

PX-150/350M/750/850/1200GP
AP-250/450/650M
MIDI Implementation

CASIO COMPUTER CO., LTD.

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Part I

MIDI Message Overview

1 Product Configuration as a MIDI Device

As a MIDI device, the 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
 - * Brilliance adjustment function
 - * Mixer master
 - Parts
 - * Sound generator instrument parts
 - * DSP (insertion effects)
 - * Mixer channel
- Performance Controller Section
 - Keyboard
 - Pedal and other real-time controllers
 - Auto play function
 - Auto Accompaniment(PX-350M, AP-650M)

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 Parts

The settings of the sound generator parts can be changed using Instrument-specific system exclusive messages. This Instrument consists of 32 parts. Of these, channel messages can be used to perform note on operations and to change settings of only the B Group (B01 through B16). The relationships between the channel message receive channel and part number are fixed, as shown in "1.2.3 Part Assignments(PX-150,PX-750,PX-850,PX-1200GP, AP-250,AP-450)" and "1.2.4 Part Assignments(PX-350M, AP-650M)".

1.2.3 Part Assignments(PX-150,PX-750,PX-850,PX-1200GP, AP-250,AP-450)

| Part Number | Part Name | MIDI Receive Ch | MIDI Send Ch | Assigned Function | Description |
|-------------|-----------|-----------------|--------------|-------------------|---|
| 00 | A01 | - | 01(Note1) | Keyboard | Upper1(main)/(Right-side keyboard in the Duet Mode) |
| 01 | A02 | - | 02 | Keyboard | Upper2(Layer) |
| 02 | A03 | - | 03 | Keyboard | Lower1(Split)/(Left-side keyboard in the Duet Mode) |
| 03 | A04 | - | - | - | |
| 04 | A05 | - | 05 | Recorder Play | Track1 main |
| 05 | A06 | - | 06 | Recorder Play | Track1 layer |
| 06 | A07 | - | 07 | Recorder Play | Track1 split |
| 07 | A08 | - | - | Metronome/Count | |
| 08 | A09 | - | - | | |
| 09 | A10 | - | - | | |
| 10 | A11 | - | - | | |
| 11 | A12 | - | - | | |
| 12 | A13 | - | - | | |
| 13 | A14 | - | - | | |
| 14 | A15 | - | 04 | Recorder Play | Track2 |
| 15 | A16 | - | - | - | - |
| 16 | B01 | 01 | - | MIDI/Song Play | Ch.01 |
| 17 | B02 | 02 | - | MIDI/Song Play | Ch.02 |
| 18 | B03 | 03 | - | MIDI/Song Play | Ch.03 (Left hand track) |
| 19 | B04 | 04 | - | MIDI/Song Play | Ch.04 (Right hand track) |
| 20 | B05 | 05 | - | MIDI/Song Play | Ch.05 |
| 21 | B06 | 06 | - | MIDI/Song Play | Ch.06 |
| 22 | B07 | 07 | - | MIDI/Song Play | Ch.07 |
| 23 | B08 | 08 | - | MIDI/Song Play | Ch.08 |
| 24 | B09 | 09 | - | MIDI/Song Play | Ch.09 |
| 25 | B10 | 10 | - | MIDI/Song Play | Ch.10 |
| 26 | B11 | 11 | - | MIDI/Song Play | Ch.11 |
| 27 | B12 | 12 | - | MIDI/Song Play | Ch.12 |
| 28 | B13 | 13 | - | MIDI/Song Play | Ch.13 |
| 29 | B14 | 14 | - | MIDI/Song Play | Ch.14 |
| 30 | B15 | 15 | - | MIDI/Song Play | Ch.15 |
| 31 | B16 | 16 | - | MIDI/Song Play | Ch.16 |

Note1 : Can be changed by the Keyboard Channel setting.

1.2.4 Part Assignments(PX-350M, AP-650M)

| Part Number | Part Name | MIDI Receive Ch | MIDI Send Ch | Assigned Function | Description |
|-------------|-----------|-----------------|--------------|-------------------------|---|
| 00 | A01 | - | 01 (Note1) | Keyboard | Upper1(main)/(Right-side keyboard in the Duet Mode) |
| 01 | A02 | - | 02 | Keyboard | Upper2(Layer) |
| 02 | A03 | - | 03 | Keyboard | Lower1(Split)/(Left-side keyboard in the Duet Mode) |
| 03 | A04 | - | 08 | Keyboard | Harmonize (DSP not supported.) |
| 04 | A05 | - | 05 | Recorder Play | System track main |
| 05 | A06 | - | 06 | Recorder Play | System track layer |
| 06 | A07 | - | 07 | Recorder Play | System track split |
| 07 | A08 | - | - | Metronome/Count | |
| 08 | A09 | - | 09 | Accompaniment | Percussion (DSP not supported.) |
| 09 | A10 | - | 10 | Accompaniment | Drum (DSP not supported.) |
| 10 | A11 | - | 11 | Accompaniment | Bass (DSP not supported.) |
| 11 | A12 | - | 12 | Accompaniment | Chord 1 (DSP not supported.) |
| 12 | A13 | - | 13 | Accompaniment | Chord 2 (DSP not supported.) |
| 13 | A14 | - | 14 | Accompaniment | Chord 3 (DSP not supported.) |
| 14 | A15 | - | 15 | Accompaniment | Chord 4 (DSP not supported.) |
| 15 | A16 | - | 16 | Accompaniment | Chord 5 (DSP not supported.) |
| 16 | B01 | - | 01 (Note2) | Recorder/Song Play/MIDI | Ch.01 |
| 17 | B02 | - | 02 (Note2) | Recorder/Song Play/MIDI | Ch.02 |
| 18 | B03 | - | 03 (Note2) | Recorder/Song Play/MIDI | Ch.03 (Left hand track) |
| 19 | B04 | - | 04 (Note2) | Recorder/Song Play/MIDI | Ch.04 (Right hand track) |
| 20 | B05 | - | 05 (Note2) | Recorder/Song Play/MIDI | Ch.05 |
| 21 | B06 | - | 06 (Note2) | Recorder/Song Play/MIDI | Ch.06 |
| 22 | B07 | - | 07 (Note2) | Recorder/Song Play/MIDI | Ch.07 |
| 23 | B08 | - | 08 (Note2) | Recorder/Song Play/MIDI | Ch.08 |
| 24 | B09 | - | 09 (Note2) | Recorder/Song Play/MIDI | Ch.09 |
| 25 | B10 | - | 10 (Note2) | Recorder/Song Play/MIDI | Ch.10 |
| 26 | B11 | - | 11 (Note2) | Recorder/Song Play/MIDI | Ch.11 |
| 27 | B12 | - | 12 (Note2) | Recorder/Song Play/MIDI | Ch.12 |
| 28 | B13 | - | 13 (Note2) | Recorder/Song Play/MIDI | Ch.13 |
| 29 | B14 | - | 14 (Note2) | Recorder/Song Play/MIDI | Ch.14 |
| 30 | B15 | - | 15 (Note2) | Recorder/Song Play/MIDI | Ch.15 |
| 31 | B16 | - | 16 (Note2) | Recorder/Song Play/MIDI | Ch.16 |

Note1 : Can be changed by the Keyboard Channel setting.

Note2 : Sent during recorder play only. When there is no data recorded in the applicable recorder track, the MIDI information of the functions of parts with the same send channel (A01 through A16) is sent.

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 accompaniment, 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 Instrument 's part number.

1.3.1 Auto Accompaniment and Auto Performance MIDI Send

This document what operation is sent by a message in the case of each message type. However, since there are so many messages sent by an auto accompaniment operation when auto performance and Accomp MIDI Out is turned on(PX-350M, AP-650M), those messages are not covered here.

2 Conditions that Disable Message Send and Receive

The main conditions when MIDI message send and receive are disabled by the Instrument are those described below.

- During storage of registration data(PX-350M, AP-650M)
- While storage is selected as the USB device mode(PX-850,PX-1200GP, AP-450,PX-350M, AP-650M)

3 Timbre Type Specific Operation

The operation that is performed for a received message depends on the current Timbre Type setting (see " 10.1 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 Channel Message Overview

4.1 Send Channel

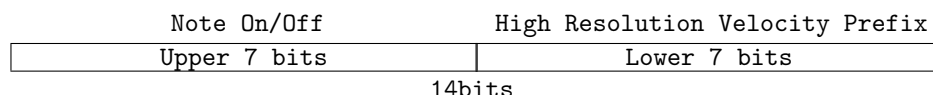
For information about the MIDI channels of the channel messages that are sent when this Instrument is played, see “ 1.2.3 Part Assignments(PX-150,PX-750,PX-850,PX-1200GP, AP-250,AP-450) ”and“ 1.2.4 Part Assignments(PX-350M, AP-650M) ”. Note, however, that the MIDI channel of the performance information that corresponds to the keyboard main part can be changed by the Keyboard Channel setting value.

4.2 Receive Channel

For information about the MIDI channel numbers of channel messages received by each part, see “ 1.2.3 Part Assignments(PX-150,PX-750,PX-850,PX-1200GP, AP-250,AP-450) ”and“ 1.2.4 Part Assignments(PX-350M, AP-650M) ”. 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 “ 19.6 Part Parameter ”.

4.3 Instrument Velocity Resolution

The upper seven bits of the 14-bit resolution correspond to the Note On/Off message, while the lower seven bits correspond to the High Resolution Velocity Prefix message. (Note1)



The initial default value for the lower 7 bits is 00H. Receipt of a High Resolution Prefix message causes the lower seven bits to be set, but note on/off is not performed.

Receipt of a Note On/Off message causes the upper seven bits to be set with note on/off performed with 14-bit resolution Velocity.

The High Resolution Velocity Prefix message corresponds the message immediately following the Note On/Off message, and the lower seven bits are cleared to 00H immediately following note on/off by the Note On/Off message. 7-bit resolution note on/off using only the Note On/Off message also continues to be supported.

For details about each message, see “5 Note Off”, “6 Note On”, and “8.17 High Resolution Velocity Prefix”.

Note1 : The PX-150,PX-750, AP-250, and PX-350M do not support Note Off Velocity. For these models, Velocity for send Note Off messages is a fixed value (40H). Velocity for receive Note Off messages is ignored. The High Resolution Velocity Prefix message is not sent or received for a Note Off message.

5 Note Off

Format

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

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

Send Sent when a key is released.(Note1)

The key number changes in accordance with on the Transpose function and Octave Shift function.

Note1 : The PX-150,PX-750, AP-250, and PX-350M do not support Note Off Velocity. For these models, Velocity for send Note Off messages is a fixed value (40H). The High Resolution Velocity Prefix message is not sent for a Note Off message.

Receive Receipt stops a note being sounded by a note on message. (Note1)

When a High Resolution Velocity Prefix message is received immediately prior to the Note Off message and the lower seven bits of the 14-bit Velocity are set, the 14-bit resolution note off of the note being sounded is performed.

For information about the relationship between the Note On/Off message and High Resolution Velocity Prefix message, see "4.3 Instrument Velocity Resolution".

Note off by making the Note On Velocity 00H is identical to note off by the combination of High Resolution Velocity prefix message 40H and Note Off Message 40H.

Note : This Instrument has a function that assumes connection of an external device that sends Note Off Velocity as a fixed value. Note Off Velocity 00H is replaced with 40H until a Note Off message with a Velocity value other than 00H is received. This function is enabled when the Instrument is turned on, and disabled by receipt of a Note Off message with a Velocity value other than 00H.

Note1 : The PX-150,PX-750, AP-250, and PX-350M do not support Note Off Velocity. Velocity for receive Note Off messages is ignored. The High Resolution Velocity Prefix message is not received for a Note Off message.

6 Note On

Format

Message Format: 9nH kkH vvH

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

Send Sent when a key is pressed. The key number changes in accordance with on the Transpose function and Octave Shift function.

Receive Receipt sounds a note of the corresponding part.

When a High Resolution Velocity Prefix message is received immediately prior to the Note On message and the lower seven bits of the 14-bit Velocity are set, the 14-bit resolution note on is performed.

For information about the relationship between the Note On/Off message and High Resolution Velocity Prefix message, see "4.3 Instrument Velocity Resolution".

7 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.

8 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, Auto Accompaniment(PX-350M, AP-650M), or other operation is performed.

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

8.1 Bank Select (00H)

Format

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

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

Send Sent when a tone is selected. 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 " 10 Program Change ". For information about numbers, see the Tone List in the User 's Guide.

8.2 Modulation (01H)

Format

Message Format: BnH 01H vvH

n: MIDI Channel Number
vv: Value

Send This message is not sent by this Instrument.

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.

8.3 Portamento Time (05H)

Format

Message Format: BnH 05H vvH

n: MIDI Channel Number
vv: Value

Send This message is not sent by this Instrument.

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

8.4 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 “ 8.20 NRPN ” and “ 8.21 RPN ”.

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

8.5 Volume (07H)

Format

Message Format: BnH 07H vvH

n: MIDI Channel Number
vv: Value

Send Sent when layer balance is adjusted.

Receive Receipt changes the volume of the corresponding part.

8.6 Pan (0AH)

Format

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

Note1 : For information about the relationship between setting values and send/receive values, see " 25.6 Pan Setting Value Table " in " VII Setting Values and Send/Receive Values ".

Send Sent in the following cases.

- When Accomp MIDI Out is on(PX-350M, AP-650M)
- When Music Library play is stopped

Receive Receipt changes the pan setting of the corresponding part.

8.7 Expression (0BH)

Format

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

Send Sent in the following cases.

- When Accomp MIDI Out is on(PX-350M, AP-650M)

Receive Receipt changes the Expression value.

8.8 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 | DSP Parameter7 [0] |
| | BnH 11H vvH | DSP Parameter7 [1] |
| | BnH 12H vvH | DSP Parameter7 [2] |
| | BnH 13H vvH | DSP Parameter7 [3] |
| | BnH 50H vvH | DSP Parameter7 [4] |
| | BnH 51H vvH | DSP Parameter7 [5] |
| | BnH 52H vvH | DSP Parameter7 [6] |
| | BnH 53H vvH | DSP Parameter7 [7] |

n: MIDI Channel Number

vv: Value

Send This message is not sent by this Instrument.

Receive Receipt change the value of Parameter7 [0-7] (7-Bit Parameter) explained under “ 20.3 Tone Dsp Parameter ”. Any message received that corresponds to the parameter of a number not being used by the currently selected DSP is ignored.

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

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

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

8.9 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
- When Accomp MIDI Out is on(PX-350M, AP-650M)

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 “ 10.1 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 “ 25.1 Off/On Setting Value Table ” in “ VII Setting Values and Send/Receive Values ”.
- **Timbre Type: Piano**
Continuous control of the following is performed in accordance with the value of the received message.
 - Piano note decay rateFor information about the relationship between setting values and send/receive values, see “ 25.2 Damper Pedal Setting Value Table ” in “ VII Setting Values and Send/Receive Values. ”
- **Timbre Type: LM (Linear Morphing) 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 Damper Resonance effect resonance notesee “ 25.2 Damper Pedal Setting Value Table ” in “ VII Setting Values and Send/Receive Values. ”
- **Timbre Type: Drum**
The received message does not affect sound source operation.

8.10 Portamento Switch (41H)

Format

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

Note1 : For information about the relationship between setting values and send/receive values, see the “ 25.1 Off/On Setting Value Table ” in “ VII Setting Values and Send/Receive Values ”.

Send This message is not sent by this Instrument.

Receive Receipt can be use to switch portamento between enabled (On) and disabled (Off).

8.11 Sostenuto (42H)

Format

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

Note1 : For information about the relationship between setting values and send/receive values, see the “ 25.1 Off/On Setting Value Table ” in “ VII Setting Values and Send/Receive Values ”.

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

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

8.12 Soft (43H)

Format

| | |
|------------------------|---------------------|
| <u>Message Format:</u> | BnH 43H vvH |
| n: | MIDI Channel Number |
| vv: | Value (Note1) |

Note1 : For information about the relationship between setting values and send/receive values, see the " 25.1 Off/On Setting Value Table " in " VII Setting Values and Send/Receive Values " .

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

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

8.13 Vibrato Rate (4CH)

Format

| | |
|------------------------|---------------------|
| <u>Message Format:</u> | BnH 4CH vvH |
| n: | MIDI Channel Number |
| vv: | Value (Note1) |

Note1 : For information about the relationship between setting values and send/receive values, see " 25.5 64 - 0 - +63 Setting Value Table " in " VII Setting Values and Send/Receive Values " of this document.

Send This message is not sent by this Instrument.

Receive Receipt changes the vibrato rate of the tone that is currently selected by the applicable part.

8.14 Vibrato Depth (4DH)

Format

| | |
|------------------------|---------------------|
| <u>Message Format:</u> | BnH 4DH vvH |
| n: | MIDI Channel Number |
| vv: | Value (Note1) |

Note1 : For information about the relationship between setting values and send/receive values, see " 25.5 64 - 0 - +63 Setting Value Table " in " VII Setting Values and Send/Receive Values " of this document.

Send This message is not sent by this Instrument.

Receive Receipt changes the vibrato auto depth of the tone that is currently selected by the applicable part.

8.15 Vibrato Delay (4EH)

Format

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

Note1 : For information about the relationship between setting values and send/receive values, see " 25.5 -64 - 0 - +63 Setting Value Table " in " VII Setting Values and Send/Receive Values " of this document.

Send This message is not sent by this Instrument.

Receive Receipt changes the vibrato auto delay of the tone that is currently selected by the applicable part.

8.16 Portamento Control (54H)

Format

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

Send This message is not sent by this Instrument.

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.

8.17 High Resolution Velocity Prefix (58H)

Format

Message Format: BnH 58H vvH
n: MIDI Channel Number
vv: Value

Send Sends the lower seven bits of 14-bit Velocity when a key is pressed or released. (Note1)

Receive Receipt is handled, in combination with the following Note On/Off message, as the lower seven bits of 14-bit Velocity. (Note1)

For information about the relationship between the Note On/Off message and High Resolution Velocity Prefix message, see "4.3 Instrument Velocity Resolution".

Note1 : The PX-150,PX-750, AP-250, and PX-350M do not support Note Off Velocity. For these models, Velocity for send Note Off messages is a fixed value (40H). Velocity for receive Note Off messages is ignored. The High Resolution Velocity Prefix message is not sent or received for a Note Off message.

8.18 Reverb Send (5BH)

Format

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

Send Sent when a GM tone is selected.(PX-350M, AP-650M only)

Receive Receipt changes Reverb Send.

8.19 Chorus Send (5DH)

Format

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

Send This message is sent at initialization, when the panel tone selection is changed, and when a chorus on/off operation is performed.

Receive Receipt changes Chorus Send.

8.20 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.

8.20.1 Assignable Functions to NRPN

This Instrument does not assign any parameters to NRPN.

8.21 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.

8.21.1 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.(PX-350M)

Receive Receipt changes Pitch Bend Sensitivity.

8.21.2 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 This message is not sent by this Instrument.

Receive Receipt changes Channel Fine Tune.

8.21.3 Coarse Tune

Format

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

n: MIDI Channel Number
mm: Value

Send This message is not sent by this Instrument.

Receive Receipt changes Channel Coarse Tune.

8.21.4 Modulation Depth

Format

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

Send This message is never sent.

Receive Receipt changes the Vibrato Modulation Depth for the tone that is currently selected by the applicable part.

8.21.5 Null

Format

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

Send This message is never sent.

Receive Receipt deselects RPN.

9 Mode Message

9.1 All Sound Off (78H)

Format

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

Send Mainly sent in the following cases.

- When USB memory is accessed(PX-350M, AP-650M)
- When repeat playback of the USER SONG/SONG RECORDER is started(PX-350M, AP-650M)
- When a SONG RECORDER FF, REW or PAUSE process is performed(PX-350M, AP-650M)

Receive Receipt stops all voices that are sounding.

9.2 Reset All Controllers (79H)

Format

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

Send Mainly sent in the following cases.

- When the keyboard channel is changed
- When a recorder function is used
- When another mode is entered from the rhythm mode(PX-350M, AP-650M)
- When the Duet mode is entered or exited
- When the Duet octave shift changed
- When the DEMO mode is entered or exited
- When USB memory is mounted

Receive Receipt initializes each performance controller.

9.3 All Notes Off (7BH)

Format

Message Format: BnH 7BH 00H

n: MIDI Channel Number

Send Mainly sent in the following cases.

- When the keyboard channel is changed
- When a recorder function is used
- When another mode is entered from the rhythm mode(PX-350M, AP-650M)
- When octave shift changed
- When the DEMO mode is entered or exited

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

9.4 Omni Off (7CH)

Format

Message Format: BnH 7CH 00H

n: MIDI Channel Number

Send This message is never sent.

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

9.5 Omni On (7DH)

Format

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

Send This message is never sent.

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

9.6 Mono (7EH)

Format

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

Send This message is never sent.

Receive Receipt of this message stops the currently sounding voice.

9.7 Poly (7FH)

Format

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

Send This message is never sent.

Receive Receipt of this message stops the currently sounding voice.

10 Program Change

Format

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

Send Sent when a tone is selected. For information about numbers, see the Tone List in the User 's Guide.

Receive Receipt changes the tone. The selected tone 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 “ 10.1 About Timbre Type ” below.

10.1 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 “ 20.1Tone 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**
This Timbre Type is for piano tones. The decay rate of the voice being sounded is seamlessly 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: LM (Linear Morphing) Piano**
This Timbre Type is for Linear Morphing piano tones. The decay rate of the voice being sounded and Damper Resonance effect characteristics are seamlessly 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.

10.2 DSP Assignments during Tone Selection

10.2.1 DSP Line Structure

Though the Instrument has four DSP lines that can be used simultaneously, selecting a tone that uses DSP causes the required number of DSP lines to become reserved so the tone is configured with the requisite DSP. For information about tones that use DSP, see “ 22 Tone with DSP List ”.

10.2.2 DSP Line Assignment

Selecting multiple tones with DSP at the same time creates the possibility that there will not be enough DSP lines. In this case, the last selected tone with DSP is given priority. Some DSP line(s) already being used will be released so they can be assigned to the newly selected tone.

10.2.3 Use of the Same DSP Line by Multiple Parts

When all of the settings below are the same for multiple parts that select tones that use DSP, the same DSP line is assigned to all of the parts in order to maximize DSP line availability.(Note1)

- Tone Number
- All DSP parameters

Note1 : Selecting the algorithms below add Part Volume and Part Pan to the above items.

| ID | DSP Algorithm |
|------|---------------|
| 0000 | Rotary |
| 0001 | Drive Rotary |
| 2002 | Compressor |
| 2003 | Limiter |

After the same DSP line is assigned to different parts as described here, Reverb Send, Chorus Send, and all DSP parameter settings are common to all parts. Note that changing the settings on any part will also affect all of the other parts that are sharing the DSP line. To assign the parts to a different DSP line, you need to change one of the parameters listed above before selecting the tone.

11 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.

12 Pitch Bend Change

Format

Message Format: EnH llH mmH

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

Send Sent when the bend wheel is operated.(PX-350M)

Receive Receipt of this message changes the pitch of the currently sounding voice. Pitch bend change sensitivity depends on the pitch bend sensitivity configured with RPN.

Part III

System Message

13 Active Sensing

Format

Message Format: FEH

Send This message is never sent.

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 the Instrument's sound source are released, the controller is reset, and the Active Sensing mode is exited.

14 System Exclusive Message

Format

Message Format: FOH...F7H

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

14.1 Universal Realtime System Exclusive Message

Format

Message Format: FOH 7FH...F7H

14.1.1 Master Volume

Format

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

11: Value LSB

mm: Value MSB

Send This message is never sent.

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

14.1.2 Master Balance

Format

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

Note1 : For information about the relationship between setting values and send/receive values, see " 25.6 Pan Setting Value Table " in " VII Setting Values and Send/Receive Values ".

Send This message is never sent.

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

14.1.3 Master Fine Tuning

Format

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

Note1 : For information about the relationship between setting values and send/receive values, see " 25.7Master Fine Tuning Setting Value Table " in " VII Setting Values and Send/Receive Values " of this document.

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

Receive Receipt changes the Master Fine Tune8 parameter of Patch.

14.1.4 Master Coarse Tuning

Format

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

Send This message is never sent.

Receive Receipt changes the Patch Master Coarse Tune parameter.

14.1.5 Reverb Parameter

Format

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

Type Format

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

Note1 : For information about the relationship between setting values and send/receive values, see " 25.8 Reverb Type Setting Value Table " in " 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: FOH 7FH 7FH 04H 05H 01H 01H 01H 01H 01H 01H vvH F7H
vv: Value

Send This message is never sent.

Receive Receipt changes the Reverb Time parameter.

14.1.6 Chorus Parameter

Format

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

Type Format

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

Note1 : For information about the relationship between setting values and send/receive values, see " 25.9Chorus Type Setting Value Table " in " 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: FOH 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 01H vvH F7H
vv: Value

Send This message is never sent.

Receive Receipt changes the System Chorus Rate parameter.

Depth Format

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

Send This message is never sent.

Receive Receipt changes the System Chorus Depth parameter.

Feedback Format

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

Send This message is never sent.

Receive Receipt changes the System Chorus Feedback parameter.

Send To Reverb Format

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

Send This message is never sent.

Receive Receipt changes the Chorus Send To Reverb parameter.

14.1.7 GM System Message

GM System On Format

Message Format: FOH 7EH 7FH 09H 01H F7H

Send This message is never sent.

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

GM System Off Format

Message Format: FOH 7EH 7FH 09H 02H F7H

Send This message is never sent.

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

GM2 System On Format

Message Format: FOH 7EH 7FH 09H 03H F7H

Send This message is never sent.

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

14.1.8 GS Message

Message Format: FOH 41H ddH 42H 12H 40H 00H 7FH 00H 41H F7H

Note: dd(Device ID) is ignored

Send This message is never sent.

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

14.2 Instrument-Specific System Exclusive Messages

Format

Message Format: FOH 44H 17H 01H...F7H

Most Instrument parameters and user data, and some operation commands can be controlled using this message. For more information, see " IV Instrument-Specific System Exclusive Messages ".

Part IV

Instrument-Specific System Exclusive Messages

15 Format

This section explains the format of the Instrument-specific System Exclusive Messages. See “ V Parameter List ” for information about what type of data can actually be sent.

15.1 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 the Instrument and as device status information when sent from the Instrument. The following table shows the parameter category for each type of transfer.

| Function Section | Parameter Category | Description |
|------------------|--------------------|--|
| System | System | Commands, Instrument status |
| | Setup | Instrument basic settings |
| Sound Generator | Patch | Sound source common settings (system effects, mastersettings, etc.) Sound source part settings (tone selection, mixing, tuning, etc.) |
| | Tone | Tone parameter, DSP settings |
| Music Player | Music Library | User song data |

15.2 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.

| | SX | MAN | MOD | <i>dev</i> | <i>act</i> | <i>cat</i> | <i>mem</i> | <i>pset</i> | <i>blk</i> | <i>prm</i> | <i>idx</i> | <i>len</i> | <i>data</i> | EOX |
|-----|----|-----|-----|------------|------------|------------|------------|-------------|------------|------------|------------|------------|-------------|-----|
| IPR | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | - | Y |
| IPS | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

15.3 Field Formats

15.3.1 SX : System Exclusive message Status

Format: 11110000B (F0H)

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

15.3.2 MAN : Manufacturer's ID

Format: 01000100B (CASIO = 44H)

Indicates this Instrument 's manufacturer ID.

15.3.3 MOD : Model ID

Format: MSB 00010111B (17H)
 LSB 00000001B (01H)

These two successive bytes (MSB, LSB) indicate the PX-150,350M,750,850,1200GP, and AP-250,450,650M Model ID.

15.3.4 *dev* : MIDI DeviceID 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 the 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.

15.3.5 *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

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

IPS:Individual Parameter Send

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

15.3.6 *cat* : Category

Format: 0ccccccB

0ccccccB = 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 |
| 21H | Music Library | F |

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

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

15.3.7 *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 |

15.3.8 *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.

15.3.9 *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: `kkkkkkkjjjjjjiiiiiiB` (Binary). When the parameter block has a multi-dimensional array structure, bit 21 of the block number is 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 cccccc` (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 000000a abbccdd` (Binary).

Example 2:

`parameter [A] [B]`

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

15.3.10 *prm* : Parameter ID

Format: LSB 0pppppppB
 MSB 0qqqqqqqB

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

15.3.11 *idx* : Data Index Number

Format: 0iiiiiiiB

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

15.3.12 *len* : Data Length

Format: 01111111B

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.

15.3.13 *data* : Parameter Data

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

Parameter data indicates the parameter value. The data array size is $len + 1$. For a one data item structure, the length depends on the data bit width, as shown below.

| dddddB + 1 | Number of <i>data</i> |
|------------|-----------------------|
| 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 LSB of the first “*data*” block, and the highest weighted bit is the MSB of the final “*data*” block. 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 the 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.

15.3.14 EOX : End of System Exclusive Message

```
Format:  11110111B
```

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

16 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 the Instrument or Individual Parameter Request may be used to check Instrument status information.

16.1 Two-way Communication

16.1.1 Example : Data send in response to send request to the Instrument

| <u>Data Receiver</u> | | <u>Data Sender</u> | <u>Operation</u> |
|----------------------|--------|--------------------|------------------|
| IPR | -----> | | Send Request |
| | <----- | IPS | Data Transfer |

16.2 One-way Communication

16.2.1 Example : Data send to Instrument from external source

| <u>Data Sender</u> | | <u>Data Receiver</u> | <u>Operation</u> |
|--------------------|--------|----------------------|------------------|
| | -----> | IPS | Data Transfer |

16.2.2 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.

17 System Parameters

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

17.1 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-150 1...PX-750 2...AP-250 3...PX-850 4...PX-1200GP 5...AP-450 6...PX-350M 7...reserved 8...reserved 9...AP-650M 10...reserved |

18 Setup Parameter

Setup Parameters put a device into the setup mode.

18.1 MIDI Parameter

| Parameter | ID | R/W | Block | Size | Array | Min-Def-Max | Description |
|----------------|------|-----|--------|------|-------|-------------|-------------|
| Midi Device Id | 0070 | R/W | 000000 | 7 | 01 | 00-7F-7F | 0-127 |

19 Patch Parameters

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

19.1 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 | 10 | 01 | 0000-0200-03FF | -100 - 0 - +99.8(cent)(1unit=100/512cents) |
| 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 |

19.2 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 |
| 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 |

19.3 System Chorus Parameters

| 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 | 00-03-7F | 0-127 |
| Depth | 0053 | R/W | | 7 | 01 | 00-13-7F | 0-127 |
| Feedback | 0054 | R/W | | 7 | 01 | 00-00-7F | 0-127 |
| Tone | 0055 | R/W | | 7 | 01 | 00-7F-7F | 0-127 |

Note1 : 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 " 25.9 Chorus Type Setting Value Table ".

19.4 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 | 00-40-7F | 0-127 |
| Tone | 0085 | R/W | | 7 | 01 | 00-7F-7F | 0-127 |

Note1 : 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 " 25.8 Reverb Type Setting Value Table ".

19.5 Brilliance Parameters

| Parameter | ID | R/W | Block | Size | Array | Min-Def-Max | Description |
|-----------|------|-----|--------|------|-------|-------------|------------------------------------|
| Type | 00A0 | R/W | 000000 | 7 | 01 | 00-00-01 | 0...For Speaker 1...For Phones |
| Mid6 Gain | 00AE | R/W | | 7 | 01 | 00-0C-18 | -12 - 0 - +12 (Brilliance) (Note1) |

Note1 : Selects Master EQ mid 6 (Brilliance) gain. See " 25.11 Brilliance Gain Setting Value Table ".

19.6 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 | | 10 | 01 | 0000-0200-03FF | -100 - 0 - +99.8(cent)(1unit=100/512cents) |
| Coarse Tune | 00E3 | R/W | | 7 | 01 | 28-40-58 | -24 - 0 - +24(semitone) |
| Scale Tune Enable | 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 Tone Parameters

20.1 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 |
| Tva Keyoff Touch Tbl | 0007 | R/W | | 7 | 01 | 00-02-7F | |
| Tva Rate Keyoff Depth | 0008 | R/W | | 7 | 01 | 00-7F-7F | -64 - 0 - +63 |
| Tvf Keyoff Touch Tbl | 0009 | R/W | | 7 | 01 | 00-02-7F | |
| Tvf Rate Keyoff Depth | 000A | R/W | | 7 | 01 | 00-7F-7F | -64 - 0 - +63 |
| Kff Keyoff Touch Tbl | 000B | R/W | | 7 | 01 | 00-02-7F | |
| Kff Rate Keyoff Depth | 000C | R/W | | 7 | 01 | 00-7F-7F | -64 - 0 - +63 |
| Sys Fx Send Override | 000D | R/W | | 1 | 01 | 00-00-01 | 0...No (Note1) 1...Yes |
| Cho Normal Send | 000E | R/W | | 7 | 01 | 00-00-7F | 0-127 |
| Cho Deep Send | 000F | R/W | | 7 | 01 | 00-00-7F | 0-127 |
| Rev Send | 0010 | R/W | | 7 | 01 | 00-28-7F | 0-127 |

Note1 : When a tone is selected whose Sys Fx Send Override parameter setting is " Yes ", the send level setting value to the System Chorus and System Reverb of the part assigned to this tone is rewritten to the value that is stored by this tone.

20.2 LFO Parameters

| Parameter | ID | R/W | Block | Size | Array | Min-Def-Max | Description |
|---------------------|------|-----|--------|------|-------|-------------|---|
| Vib Wave | 0013 | 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...Depends on original |
| Vib Rate | 0014 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Vib Auto Delay | 0015 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Vib Auto Rise | 0016 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Vib Auto Depth | 0017 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Vib Mod Depth | 0018 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Vib After Depth | 0019 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Wave | 001A | 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...Depends on original |
| Lfo Rate | 001B | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Fil Auto Delay | 001C | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Fil Auto Rise | 001D | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Fil Auto Depth | 001E | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Fil Mod Depth | 001F | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Fil After Depth | 0020 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Amp Auto Delay | 0021 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Amp Auto Rise | 0022 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Amp Auto Depth | 0023 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Amp Mod Depth | 0024 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |
| Lfo Amp After Depth | 0025 | R/W | | 7 | 01 | 00-40-7F | -64 - 0 - +63 (Note1) |

Note1 : 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.

20.3 DSP Parameters

| Parameter | ID | R/W | Block | Size | Array | Min-Def-Max | Description |
|-----------------|------|-----|--------|------|-------|---------------------------|--------------------------|
| Name | 0035 | R/W | 000000 | 7 | 10 | 00-20-7F | Ascii Character |
| Algorithm | 0036 | R/W | | 14 | 01 | 0000-0000-3FFF | Serial Number (Note1) |
| Cho Normal Send | 0037 | R/W | | 7 | 01 | 00-00-7F | 0-127 |
| Cho Deep Send | 0038 | R/W | | 7 | 01 | 00-00-7F | 0-127 |
| Rev Send | 0039 | R/W | | 7 | 01 | 00-28-7F | 0-127 |
| Parameter7 | 003C | R/W | | 7 | 20 | 00-40-7F | 0-127 |
| Parameter16 | 003D | R/W | | 32 | 10 | 00000000-00000000-FFFFFFF | 0x0000-0xFFFF |

Note1 : 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 " 23 DSP Algorithm ID Tables ".

21 Music Library Parameters

This parameter is a container for Music Library related information.

| Parameter | ID | R/W | Block | Size | Array | Min-Def-Max | Description |
|-----------|------|-----|--------|------|-------|----------------------------|-----------------|
| Name | 0000 | R | 000000 | 7 | 0C | 20-20-7F | Ascii Character |
| Address | 0001 | R | | 32 | 01 | 00000000-00000000-00FFFFFF | 0-0xFFFFFFFF |
| Size | 0002 | R | | 32 | 01 | 00000000-00000000-00FFFFFF | 0-0xFFFFFFFF |

Part VI

DSP Parameter List

22 Tone with DSP List

This is a list of tones that use DSP.

22.1 PX-150,PX-750,PX-850,AP-250,AP-450

| Tone Number | Tone Name | Mono/Stereo | DSP Algorithm |
|-------------|---------------------|---------------|---------------|
| 1 | GRAND PIANO CONCERT | Stereo-Stereo | EQ 3Band |
| 2 | GRAND PIANO MODERN | Stereo-Stereo | EQ 3Band |
| 4 | GRAND PIANO MELLOW | Stereo-Stereo | EQ 3Band |
| 5 | GRAND PIANO BRIGHT | Stereo-Stereo | EQ 3Band |
| 8 | 60'S E.PIANO | Stereo-Stereo | Tremolo |
| 9 | HARPSICHORD | Stereo-Stereo | EQ 3Band |
| 10 | VIBRAPHONE | Stereo-Stereo | Tremolo |
| 11 | STRINGS 1 | Stereo-Stereo | EQ 3Band |
| 15 | ELEC ORGAN 1 | Mix-Stereo | Drive Rotary |
| 16 | ELEC ORGAN 2 | Stereo-Stereo | Tremolo |

22.2 PX-1200GP

| Tone Number | Tone Name | Mono/Stereo | DSP Algorithm |
|-------------|-----------------------|---------------|------------------|
| 1 | GRAND PIANO CONCERT 1 | Stereo-Stereo | EQ 3Band |
| 2 | GRAND PIANO MELLOW 1 | Stereo-Stereo | EQ 3Band |
| 3 | GRAND PIANO BRIGHT 1 | Stereo-Stereo | EQ 3Band |
| 4 | GRAND PIANO CONCERT 2 | Stereo-Stereo | EQ 3Band |
| 5 | GRAND PIANO MELLOW 2 | Stereo-Stereo | EQ 3Band |
| 6 | GRAND PIANO BRIGHT 2 | Stereo-Stereo | EQ 3Band |
| 7 | GRAND PIANO MODERN | Stereo-Stereo | EQ 3Band |
| 9 | GRAND PIANO JAZZ | Mix-Stereo | Early Reflection |
| 10 | GRAND PIANO POP | Stereo-Stereo | EQ 3Band |
| 13 | ELEC. PIANO 3 | Stereo-Stereo | Tremolo |
| 14 | STRINGS | Stereo-Stereo | EQ 3Band |
| 15 | HARPSICHORD | Stereo-Stereo | EQ 3Band |

22.3 PX-350M, AP-650M

| Tone Name | Display | Mono/Stereo | DSP Algorithm |
|---------------------|--------------|---------------|------------------|
| GRAND PIANO CONCERT | GrPnoConcert | Stereo-Stereo | EQ 3Band |
| GRAND PIANO STUDIO | GrPno Studio | Mix-Stereo | Early Reflection |
| GRAND PIANO MODERN | GrPno Modern | Stereo-Stereo | EQ 3Band |
| GRAND PIANO BRIGHT | GrPno Bright | Stereo-Stereo | EQ 3Band |
| GRAND PIANO MELLOW | GrPno Mellow | Stereo-Stereo | EQ 3Band |
| GRAND PIANO DOLCE | GrPianoDolce | Stereo-Stereo | EQ 3Band |
| DANCE PIANO | Dance Piano | Stereo-Stereo | EQ 3Band |
| 60'S E.PIANO | 60's E.Piano | Stereo-Stereo | Tremolo |
| DYNO ELEC.PIANO | Dyno E.Piano | Stereo-Stereo | Auto Pan |
| VIBRAPHONE | Vibraphone | Stereo-Stereo | Tremolo |
| CLAVI | Clavi | Stereo-Stereo | Enhancer |
| WAH CLAVI | Wah Clavi | Mix-Stereo | Rotary |
| ROCK ORGAN 1 | Rock Organ 1 | Mix-Stereo | Drive Rotary |
| JAZZ ORGAN | Jazz Organ | Mix-Stereo | Rotary |
| DRAWBAR ORGAN | DrawbarOrgan | Mix-Stereo | Rotary |
| ROTARY DRAWBAR | RotaryDrwbar | Mix-Stereo | Rotary |
| ROTARY ORGAN | Rotary Organ | Mix-Stereo | Rotary |
| PERC.ORGAN | Perc.Organ | Mix-Stereo | Rotary |
| 70'S ORGAN | 70's Organ | Mix-Stereo | Rotary |
| OVERDRIVE ORGAN | OverdriveOrg | Mix-Stereo | Drive Rotary |
| TREMOLO ORGAN | Tremolo Org | Stereo-Stereo | Tremolo |
| FULL DRAWBAR | Full Drawbar | Mix-Stereo | Rotary |
| STRING ENSEMBLE | String Ens. | Stereo-Stereo | EQ 3Band |
| SYNTH-STRINGS | SynthStrings | Stereo-Stereo | EQ 3Band |
| NEW AGE | New Age | Stereo-Stereo | EQ 3Band |
| CHORUS CLEAN GUITAR | Cho.CleanGt | Stereo-Stereo | Enhancer |
| OVERDRIVE GUITAR | Overdrive Gt | Stereo-Stereo | Enhancer |
| TRUMPET | Trumpet | Stereo-Stereo | Enhancer |
| TROMBONE | Trombone | Stereo-Stereo | Enhancer |
| STEREO BRASS | Stereo Brass | Mix-Stereo | Early Reflection |

23 DSP Algorithm ID Tables

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

23.1 DSP Algorithm List

| ID | Algorithm | Input | Output | Parameter Set Type |
|------|---------------------|--------|--------|--------------------|
| 0000 | Rotary | Mix | Stereo | Rotary |
| 0001 | Drive Rotary | Mix | Stereo | Drive Rotary |
| 0002 | Compressor Enhancer | Mix | Stereo | Compressor |
| 2000 | Thru | Stereo | Stereo | - |
| 2001 | EQ 3Band | Stereo | Stereo | EQ 3Band |
| 2002 | Compressor | Stereo | Stereo | Compressor |
| 2003 | Limiter | Stereo | Stereo | Limiter |
| 2004 | Enhancer | Stereo | Stereo | Enhancer |
| 2005 | Tremolo | Stereo | Stereo | Tremolo/Auto Pan |
| 2006 | Auto Pan | Stereo | Stereo | Tremolo/Auto Pan |
| 2007 | Early Reflection | Mix | Stereo | Early Reflection |

24 DSP Parameter Set Types

This section describes the DSP parameter combination patterns of each algorithm specified in the “ Parameter Set Type ” column of “ 23 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.

24.1 Tremolo/Auto Pan

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

24.2 EQ 3Band

| Parameter Number | Parameter Name | Value | Notes |
|------------------|----------------|---------|-------|
| Parameter7[00] | Low Freq | 00 - 0F | Note1 |
| Parameter7[01] | Low Gain | 34 - 4C | Note2 |
| Parameter7[02] | Mid Freq | 00 - 0F | Note1 |
| Parameter7[03] | Mid Gain | 34 - 4C | Note2 |
| Parameter7[04] | High Freq | 00 - 0F | Note1 |
| Parameter7[05] | High Gain | 34 - 4C | Note2 |

Note1 : See “ 25.10 Equalizer Frequency Setting Value Table ”.
Note2 : See “ 25.12 DSP Equalizer Gain Setting Value Table ”.

24.3 Compressor

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

24.4 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 | |

24.5 Early Reflection

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

24.6 Rotary

| Parameter Number | Parameter Name | Value | Notes |
|------------------|----------------|---------|-------|
| Parameter7[00] | Speed | 0 - 1 | Note1 |
| Parameter7[01] | Brake | 0 - 1 | 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 | |

Note1 : See " 25.3 Slow/Fast Setting Value Table ".
 Note2 : See " 25.4 Rotate/Brake Setting Value Table ".

24.7 Drive Rotary

| Parameter Number | Parameter Name | Value | Notes |
|------------------|-----------------|---------|-------|
| Parameter7[00] | Overdrive Gain | 00 - 7F | |
| Parameter7[01] | Overdrive Level | 00 - 7F | |
| Parameter7[02] | Speed | 0 - 1 | Note1 |
| Parameter7[03] | Brake | 0 - 1 | 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 | |

Note1 : See " 25.3 Slow/Fast Setting Value Table ".
 Note2 : See " 25.4 Rotate/Brake Setting Value Table ".

24.8 Enhancer

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

24.9 Compressor Enhancer

| Parameter Number | Parameter Name | Value | Notes |
|------------------|----------------|---------|-------|
| Parameter7[00] | Comp Depth | 00 - 7F | |
| Parameter7[01] | Comp Attack | 00 - 7F | |
| Parameter7[02] | Comp Release | 00 - 7F | |
| Parameter7[03] | Comp Level | 00 - 7F | |
| Parameter7[04] | Enh Low Freq | 00 - 7F | |
| Parameter7[05] | Enh Low Gain | 00 - 7F | |
| Parameter7[06] | Enh Hi Freq | 00 - 7F | |
| Parameter7[07] | Enh Hi Gain | 00 - 7F | |

Part VII

Setting Values and Send/ Receive Values

25 Setting Value Tables

25.1 Off/On Setting Value Table

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

25.2 Damper Pedal Setting Value Table

PX-850,PX-1200GP, AP-450,AP-650M

| Transmit Value | Receive Value | Parameter |
|----------------|---------------|--------------|
| 00H | 00H | Off |
| : | : | (continuous) |
| 7FH | 7FH | Full |

PX-150,PX-750, AP-250,PX-350M

| Transmit Value | Receive Value | Parameter |
|----------------|---------------|----------------------------|
| 00H | 00H | Off |
| - | : | (continuous, receive only) |
| vvH | : | Half(Note1) |
| - | : | (continuous, receive only) |
| 7FH | 7FH | Full |

Note1 :

PX-150,PX-750, AP-250 vvH = 40H
PX-350M vvH = 00H - 7FH

25.3 Slow/Fast Setting Value Table

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

25.4 Rotate/Brake Setting Value Table

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

25.5 -64 - 0 - +63 Setting Value Table

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

25.6 Pan Setting Value Table

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

25.7 Master Fine Tuning Setting Value Table

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

25.8 Reverb Type Setting Value Table

| Transmit/Receive Value | Parameter | Display(PX-350M, AP-650M) | PanelNumber(PX-150,PX-750,PX-850,PX-1200GP, AP-250,AP-450) |
|------------------------|--------------------|---------------------------|--|
| 00H | Room1 | - | - |
| 01H | Room2 | Room | 1 |
| 02H | Room3 | - | - |
| 03H | Hall1 | Large Hall | 3 |
| 04H | Hall2 | Hall | 2(default) |
| 05H | Plate1 | - | - |
| 06H | Delay | - | - |
| 07H | Panning Delay | - | - |
| 08H | Plate2 | - | - |
| 09H | Plate3 | - | - |
| 0AH | Large Room1 | - | - |
| 0BH | Large Room2 | - | - |
| 0CH | Stadium1 | Stadium | 4 |
| 0DH | Stadium2 | - | - |
| 0EH | Long Delay | - | - |
| 0FH | Long Panning Delay | - | - |

25.9 Chorus Type Setting Value Table

| Transmit/Receive Value | Parameter | Display(PX-350M, AP-650M) | PanelNumber(PX-150,PX-750,PX-850,PX-1200GP, AP-250,AP-450) |
|------------------------|---------------------------|---------------------------|--|
| 00H | Chorus1 | LightChorus | 1 |
| 01H | Chorus2 | - | - |
| 02H | Chorus3 | Chorus | 2(default) |
| 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 | 3 |
| 0BH | Flanger2 | Flanger | 4 |
| 0CH | Flanger3 | - | - |
| 0DH | Flanger4 | - | - |
| 0EH | Short Delay Modulation | - | - |
| 0FH | Short Delay Modulation FB | - | - |

25.10 Equalizer Frequency Setting Value Table

| Parameter Value | Frequency |
|-----------------|-----------|
| 00H | 100Hz |
| 01H | 130Hz |
| 02H | 160Hz |
| 03H | 200Hz |
| 04H | 300Hz |
| 05H | 400Hz |
| 06H | 600Hz |
| 07H | 800Hz |
| 08H | 1.0KHz |
| 09H | 1.3KHz |
| 0AH | 1.6KHz |
| 0BH | 2.0KHz |
| 0CH | 2.5KHz |
| 0DH | 3.2KHz |
| 0EH | 4.0KHz |
| 0FH | 5.0KHz |

25.11 Brilliance 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).

25.12 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

26 Value Notation

26.1 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 |

26.2 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 |