PX-360M/PX-560M
MIDI Implementation

CASIO COMPUTER CO., LTD.

Contents

Part I
Overview

1 Product Configuration as a MIDI Device

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

1.1 System Section

The System Section manages the Instrument status and user data.

1.2 Performance Controller Section

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

1.3 Sound Generator Section

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

1.3.1 Sound Generator Common Block

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

1.3.2 Instrument Part Block

The instrument part section is devided into A, B, C group for every 16 parts, and it consists of a total of 48 parts. The settings of each part can be changed using the mixer function or channel messages or all.

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

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
A	1	1	01	Upper1	-
A	2	2	02	Upper2	-
A	3	3	03	Lower1	-
A	4	4	04	Lower2	-
A	5	5	05	Auto Harmonize	-
A	6	6	-	-	-
A	7	7	-	-	-
A	8	8	-	Metronome	-
A	9	9	9	Accomp	Percussion
A	10	10	10	Accomp	Drum
A	11	11	11	Accomp	Bass
A	12	12	12	Accomp	Chord1
A	13	13	13	Accomp	Chord2
A	14	14	14	Accomp	Chord3
A	15	15	15	Accomp	Chord4
A	16	16	16	Accomp	Chord5

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
B	1	1	-	MIDI Recorder System Track	Upper1
B	2	2	-	MIDI Recorder System Track	Upper2
B	3	3	-	MIDI Recorder System Track	Lower1
B	4	4	-	MIDI Recorder System Track	Lower2
B	5	5	-	MIDI Recorder System Track	Auto Harmonize
B	6	6	-	-	-
B	7	7	-	-	-
B	8	8	-	-	-
B	9	9	-	-	-
B	10	10	-	-	-
B	11	11	-	-	-
B	12	12	-	-	-
B	13	13	-	-	-
B	14	14	-	-	-
B	15	15	-	-	-
B	16	16	-	-	-

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
C	1	1	-	MIDI Recorder Solo Track1	-
C	2	2	-	MIDI Recorder Solo Track2	-
C	3	3	-	MIDI Recorder Solo Track3	-
C	4	4	-	MIDI Recorder Solo Track4	-
C	5	5	-	MIDI Recorder Solo Track5	-
C	6	6	-	MIDI Recorder Solo Track6	-
C	7	7	-	MIDI Recorder Solo Track7	-
C	8	8	-	MIDI Recorder Solo Track8	-
C	9	9	-	MIDI Recorder Solo Track9	-
C	10	10	-	MIDI Recorder Solo Track10	-
C	11	11	-	MIDI Recorder Solo Track11	-
C	12	12	-	MIDI Recorder Solo Track12	-
C	13	13	-	MIDI Recorder Solo Track13	-
C	14	14	-	MIDI Recorder Solo Track14	-
C	15	15	-	MIDI Recorder Solo Track15	-
C	16	16	-	MIDI Recorder Solo Track16	-

2 Timbre Type Specific Operation

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

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

Send and receive of MIDI messages for each instrument part can be controlled by mixer function and global Instrument MIDI settings, Performance MIDI settings and NRPN messages. See the Instrument's User's Guide for details.
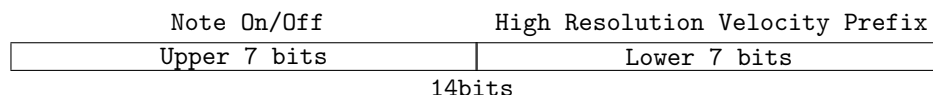
4 Conditions that Disable Message Send and Receive

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

Part II
Channel Message

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.

```
         Note On/Off         High Resolution Velocity Prefix
    +-----------------------+--------------------------------+
    |     Upper 7 bits      |          Lower 7 bits          |
    +-----------------------+--------------------------------+
                   14bits
```

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 "7.20 High Resolution Velocity Prefix".

5   Note Off

Format

```
Message Format:   8nH kkH vvH
                  9nH kkH 00H(receive only)
            n:   MIDI Channel Number
           kk:   Key Number
           vv:   velocity
```

Transmit Sent when something is played on the keyboard or when play is performed using an arpeggio, etc. The key number changes in accordance with on the Transpose function and Octave Shift function.

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

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 "Instrument Velocity Resolution" at the beginning of part II.

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.

6   Note On

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

Transmit   Sent when something is played on the keyboard or when play is performed using an arpeggio, etc. The key number changes in accordance with on the Transpose function and Octave Shift function.

Receive   Receipt sounds a note of the corresponding instrument part.

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 "Instrument Velocity Resolution" at the beginning of part II.

7   Control Change

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

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

7.1   Bank Select (00H,20H)

Message Format:	BnH 00H mmH (MSB)
	BnH 20H llH (LSB)
n:	MIDI Channel Number
mm:	MSB Value(Note1)
ll:	LSB Value(Transmit:00H, Receive:Ignored)

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

Transmit   Sent when a tone or stage setup number is selected.

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

7.2 Modulation (01H)

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

Transmit   Sent when the modulation wheel is operated.

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

7.3 Portamento Time(05H)

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

Receive   Receipt changes the portamento application time.

7.4 Data Entry (06H,26H)

```
Message Format:  BnH 06H mmH (MSB)
                 BnH 26H llH (LSB)
                 n:   MIDI Channel Number
                 mm:  MSB Value
                 ll:  LSB Value
```

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

Receive   Receipt changes the parameter assigned to RPN, NRPN.

7.5 Volume (07H)

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

Transmit   Sent when the mixer part volume is changed.

Receive   Receipt changes the mixer part volume.

7.6 Pan (0AH)

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

Note1: For information about the relationship between setting values and send/receive values, see "12.6 Pan Setting Value Table" in "IV Setting Values and Send/Receive Values".

Transmit   Sent when the pan of any part is changed.

Receive   Receipt changes the pan of the corresponding part.

7.7   Expression (0BH)

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

Transmit   Sent when Auto Acompanishment is used and during recorded song playback.

Receive   Receipt changes the Expression value.

7.8   Hold1 (40H)

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

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

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

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

- Timbre Type: Melody,Hex Layer
  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 " 12.3 Off/On Setting Value Table " in

  " IV 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 rate

  For information about the relationship between setting values and

  send/receive values,

  see " 12.4 Sustain Pedal Setting Value Table " in " IV 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 note

  see " 12.4 Sustain Pedal Setting Value Table " in " IV Setting

  Values and Send/Receive Values. "

- Timbre Type: Drum

  The received message does not affect sound source operation.

7.9 Portamento On/Off(41H)

```
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 "12.3 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when the portament on/off is changed.

Receive Receipt changes the portamento on/off setting.

7.10 Sostenuto (42H)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.3 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

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

7.11 Soft (43H)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.3 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

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

7.12   Filter Resonance(47H)

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

Receive   Receipt changes the resonance intensity.

7.13   Release Time (48H)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.5 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

7.14   Attack Time (49H)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.5 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

7.15   Filter Cutoff (4AH)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.5 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

7.16 Vibrato Rate (4CH)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.5 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the note vibrato rate.

7.17 Vibrato Depth (4DH)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.5 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the degree of pitch modulation.

7.18 Vibrato Delay (4EH)

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

Note1: For information about the relationship between setting values and send/receive values, see the "12.5 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

7.19 Portamento Control(54H)

Message Format:	BnH 54H vvH	
	n:	MIDI Channel Number
	vv:	Source Key Number

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.

7.20   High Resolution Velocity Prefix (58H)

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

Transmit   Sends the lower seven bits of 14-bit Velocity when a key is pressed or released.

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 "Instrument Velocity Resolution" at the beginning of part II.

7.21   Reverb Send (5BH)

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

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

Receive   Receipt changes the reverb send of the corresponding part.

7.22   Chorus Send (5DH)

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

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

Receive   Receipt changes the chorus send of the corresponding part.

7.23   Delay Send (5EH)

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

Transmit   Sent when the delay send of any part is changed.

Receive   Receipt changes the delay send of the corresponding part.

7.24 NRPN (62H,63H)

```
Message Format:  BnH 62H llH (LSB)
                 BnH 63H mmH (MSB)
```
```
          n:  MIDI Channel Number
         ll:  LSB Value
         mm:  MSB Value
```

7.24.1 Part Enable

```
Message Format:  BnH 62H 00H
                 BnH 63H 22H
                 BnH 06H mmH
                 BnH 26H llH
```
```
          n:  MIDI Channel Number
         mm:  Value (Note1)
         ll:  (Transmit:00H, Receive:Ignored)
```

Note1: For information about the relationship between setting values and send/receive values, see the "12.3 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

Receive   Receipt changes the mixer part on/off setting.

7.24.2 DSP Parameter

DSP parameters can be changed by NRPN. The relationship between each parameter and NRPN numbers is shown below.

7.24.3 Tone

Tone parameters can be changed by NRPN. The relationship between each parameter and NRPN numbers is shown below.

Hex Layer Edit

Parameter	MSB	LSB	Notes
Layer On/Off	5XH	00H	Note1
Octave Shift	5XH	01H	Note2
Pitch LFO Depth	5XH	02H	
Filter LFO Depth	5XH	03H	
Amp Volume	5XH	04H	
Amp Pan	5XH	05H	Note3
Amp LFO Depth	5XH	06H	
DSP On/Off	5XH	07H	Note1

Note: X 0 through 5 correspond respectively to Layers 1 through 6.

Note1: For information about the relationship between setting values and send/receive values, see "12.3 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Note2: For information about the relationship between setting values and send/receive values, see "12.11 Octave Shift Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Note3: For information about the relationship between setting values and send/receive values, see "12.6 Pan Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Hex Layer Detune

Parameter	MSB	LSB	Notes
Detune	56H	00H	Note1

Note1: For information about the relationship between setting values and send/receive values, see "12.10 Hex Layer Detune Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

7.25 RPN (64H,65H)

Message Format:	BnH 64H llH (LSB)
	BnH 65H mmH (MSB)
n:	MIDI Channel Number
ll:	LSB Value
mm:	MSB Value

7.25.1 Pitch Bend Sensitivity

Message Format:	BnH 64H 00H
	BnH 65H 00H
	BnH 06H mmH
	BnH 26H llH
n:	MIDI Channel Number
mm:	MSB Value(00H - 18H)
ll:	LSB Value(Transmit:00H, Receive:Ignored)

Transmit   Sent when Bend Range of any part is changed.

Receive   Receipt changes Bend Range of the corresponding part.

7.25.2 Fine Tune

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

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

Receive Receipt changes the fine tune of the corresponding part.

7.25.3   Coarse Tune

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

```
         n:   MIDI Channel Number
        mm:   MSB Value(28H - 58H)
        ll:   LSB Value(Transmit:00H, Receive:Ignored)
```

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

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

7.25.4   Null

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

```
         n:   MIDI Channel Number
```

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

Receive Receipt de-selects RPN, NRPN.

7.26   All Sound Off (78H)

```
Message Format:   BnH 78H 00H
```

```
         n:   MIDI Channel Number
```

Receive Receipt stops all voices that are sounding.

7.27   Reset All Controllers (79H)

```
Message Format:   BnH 79H 00H
```

```
         n:   MIDI Channel Number
```

Transmit Sent when MIDI send related settings are changed.

Receive Receipt initializes each performance controller.

7.28   All Notes Off (7BH)

```
Message Format:   BnH 7BH 00H
```

```
         n:   MIDI Channel Number
```

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

7.29   Omni Off (7CH)

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

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

7.30   Omni On (7DH)

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

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

7.31   Mono (7EH)

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

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

7.32   Poly (7FH)

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

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

8   Program Change

Message Format:	CnH ppH
n:	MIDI Channel Number
pp:	Program Number (Note1)

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

Transmit   Sent when a tone or stage setup number is selected.

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

The stage setup number can also be changed by the bank program. For details, see "Stage Setup Number Switching by Bank Select Message and Program Change Message" below.

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

- Melody

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

- 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.

- LMPiano

  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.

- Drum

  This setting optimizes for drum sounds. The damper pedal does not function. The Hold1, Channel Coarse Tune, and Master Coarse Tune messages are ignored if they are received.

- Hex Layer

  This setting optimizes for hex layer tones. The damper pedal performs on/off operations.

9   Channel After Touch

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

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

10   Pitch Bend

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

Transmit   Sent when the bender is operated.

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

Part III
System Message

11 Active Sensing

```
Message Format:   FEH
```

Transmit   Sent periodically when the MIDI sync mode is master.

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

12 System Exclusive Message

```
Message Format:   F0H iiH ddH....F7H
          ii:   ID Number
          dd:   Device ID
```

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

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

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

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

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

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

12.1 Universal Real Time System Exclusive Message

```
Message Format:   F0H 7FH ddH....F7H
          dd:   Device ID
```

12.1.1 Master Volume

```
Message Format:   F0H 7FH ddH 04H 01H llH mmH F7H
          dd:   Device ID
          ll:   LSB Value(Receive:Ignored)
          mm:   MSB Value
```

Transmit   Sent when the Master Volume is changed.

Receive   Receipt changes the Master Volume.

12.1.2   Master Fine Tuning

Message Format:	F0H 7FH ddH 04H 03H llH mmH F7H
	dd: Device ID
	ll: LSB Value(Note1)
	mm: MSB Value(Note1)

Note1: For information about the relationship between setting values and send/receive values, see "12.7 Fine Tuning Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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

Receive   Receipt changes the tuning setting.

12.1.3   Master Coarse Tuning

Message Format:	F0H 7FH ddH 04H 04H llH mmH F7H
	dd: Device ID
	ll: LSB Value(Transmit:00H,Receive:Ignored)
	mm: MSB Value(28H - 58H)

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

Receive   Receipt changes the Patch Master Coarse Tune parameter.

12.1.4   Reverb Type

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

Note1: For information about the relationship between setting values and send/receive values, see "12.8 Reverb Type Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive   Receipt changes the reverb type.

12.1.5   Reverb Time

Message Format:	F0H 7FH ddH 04H 05H 01H 01H 01H 01H 01H 01H vvH F7H
	dd: Device ID
	vv: Value

Receive   Receipt changes the Reverb duration.

12.1.6 Chorus Type

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

Note1: For information about the relationship between setting values and send/receive values, see "12.9 Chorus Type Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the chorus type.

12.1.7 Modulation Rate

Message Format:	F0H 7FH ddH 04H 05H 01H 01H 01H 01H 02H 01H vvH F7H
dd:	Device ID
vv:	Value

Receive Receipt changes the Chorus Rate.

12.1.8 Modulation Depth

Message Format:	F0H 7FH ddH 04H 05H 01H 01H 01H 01H 02H 02H vvH F7H
dd:	Device ID
vv:	Value

Receive Receipt changes the chorus level setting.

12.1.9 Send To Reverb

Message Format:	F0H 7FH ddH 04H 05H 01H 01H 01H 01H 02H 04H vvH F7H
dd:	Device ID
vv:	Value

Receive Receipt changes the Chorus Sent To Reverb setting.

12.2 Universal Non Real Time System Exclusive Message

Message Format:	F0H 7EH ddH....F7H
dd:	Device ID

12.2.1 GM System On

Message Format:	F0H 7EH ddH 09H 01H F7H
dd:	Device ID

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

12.2.2 GM System Off

Message Format:	F0H 7EH ddH 09H 02H F7H
dd:	Device ID

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

12.2.3 GM2 System On

Message Format:	F0H 7EH ddH 09H 03H F7H
dd:	Device ID

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

Part IV
Setting Values and Send/ Receive Values

12.3   Off/On Setting Value Table

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

12.4   Sustain Pedal Setting Value Table

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

12.5   −64 - 0 - +63 Setting Value Table

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

12.6   Pan Setting Value Table

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

12.7 Fine Tuning Setting Value Table

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

12.8 Reverb Type Setting Value Table

Transmit Value	Receive Value	Parameter
-	00H	Room
-	01H	Room
-	02H	Room
-	03H	Hall1
-	04H	Hall2
-	08H	Plate

12.9 Chorus Type Setting Value Table

Transmit Value	Receive Value	Parameter
-	00H	Light Cho
-	01H	Light Cho
-	02H	Chorus
-	03H	Chorus
-	04H	FB Chorus
-	05H	Flanger

12.10 Hex Layer Detune Setting Value Table

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

12.11 Octave Shift Setting Value Table

Transmit Value	Receive Value	Parameter
MSB		
-	00H - 18H	-2
-	19H - 32H	-1
-	33H - 4BH	-0
-	4CH - 65H	+1
-	66H - 7FH	+2

Part V
MIDI Implementation Notation

13 Value Notation

13.1 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

13.2 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