Tone Num	00E1	R/W	↑	14	01	0000-0000-3FFF	0-16383
Fine Tune	00E2	R/W	↑	7	01	00-40-7F	-100 - 0 - +99 (cent)
Coarse Tune	00E3	R/W	↑	7	01	28-40-58	-24 - 0 - +24 (semitone)
ScaleTuneEnable	00E4	R/W	↑	1	01	00-00-01	0...Disable 1...Enable
Volume	00E5	R/W	↑	7	01	00-64-7F	0-127
Acmp Volume	00E6	R/W	↑	7	01	00-7F-7F	0-127
Pan	00E7	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Cho Send	00E8	R/W	↑	7	01	00-00-7F	0-127
Rev Send	00E9	R/W	↑	7	01	00-28-7F	0-127
Acou Reso Send	00EA	R/W	↑	7	01	00-00-7F	0-127
Bend Range	00EC	R/W	↑	7	01	00-02-18	0-24

20.8 Part Registration Parameter

Parameters that have the same names as Part Parameters have the same functions as well.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Tone Num	0100	R/W	20-6: 0	14	01	0000-0000-3FFF	0-16383
Internal External Select	0102	R/W	5-0: Part # ↑	2	01	00-03-03	00 (0)...Both Off 01 (1)...External Only 10 (2)...Internal Only 11 (3)...Both On (Note1)
Volume	0103	R/W	↑	7	01	00-7F-7F	0-127
Pan	0104	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Octave Shift	0105	R/W	↑	7	01	3E-40-42	-2 - 0 - +2
Midi Channel	0106	R/W	↑	4	01	00-00-0F	1-16 (Note1)
Bank Msb	0107	R/W	↑	7	01	00-00-7F	0-127
Bank Lsb	0108	R/W	↑	7	01	00-00-7F	0-127
Program Change	0109	R/W	↑	7	01	00-00-7F	0-127
Dsp Type	010A	R/W	↑	8	01	00-40-40	0....DSP# 1 : 63...DSP# 64 64...Default DSP of Tone (Note2)
Dsp Parameters	010B	R/W	↑	7	10	00-00-7F	0-127
Dsp Reverb Send	010C	R/W	↑	7	01	00-28-7F	0-127
Dsp Chorus Send	010D	R/W	↑	7	01	00-00-7F	0-127
Coarse Tune	010E	R/W	↑	7	01	34-40-4C	-12 - 0 - +12
Fine Tune	010F	R/W	↑	8	01	1D-80-E3	-99 - 0 - +99
Portamento Onoff	0110	R/W	↑	1	01	00-00-01	0...Off 1...On
Portamento Time	0111	R/W	↑	7	01	00-00-7F	0-127
Attack	0112	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Release	0113	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Filter	0114	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Touch Sense	0115	R/W	↑	7	01	00-7F-7F	-64 - 0 - +63
Vibrato Rate	0116	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Vibrato Depth	0117	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Vibrato Delay	0118	R/W	↑	7	01	00-40-7F	-64 - 0 - +63
Vibrato Waveform	0119	R/W	↑	3	01	00-00-07	0...Original 1...Sin 2...Tri 3...Saw Up 4...Saw Down 5...Puls 1:3 6...Puls 2:2 7...Puls 3:1
Rev Send	011A	R/W	↑	7	01	00-28-7F	0-127
Cho Send	011B	R/W	↑	7	01	00-00-7F	0-127
Acou Reso Send	011C	R/W	↑	7	01	00-00-7F	0-127
Dsp Onoff	011D	R/W	↑	1	01	00-01-01	0...Off 1...On
Pedal Onoff	011E	R/W	↑	1	01	00-01-01	0...Off 1...On
Bender Onoff	011F	R/W	↑	1	01	00-01-01	0...Off 1...On
Assign1 Onoff	0120	R/W	↑	1	01	00-01-01	0...Off 1...On
Assign2 Onoff	0121	R/W	↑	1	01	00-01-01	0...Off 1...On

Note 1:

Does not apply to Group C (C01 through C16) parts.

Note 2:

DSP types correspond to DSP numbers. For information about the relationship between DSP numbers and DSP algorithms, see the Instrument's User's Guide. The DSP Type 64 algorithm is the one applied to the current tone, and it is equivalent to this Instrument's DSP type "ton" setting (initial default setting for each tone). For information about DSP algorithm applied to each tone, see the Instrument's User's Guide.

21 Tone Parameters

21.1 Basic Parameters

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R/W	000000	7	10	00-20-7F	Ascii Character
Timbre Type	0001	R/W	↑	4	01	00-00-0F	0...Melody 1...Piano 2...Drum 3...reserved 4...LM Piano
Timbre Num	0002	R/W	↑	14	01	0000-0000-3FFF	0-16383
Oct Shift	0003	R/W	↑	3	01	02-04-06	-2 - 0 - +2
Line Select	0004	R/W	↑	1	01	00-00-01	0...Direct 1...DSP
Level	0005	R/W	↑	7	01	00-7F-7F	0-127
Touch Sens	0006	R/W	↑	7	01	00-7F-7F	-64 - 0 - +63
Sys Fx Send Override	0007	R/W	↑	1	01	00-00-01	0...No (Notel) 1...Yes
Cho Normal Send	0008	R/W	↑	7	01	00-00-7F	0-127
Rev Send	000A	R/W	↑	7	01	00-28-7F	0-127
Acou Reso Send	000B	R/W	↑	7	01	00-00-7F	0-127

Note 1:

When a tone is selected whose Sys Fx Send Override parameter setting is “Yes”, the send level setting value to the System Chorus, System Reverb, and System Acoustic Resonance of the part assigned to this tone is rewritten to the value that is stored by this tone.

21.2 LFO Parameters

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Vib Wave	000D	R/W	000000	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 15...Dependsonoriginal
Vib Rate	000E	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Vib Auto Delay	000F	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Vib Auto Rise	0010	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Vib Auto Depth	0011	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Vib Mod Depth	0012	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Vib After Depth	0013	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Wave	0014	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 15...Dependsonoriginal
Lfo Rate	0015	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Fil Auto Delay	0016	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Fil Auto Rise	0017	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Fil Auto Depth	0018	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Fil Mod Depth	0019	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Fil After Depth	001A	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Amp Auto Delay	001B	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Amp Auto Rise	001C	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Amp Auto Depth	001D	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Amp Mod Depth	001E	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)
Lfo Amp After Depth	001F	R/W	↑	7	01	00-40-7F	-64 - 0 - +63 (Notel)

Note 1:

The function of this parameter is to relatively change the original setting value of the tone. The parameter is set to the maximum value when the maximum is exceeded, and to the minimum when the minimum is exceeded.

21.3 DSP Parameters

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	002D	R/W	000000	7	10	00-20-7F	Ascii Character
Algorithm	002E	R/W	↑	14	01	0000-0000-3FFF	Serial Number (Notel)
Cho Normal Send	002F	R/W	↑	7	01	00-00-7F	0-127
Rev Send	0031	R/W	↑	7	01	00-28-7F	0-127
Acou Reso Send	0032	R/W	↑	7	01	00-00-7F	0-127
Parameter7	0034	R/W	↑	7	20	00-40-7F	0-127

Note 1:

This value is the DSP algorithm ID, which cannot be changed directly at the user level. Changing the DSP Type or Tone Number causes the algorithm ID of the original DSP to be copied automatically to this area. See “25 DSP Algorithm ID Tables”.

22 Scale Tune

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Note	0000	R/W	000000	8	0C	00-80-FF	-128 - 0 - 127 Array : Note 0....C 1....C# 2....D 3....D# 4....E 5....F 6....F# 7....G 8....G# 9....A 10...A# 11...B
A Key Mode	0001	R/W	↑	1	01	00-00-01	0...Relative 1...Absolute

23 Registration Parameter

Registration parameters are this Instrument's registration setting data.

23.1 Assignable Button 1 Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Type	002D	R/W	000000	2	01	00-00-02	0...Modulation 1...Portamento 2...Control Change
Modulation Depth (Sw Off)	002E	R/W	↑	7	01	00-00-7F	0-127
Modulation Depth (Sw Off)	002F	R/W	↑	7	01	00-7F-7F	0-127
CC Number	0030	R/W	↑	7	01	00-00-7F	0-127
CC Channel	0031	R/W	↑	4	01	00-00-0F	1-16
CC Value (Sw Off)	0032	R/W	↑	7	01	00-00-7F	0-127
CC Value (Sw On)	0033	R/W	↑	7	01	00-00-7F	0-127

23.2 Assignable Button 2 Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Type	0034	R/W	000000	2	01	00-00-03	0...Rotary 1...Portamento 2...DSP Bypass 3...Control Change
Dsp Bypass Zone	0035	R/W	↑	2	01	00-00-03	0...Upper1 1...Upper2 2...Lower1 3...Lower2
CC Number	0036	R/W	↑	7	01	00-00-7F	0-127
CC Channel	0037	R/W	↑	4	01	00-00-0F	1-16
CC Value (Sw Off)	0038	R/W	↑	7	01	00-00-7F	0-127
CC Value (Sw On)	0039	R/W	↑	7	01	00-00-7F	0-127

23.3 Common Parameter

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Layer Onoff	0022	R/W	000000	1	01	00-00-01	0...Off 1...On
Split Onoff	0023	R/W	↑	1	01	00-00-01	0...Off 1...On
Split Point	0024	R/W	↑	7	01	15-30-6C	21....A0 22....B ^b 0 : 107...B7 108...C8
Reverb Onoff	0025	R/W	↑	1	01	00-00-01	0...Off 1...On
Reverb Type	0026	R/W	↑	2	01	00-00-03	0...Room 1...Hall 2...Large Hall 3...Stadium
Chorus Onoff	0027	R/W	↑	1	01	00-00-01	0...Off 1...On
Chorus Type	0028	R/W	↑	2	01	00-00-03	0...Light Chorus 1...Chorus 2...Deep Chorus 3...Flanger
Transpose	0029	R/W	↑	7	01	34-40-4C	-12 - 0 - +12
Bend Range	002A	R/W	↑	4	01	00-02-0C	0-12
Brilliance	002B	R/W	↑	7	01	3D-40-43	-3 - 0 - +3
Touch Curve	002C	R/W	↑	2	01	00-02-03	Off(0), 1, 2, 3
Temperament Type	0043	R/W	↑	5	01	00-00-10	0-16
Temperament Root	0044	R/W	↑	4	01	00-00-0B	0....C 1....C# 2....D 3....D# 4....E 5....F 6....F# 7....G 8....G# 9....A 10...A# 11...B
Stretch Tune Onoff	0045	R/W	↑	1	01	00-01-01	0...Off 1...On
Acoustic Resonance Onoff	0046	R/W	↑	1	01	00-01-01	0...Off 1...On
Half Damper Depth	0047	R/W	↑	6	01	00-18-2A	0-42
Pedal Assign	0048	R/W	↑	2	01	00-00-01	0...Soft 1...Sostenuto

23.4 Equalizer Parameter

This is a registration parameter whose operation is basically the same as the Master Equalizer Parameter.

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Equalizer Low Gain	003A	R/W	000000	7	01	34-40-4C	-12 - 0 - +12 (Note1)
Equalizer Lowmid Gain	003B	R/W	↑	7	01	34-40-4C	-12 - 0 - +12 (Note1)
Equalizer Highmid Gain	003C	R/W	↑	7	01	34-40-4C	-12 - 0 - +12 (Note1)
Equalizer High Gain	003D	R/W	↑	5	01	34-40-4C	-12 - 0 - +12 (Note1)
Equalizer Low Frequency	003E	R/W	↑	3	01	00-00-02	0-2 (Note2)
Equalizer Lowmid Frequency	003F	R/W	↑	3	01	00-00-07	0-7 (Note3)
Equalizer Highmid Frequency	0040	R/W	↑	3	01	00-04-07	0-7 (Note3)
Equalizer High Frequency	0041	R/W	↑	3	01	00-02-02	0-2 (Note4)
Equalizer Onoff	0042	R/W	↑	1	01	00-01-01	0...Off 1...On

Note 1:

See “27.14 Equalizer Gain Setting Value Table”.

Note 2:

See “27.11 Equalizer Low Frequency Setting Value Table”.

Note 3:

See “27.12 Equalizer Mid Frequency Setting Value Table”.

Note 4:

See “27.13 Equalizer High Frequency Setting Value Table”.

24 Registration Bank Parameter

24.1 Bank Common

Parameter	ID	R/W	Block	Size	Array	Min-Def-Max	Description
Name	0000	R/W	2-0: Bank #	8	0C	00-20-FF	Ascii Character

Part VI

DSP Parameter List

25 DSP Algorithm ID Tables

The lists in this section show the DSP algorithms that are built into this Instrument.

25.1 Stereo Tone DSP

Number	ID	Algorithm	Input	Output	Parameter Set Type
01	2001	Equalizer	Stereo	Stereo	Equalizer
02	2002	Compressor	Stereo	Stereo	Compressor
03	2003	Limiter	Stereo	Stereo	Limiter
04	2004	Enhancer	Stereo	Stereo	Enhancer
05	2006	Chorus	Stereo	Stereo	Chorus
06	2007	Tremolo	Stereo	Stereo	Tremolo/Auto Pan
07	200B	Early Reflection	Mix	Stereo	Early Reflection
08	200C	Rotary	Mix	Stereo	Rotary
09	200D	Drive Rotary	Mix	Stereo	Drive Rotary
10	2010	3-Phase Chorus	Mix	Stereo	3-Phase Chorus
11	2011	Auto Pan	Stereo	Stereo	Tremolo/Auto Pan
12	2019	Stereo Phaser	Stereo	Stereo	Stereo Phaser/Phaser
13	201A	Phaser	Mix	Stereo	Stereo Phaser/Phaser
14	201B	Distortion	Mix	Stereo	Distortion
15	201C	Auto Wah	Mix	Stereo	Auto Wah
16	201D	LFO Wah	Mix	Stereo	LFO Wah
17	201E	Flanger	Stereo	Stereo	Flanger
M01	2013	Multi01(Enhancer - Chorus)	Mix	Stereo	Multi01(Enhancer - Chorus)
M02	2014	Multi02(Chorus - Tremolo)	Mix	Stereo	Multi02(Chorus - Tremolo)
M03	2015	Multi03(Compressor Enhancer)	Mix	Stereo	Multi03(Compressor Enhancer)
M04	2016	Multi04(Compressor - Chorus)	Mix	Stereo	Multi04(Compressor - Chorus)
M05	201F	Multi05(Phaser - Chorus)	Stereo	Stereo	Multi05(Phaser - Chorus)
M06	2020	Multi06(Phaser - Auto Pan)	Stereo	Stereo	Multi06(Phaser - Auto Pan)
M07	2021	Multi07(Chorus - Flanger)	Stereo	Stereo	Multi07(Chorus - Flanger)
M08	2022	Multi08(Auto Wah - Phaser)	Mix	Stereo	Multi08(Auto Wah - Phaser)
M09	2023	Multi09(Distortion - Phaser)	Mix	Stereo	Multi09(Distortion - Phaser)
M10	2024	Multi10(Distortion - Chorus)	Mix	Stereo	Multi10(Distortion - Chorus)
M11	2025	Multi11(Compressor - Auto Wah)	Mix	Stereo	Multi11(Compressor - Auto Wah)
M12	2026	Multi12(Compressor - LFO Wah)	Mix	Stereo	Multi12(Compressor - LFO Wah)
M13	2027	Multi13(Distortion - Auto Pan)	Mix	Stereo	Multi13(Distortion - Auto Pan)
M14	2028	Multi14(Distortion - Tremolo)	Mix	Stereo	Multi14(Distortion - Tremolo)
M15	2029	Multi15(Compressor - Auto Pan)	Stereo	Stereo	Multi15(Compressor - Auto Pan)
M16	202A	Multi16(Compressor - Tremolo)	Stereo	Stereo	Multi16(Compressor - Tremolo)
M17	202B	Multi17(Compressor - Phaser)	Stereo	Stereo	Multi17(Compressor - Phaser)
M18	202C	Multi18(Phaser - Distortion)	Mix	Stereo	Multi18(Phaser - Distortion)
M19	202D	Multi19(Phaser - Chorus - Auto Pan)	Stereo	Stereo	Multi19(Phaser - Chorus - Auto)
M20	202E	Multi20(LFO Wah - Chorus)	Mix	Stereo	Multi20(LFO Wah - Chorus)
M21	202F	Multi21(Auto Wah - Chorus)	Mix	Stereo	Multi21(Auto Wah - Chorus)
M22	2030	Multi22(Compressor - Distortion - Chorus)	Mix	Stereo	Multi22(Compressor - Distortion - Chorus)
M23	2031	Multi23(LFO Wah - Distortion - Chorus)	Mix	Stereo	Multi23(LFO Wah - Distortion - Chorus)
M24	2032	Multi24(Auto Wah - Distortion - Chorus)	Mix	Stereo	Multi24(Auto Wah - Distortion - Chorus)
M25	2033	Multi25(Compressor - Distortion - Auto Pan)	Mix	Stereo	Multi25(Compressor - Distortion - Auto Pan)
M26	2034	Multi26(Compressor - Distortion - Tremolo)	Mix	Stereo	Multi26(Compressor - Distortion - Tremolo)

26 DSP Parameter Set Types

This section describes the DSP parameter combination patterns of each algorithm specified in the “Parameter Set Type” column of “25 DSP Algorithm ID Tables”.

Note:

The characteristics of a DSP are different depending on the tone, even if the same algorithm is used. Because of this, the same algorithm may not produce the same effect for different tones.

26.1 Equalizer

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	EQ1 Freq	00 - 07	Note1
Parameter7[01]	EQ1 Gain	34 - 4C	Note2
Parameter7[02]	EQ2 Freq	00 - 07	Note1
Parameter7[03]	EQ2 Gain	34 - 4C	Note2
Parameter7[04]	EQ3 Freq	00 - 07	Note1
Parameter7[05]	EQ3 Gain	34 - 4C	Note2

Note 1: See “27.12 Equalizer Mid Frequency Setting Value Table”.

Note 2: See “27.15 DSP Equalizer Gain Setting Value Table”.

26.2 Compressor

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Depth	00 - 7F	
Parameter7[01]	Attack	00 - 7F	
Parameter7[02]	Release	00 - 7F	
Parameter7[03]	Level	00 - 7F	

26.3 Limiter

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Limit	00 - 7F	
Parameter7[01]	Attack	00 - 7F	
Parameter7[02]	Release	00 - 7F	
Parameter7[03]	Level	00 - 7F	

26.4 Enhancer

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Low Freq	00 - 7F	
Parameter7[01]	Low Gain	00 - 7F	
Parameter7[02]	High Freq	00 - 7F	
Parameter7[03]	High Gain	00 - 7F	

26.5 Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Rate	00 - 7F	
Parameter7[01]	Depth	00 - 7F	
Parameter7[02]	Feedback	00 - 7F	Note1
Parameter7[03]	Wet Level	00 - 7F	
Parameter7[04]	Polarity	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

26.6 Tremolo

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Rate	00 - 7F	
Parameter7[01]	Depth	00 - 7F	

26.7 Early Reflection

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Wet Level	00 - 7F	
Parameter7[01]	Feedback	00 - 7F	
Parameter7[02]	Tone	00 - 7F	

26.8 Rotary

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Speed	00 - 7F	Note1
Parameter7[01]	Brake	00 - 7F	Note2
Parameter7[02]	Fall Accel	00 - 7F	
Parameter7[03]	Rise Accel	00 - 7F	
Parameter7[04]	Slow Rate	00 - 7F	
Parameter7[05]	Fast Rate	00 - 7F	

Note 1: See “27.3 Slow/Fast Setting Value Table”.

Note 2: See “27.4 Rotate/Brake Setting Value Table”.

26.9 Drive Rotary

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Overdrive Gain	00 - 7F	
Parameter7[01]	Overdrive Level	00 - 7F	
Parameter7[02]	Speed	00 - 7F	Note1
Parameter7[03]	Brake	00 - 7F	Note2
Parameter7[04]	Fall Accel	00 - 7F	
Parameter7[05]	Rise Accel	00 - 7F	
Parameter7[06]	Slow Rate	00 - 7F	
Parameter7[07]	Fast Rate	00 - 7F	

Note 1: See “27.3 Slow/Fast Setting Value Table”.

Note 2: See “27.4 Rotate/Brake Setting Value Table”.

26.10 3-Phase Chorus

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Rate 1	00 - 7F	
Parameter7[01]	Depth 1	00 - 7F	
Parameter7[02]	Rate 2	00 - 7F	
Parameter7[03]	Depth 2	00 - 7F	
Parameter7[04]	Wet Level	00 - 7F	

26.11 Auto Pan

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Rate	00 - 7F	
Parameter7[01]	Depth	00 - 7F	

26.12 Stereo Phaser

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Resonance	00 - 7F	
Parameter7[01]	Manual	00 - 7F	Note1
Parameter7[02]	Rate	00 - 7F	
Parameter7[03]	Depth	00 - 7F	
Parameter7[04]	Wet Level	00 - 7F	

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

26.13 Phaser

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Resonance	00 - 7F	
Parameter7[01]	Manual	00 - 7F	Note1
Parameter7[02]	Rate	00 - 7F	
Parameter7[03]	Depth	00 - 7F	
Parameter7[04]	Wet Level	00 - 7F	

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

26.14 Distortion

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Gain	00 - 7F	
Parameter7[01]	Low	00 - 7F	
Parameter7[02]	High	00 - 7F	
Parameter7[03]	Level	00 - 7F	

26.15 Auto Wah

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Input Lvl	00 - 7F	
Parameter7[01]	Resonance	00 - 7F	
Parameter7[02]	Manual	00 - 7F	
Parameter7[03]	Depth	00 - 7F	Note1

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

26.16 LFO Wah

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Input Lvl	00 - 7F	
Parameter7[01]	Resonance	00 - 7F	
Parameter7[02]	Manual	00 - 7F	
Parameter7[03]	Rate	00 - 7F	
Parameter7[04]	Depth	00 - 7F	

26.17 Flanger

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Rate	00 - 7F	
Parameter7[01]	Depth	00 - 7F	
Parameter7[02]	Feedback	00 - 7F	Note1
Parameter7[03]	Wet Level	00 - 7F	

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

26.18 Multi01 (Enhancer - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	EnLowFreq	00 - 7F	
Parameter7[01]	EnLowGain	00 - 7F	
Parameter7[02]	En HiFreq	00 - 7F	
Parameter7[03]	En HiGain	00 - 7F	
Parameter7[04]	Cho Rate	00 - 7F	
Parameter7[05]	Cho Depth	00 - 7F	
Parameter7[06]	Chorus FB	00 - 7F	Note1
Parameter7[07]	ChoWetLvl	00 - 7F	

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

26.19 Multi02 (Chorus - Tremolo)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cho Rate	00 - 7F	
Parameter7[01]	Cho Depth	00 - 7F	
Parameter7[02]	Chorus FB	00 - 7F	Note1
Parameter7[03]	ChoWetLvl	00 - 7F	
Parameter7[04]	Trem Rate	00 - 7F	
Parameter7[05]	TremDepth	00 - 7F	
Parameter7[06]	ChoPolari	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

26.20 Multi03 (Compressor - Enhancer)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	EnLowFreq	00 - 7F	
Parameter7[05]	EnLowGain	00 - 7F	
Parameter7[06]	En HiFreq	00 - 7F	
Parameter7[07]	En HiGain	00 - 7F	

26.21 Multi04 (Compressor - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	Cho Rate	00 - 7F	
Parameter7[05]	Cho Depth	00 - 7F	
Parameter7[06]	Chorus FB	00 - 7F	Note1
Parameter7[07]	ChoWetLvl	00 - 7F	
Parameter7[08]	Cho Polari	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

26.22 Multi05 (Phaser - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Pha Reso	00 - 7F	
Parameter7[01]	PhaManual	00 - 7F	Note1
Parameter7[02]	Pha Rate	00 - 7F	
Parameter7[03]	Pha Depth	00 - 7F	
Parameter7[04]	PhaWetLvl	00 - 7F	
Parameter7[05]	Cho Rate	00 - 7F	
Parameter7[06]	Cho Depth	00 - 7F	
Parameter7[07]	Chorus FB	00 - 7F	Note1
Parameter7[08]	ChoWetLvl	00 - 7F	
Parameter7[09]	Cho Polari	00 - 7F	Note2
Parameter7[10]	Pha Skip	00 - 7F	Note3

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

Note 3: See “27.1 Off/On Setting Value Table”.

26.23 Multi06 (Phaser - Auto Pan)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Pha Reso	00 - 7F	
Parameter7[01]	PhaManual	00 - 7F	Note1
Parameter7[02]	Pha Rate	00 - 7F	
Parameter7[03]	Pha Depth	00 - 7F	
Parameter7[04]	PhaWetLvl	00 - 7F	
Parameter7[05]	APan Rate	00 - 7F	
Parameter7[06]	APanDepth	00 - 7F	
Parameter7[07]	Pha Skip	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.1 Off/On Setting Value Table”.

26.24 Multi07 (Chorus - Flanger)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cho Rate	00 - 7F	
Parameter7[01]	Cho Depth	00 - 7F	
Parameter7[02]	Chorus FB	00 - 7F	Note1
Parameter7[03]	ChoWetLvl	00 - 7F	
Parameter7[04]	Fln Rate	00 - 7F	
Parameter7[05]	Fln Depth	00 - 7F	
Parameter7[06]	FlangerFB	00 - 7F	Note1
Parameter7[07]	FlnWetLvl	00 - 7F	
Parameter7[08]	ChoPolari	00 - 7F	Note2
Parameter7[09]	FlnPolari	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

26.25 Multi08 (Auto Wah - Phaser)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	AWh Input	00 - 7F	
Parameter7[01]	AWh Reso	00 - 7F	
Parameter7[02]	AWhManual	00 - 7F	
Parameter7[03]	AWh Depth	00 - 7F	Note1
Parameter7[04]	Pha Reso	00 - 7F	
Parameter7[05]	PhaManual	00 - 7F	Note1
Parameter7[06]	Pha Rate	00 - 7F	
Parameter7[07]	Pha Depth	00 - 7F	
Parameter7[08]	PhaWetLvl	00 - 7F	
Parameter7[09]	AWh Skip	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.1 Off/On Setting Value Table”.

26.26 Multi09 (Distortion - Phaser)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Dist Gain	00 - 7F	
Parameter7[01]	Dist Low	00 - 7F	
Parameter7[02]	Dist High	00 - 7F	
Parameter7[03]	DistLevel	00 - 7F	
Parameter7[04]	Pha Reso	00 - 7F	
Parameter7[05]	PhaManual	00 - 7F	Note1
Parameter7[06]	Pha Rate	00 - 7F	
Parameter7[07]	Pha Depth	00 - 7F	
Parameter7[08]	PhaWetLvl	00 - 7F	
Parameter7[09]	Dist Skip	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.1 Off/On Setting Value Table”.

26.27 Multi10 (Distortion - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Dist Gain	00 - 7F	
Parameter7[01]	Dist Low	00 - 7F	
Parameter7[02]	Dist High	00 - 7F	
Parameter7[03]	DistLevel	00 - 7F	
Parameter7[04]	Cho Rate	00 - 7F	
Parameter7[05]	Cho Depth	00 - 7F	
Parameter7[06]	Chorus FB	00 - 7F	Note1
Parameter7[07]	ChoWetLvl	00 - 7F	
Parameter7[08]	Cho Polari	00 - 7F	Note2
Parameter7[09]	Dist Skip	00 - 7F	Note3

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

Note 3: See “27.1 Off/On Setting Value Table”.

26.28 Multi11 (Compressor - Auto Wah)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	AWh Input	00 - 7F	
Parameter7[05]	AWh Reso	00 - 7F	
Parameter7[06]	AWhManual	00 - 7F	
Parameter7[07]	AWh Depth	00 - 7F	Note1
Parameter7[08]	AWh Skip	00 - 7F	Note2
Parameter7[09]	Routing	00 - 7F	Note3

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.1 Off/On Setting Value Table”.

Note 3: See “27.5 Routing Setting Value Table”.

26.29 Multi12 (Compressor - LFO Wah)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	LWh Input	00 - 7F	
Parameter7[05]	LWh Reso	00 - 7F	
Parameter7[06]	LWhManual	00 - 7F	
Parameter7[07]	LWh Rate	00 - 7F	
Parameter7[08]	LWh Depth	00 - 7F	
Parameter7[09]	LWh Skip	00 - 7F	Note1
Parameter7[10]	Routing	00 - 7F	Note2

Note 1: See “27.1 Off/On Setting Value Table”.

Note 2: See “27.5 Routing Setting Value Table”.

26.30 Multi13 (Distortion - Auto Pan)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Dist Gain	00 - 7F	
Parameter7[01]	Dist Low	00 - 7F	
Parameter7[02]	Dist High	00 - 7F	
Parameter7[03]	DistLevel	00 - 7F	
Parameter7[04]	APan Rate	00 - 7F	
Parameter7[05]	APanDepth	00 - 7F	
Parameter7[06]	Dist Skip	00 - 7F	Note1
Parameter7[07]	APan Skip	00 - 7F	Note1

Note 1: See “27.1 Off/On Setting Value Table”.

26.31 Multi14 (Distortion - Tremolo)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Dist Gain	00 - 7F	
Parameter7[01]	Dist Low	00 - 7F	
Parameter7[02]	Dist High	00 - 7F	
Parameter7[03]	DistLevel	00 - 7F	
Parameter7[04]	Trem Rate	00 - 7F	
Parameter7[05]	TremDepth	00 - 7F	
Parameter7[06]	Dist Skip	00 - 7F	Note1
Parameter7[07]	Trem Skip	00 - 7F	Note1

Note 1: See “27.1 Off/On Setting Value Table”.

26.32 Multi15 (Compressor - Auto Pan)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	APan Rate	00 - 7F	
Parameter7[05]	APanDepth	00 - 7F	
Parameter7[06]	APan Skip	00 - 7F	Note1

Note 1: See “27.1 Off/On Setting Value Table”.

26.33 Multi16 (Compressor - Tremolo)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	Trem Rate	00 - 7F	
Parameter7[05]	TremDepth	00 - 7F	
Parameter7[06]	Trem Skip	00 - 7F	Note1

Note 1: See “27.1 Off/On Setting Value Table”.

26.34 Multi17 (Compressor - Phaser)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	Pha Reso	00 - 7F	
Parameter7[05]	PhaManual	00 - 7F	Note1
Parameter7[06]	Pha Rate	00 - 7F	
Parameter7[07]	Pha Depth	00 - 7F	
Parameter7[08]	PhaWetLvl	00 - 7F	
Parameter7[09]	Pha Skip	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.1 Off/On Setting Value Table”.

26.35 Multi18 (Phaser - Distortion)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Pha Reso	00 - 7F	
Parameter7[01]	PhaManual	00 - 7F	Note1
Parameter7[02]	Pha Rate	00 - 7F	
Parameter7[03]	Pha Depth	00 - 7F	
Parameter7[04]	PhaWetLvl	00 - 7F	
Parameter7[05]	Dist Gain	00 - 7F	
Parameter7[06]	Dist Low	00 - 7F	
Parameter7[07]	Dist High	00 - 7F	
Parameter7[08]	DistLevel	00 - 7F	
Parameter7[09]	Pha Skip	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.1 Off/On Setting Value Table”.

26.36 Multi19 (Phaser - Chorus - Auto Pan)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Pha Reso	00 - 7F	
Parameter7[01]	PhaManual	00 - 7F	Note1
Parameter7[02]	Pha Rate	00 - 7F	
Parameter7[03]	Pha Depth	00 - 7F	
Parameter7[04]	PhaWetLvl	00 - 7F	
Parameter7[05]	Cho Rate	00 - 7F	
Parameter7[06]	Cho Depth	00 - 7F	
Parameter7[07]	Chorus FB	00 - 7F	Note1
Parameter7[08]	ChoWetLvl	00 - 7F	
Parameter7[09]	APan Rate	00 - 7F	
Parameter7[10]	APanDepth	00 - 7F	

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

26.37 Multi20 (LFO Wah - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	LWh Input	00 - 7F	
Parameter7[01]	LWh Reso	00 - 7F	
Parameter7[02]	LWhManual	00 - 7F	
Parameter7[03]	LWh Rate	00 - 7F	
Parameter7[04]	LWh Depth	00 - 7F	
Parameter7[05]	Cho Rate	00 - 7F	
Parameter7[06]	Cho Depth	00 - 7F	
Parameter7[07]	Chorus FB	00 - 7F	Note1
Parameter7[08]	ChoWetLvl	00 - 7F	
Parameter7[09]	ChoPolari	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

26.38 Multi21 (Auto Wah - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	AWh Input	00 - 7F	
Parameter7[01]	AWh Reso	00 - 7F	
Parameter7[02]	AWhManual	00 - 7F	
Parameter7[03]	AWh Depth	00 - 7F	Note1
Parameter7[04]	Cho Rate	00 - 7F	
Parameter7[05]	Cho Depth	00 - 7F	
Parameter7[06]	Chorus FB	00 - 7F	Note1
Parameter7[07]	ChoWetLvl	00 - 7F	
Parameter7[08]	ChoPolari	00 - 7F	Note2

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

26.39 Multi22 (Compressor - Distortion - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	Dist Gain	00 - 7F	
Parameter7[05]	Dist Low	00 - 7F	
Parameter7[06]	Dist High	00 - 7F	
Parameter7[07]	DistLevel	00 - 7F	
Parameter7[08]	Cho Rate	00 - 7F	
Parameter7[09]	Cho Depth	00 - 7F	
Parameter7[10]	Chorus FB	00 - 7F	Note1
Parameter7[11]	ChoWetLvl	00 - 7F	
Parameter7[12]	Cho Polari	00 - 7F	Note2
Parameter7[13]	Dist Skip	00 - 7F	Note3

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

Note 3: See “27.1 Off/On Setting Value Table”.

26.40 Multi23 (LFO Wah - Distortion - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	LWh Input	00 - 7F	
Parameter7[01]	LWh Reso	00 - 7F	
Parameter7[02]	LWhManual	00 - 7F	
Parameter7[03]	LWh Rate	00 - 7F	
Parameter7[04]	LWh Depth	00 - 7F	
Parameter7[05]	Dist Gain	00 - 7F	
Parameter7[06]	Dist Low	00 - 7F	
Parameter7[07]	Dist High	00 - 7F	
Parameter7[08]	DistLevel	00 - 7F	
Parameter7[09]	Cho Rate	00 - 7F	
Parameter7[10]	Cho Depth	00 - 7F	
Parameter7[11]	Chorus FB	00 - 7F	Note1
Parameter7[12]	ChoWetLvl	00 - 7F	
Parameter7[13]	Cho Polari	00 - 7F	Note2
Parameter7[14]	Dist Skip	00 - 7F	Note3

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

Note 3: See “27.1 Off/On Setting Value Table”.

26.41 Multi24 (Auto Wah - Distortion - Chorus)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	AWh Input	00 - 7F	
Parameter7[01]	AWh Reso	00 - 7F	
Parameter7[02]	AWhManual	00 - 7F	
Parameter7[03]	AWh Depth	00 - 7F	Note1
Parameter7[04]	Dist Gain	00 - 7F	
Parameter7[05]	Dist Low	00 - 7F	
Parameter7[06]	Dist High	00 - 7F	
Parameter7[07]	DistLevel	00 - 7F	
Parameter7[08]	Cho Rate	00 - 7F	
Parameter7[09]	Cho Depth	00 - 7F	
Parameter7[10]	Chorus FB	00 - 7F	Note1
Parameter7[11]	ChoWetLvl	00 - 7F	
Parameter7[12]	Cho Polari	00 - 7F	Note2
Parameter7[13]	Dist Skip	00 - 7F	Note3

Note 1: See “27.6 -64 - 0 +63 Setting Value Table”.

Note 2: See “27.2 -/+ Setting Value Table”.

Note 3: See “27.1 Off/On Setting Value Table”.

26.42 Multi25 (Compressor - Distortion - Auto Pan)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	Dist Gain	00 - 7F	
Parameter7[05]	Dist Low	00 - 7F	
Parameter7[06]	Dist High	00 - 7F	
Parameter7[07]	DistLevel	00 - 7F	
Parameter7[08]	APan Rate	00 - 7F	
Parameter7[09]	APanDepth	00 - 7F	
Parameter7[10]	Dist Skip	00 - 7F	Note1
Parameter7[11]	APan Skip	00 - 7F	Note1

Note 1: See “27.1 Off/On Setting Value Table”.

26.43 Multi26 (Compressor - Distortion - Tremolo)

Parameter Number	Parameter Name	Value	Notes
Parameter7[00]	Cmp Depth	00 - 7F	
Parameter7[01]	CmpAttack	00 - 7F	
Parameter7[02]	Cmp Reles	00 - 7F	
Parameter7[03]	Cmp Level	00 - 7F	
Parameter7[04]	Dist Gain	00 - 7F	
Parameter7[05]	Dist Low	00 - 7F	
Parameter7[06]	Dist High	00 - 7F	
Parameter7[07]	DistLevel	00 - 7F	
Parameter7[08]	Trem Rate	00 - 7F	
Parameter7[09]	TremDepth	00 - 7F	
Parameter7[10]	Dist Skip	00 - 7F	Note1
Parameter7[11]	Trem Skip	00 - 7F	Note1

Note 1: See “27.1 Off/On Setting Value Table”.

Part VII

Setting Values and Send/Receive Values

27 Setting Value Tables

27.1 Off/On Setting Value Table

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

27.2 -/+ Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	-
7FH	40H - 7FH	+

27.3 Slow/Fast Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	Slow
7FH	40H - 7FH	Fast

27.4 Rotate/Brake Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	Rotate
7FH	40H - 7FH	Brake

27.5 Routing Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H - 3FH	Comp-Wah
7FH	40H - 7FH	Wah-Comp

27.6 -64 - 0 - +63 Setting Value Table

Transmit/Receive Value	Parameter
00H	-64
01H	-63
:	:
40H	0
:	:
7EH	+62
7FH	+63

27.7 -100 - 0 - +99 Setting Value Table

Transmit/Receive Value	Parameter
(MSB-LSB)	
00H - 00H	-100
:	:
40H - 00H	0
:	:
7FH - 7FH	+99

27.8 Pan Setting Value Table

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

27.9 Reverb Type Setting Value Table

Transmit / Receive Value	Parameter	Display
00H	Room1	-
01H	Room2	Room
02H	Room3	-
03H	Hall1	LargeHall
04H	Hall2	Hall
05H	Plate1	-
06H	Delay	-
07H	Panning Delay	-
08H	Plate2	-
09H	Plate3	-
0AH	Large Room1	-
0BH	Large Room2	-
0CH	Stadium1	Stadium
0DH	Stadium2	-
0EH	Long Delay	-
0FH	LongPanningDelay	-

27.10 Chorus Type Setting Value Table

Transmit / Receive Value	Parameter	Display
00H	Chorus1	LightChorus
01H	Chorus2	-
02H	Chorus3	Chorus
03H	Chorus4	-
04H	Feedback Chorus	-
05H	Flanger1	-
06H	Short Delay	-
07H	Short Delay FB	-
08H	Soft Chorus	-
09H	Bright Chorus	-
0AH	Deep Chorus	Deep Chorus
0BH	Flanger2	Flanger
0CH	Flanger3	-
0DH	Flanger4	-
0EH	Short Delay Modulation	-
0FH	Short Delay Modulation FB	-

27.11 Equalizer Low Frequency Setting Value Table

Parameter Value	Frequency
00H	200Hz
01H	400Hz
02H	800Hz

27.12 Equalizer Mid Frequency Setting Value Table

Parameter Value	Frequency
00H	1.0KHz
01H	1.3KHz
02H	1.6KHz
03H	2.0KHz
04H	2.5KHz
05H	3.2KHz
06H	4.0KHz
07H	5.0KHz

27.13 Equalizer High Frequency Setting Value Table

Parameter Value	Frequency
00H	6.0KHz
01H	8.0KHz
02H	10.0KHz

27.14 Equalizer Gain Setting Value Table

Parameter Value	Gain
00H	-12
01H	-11
02H	-10
03H	-9
04H	-8
05H	-7
06H	-6
07H	-5
08H	-4
09H	-3
0AH	-2
0BH	-1
0CH	0
0DH	+1
0EH	+2
0FH	+3
10H	+4
11H	+5
12H	+6
13H	+7
14H	+8
15H	+9
16H	+10
17H	+11
18H	+12

Note:
The gain value does not exactly correspond to decibels (dB).

27.15 DSP Equalizer Gain Setting Value Table

Parameter Value	Gain
34H	-12
35H	-11
36H	-10
37H	-9
38H	-8
39H	-7
3AH	-6
3BH	-5
3CH	-4
3DH	-3
3EH	-2
3FH	-1
40H	0
41H	+1
42H	+2
43H	+3
44H	+4
45H	+5
46H	+6
47H	+7
48H	+8
49H	+9
4AH	+10
4BH	+11
4CH	+12

Note:
The gain value does not exactly correspond to decibels (dB).

Part VIII

MIDI Implementation Notation

28 Value Notation

28.1 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

28.2 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

CASIO®

CASIO COMPUTER CO., LTD.
6-2, Hon-machi 1-chome
Shibuya-ku, Tokyo 151-8543, Japan

MA1201-B

© 2012 CASIO COMPUTER CO., LTD.