PX-S5000
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. 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 effect function, or general universal system exclusive messages.

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 channel messages. Of these, only the C group can be controlled by external channel messages.

The functions assigned to each part are shown below.

Port	Part number	MIDI Receive Ch	MIDI Transmit ch	Assigned Function	Details
A	01	-	1-16	Upper1	-
A	02	-	1-16	Upper2	-
A	03	-	1-16	Lower1	-
A	04	-	-	-	-
A	05	-	-	-	-
A	06	-	-	-	-
A	07	-	-	-	-
A	08	-	8	Metronome	-
A	09	-	-	-	-
A	10	-	-	-	-
A	11	-	-	-	-
A	12	-	-	-	-
A	13	-	-	-	-
A	14	-	-	-	-
A	15	-	-	-	-
A	16	-	-	-	-

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
B	17	-	-	Recorder	System Track Upper1
B	18	-	-	Recorder	System Track Upper2
B	19	-	-	Recorder	System Track Lower1
B	20	-	-	-	-
B	21	-	-	-	-
B	22	-	-	-	-
B	23	-	-	-	-
B	24	-	-	Pre count	-
B	25	-	-	-	-
B	26	-	-	-	-
B	27	-	-	-	-
B	28	-	-	-	-
B	29	-	-	-	-
B	30	-	-	-	-
B	31	-	-	-	-
B	32	-	-	-	-

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
C	33	1	-	MIDI/Auto Play/Recorder	Recorder Solo Track
C	34	2	-	MIDI/Auto Play	-
C	35	3	-	MIDI/Auto Play	-
C	36	4	-	MIDI/Auto Play	-
C	37	5	-	MIDI/Auto Play	-
C	38	6	-	MIDI/Auto Play	-
C	39	7	-	MIDI/Auto Play	-
C	40	8	-	MIDI/Auto Play	-
C	41	9	-	MIDI/Auto Play	-
C	42	10	-	MIDI/Auto Play	-
C	43	11	-	MIDI/Auto Play	-
C	44	12	-	MIDI/Auto Play	-
C	45	13	-	MIDI/Auto Play	-
C	46	14	-	MIDI/Auto Play	-
C	47	15	-	MIDI/Auto Play	-
C	48	16	-	MIDI/Auto Play	-

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 global Instrument MIDI settings and Instrument-specific system exclusive messages. See the Instrument's User's Guide for details.

4 Conditions that Disable Message Send and Receive

No MIDI messages at all can be sent or received while the instrument is starting up, shutting down, or accessing flash memory, etc.

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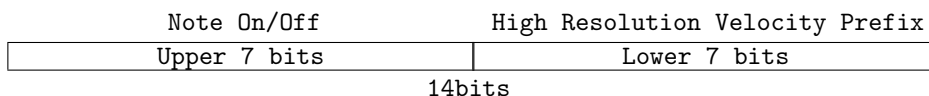
The initial default value for the lower 7 bits is 00H. Receipt of a High Resolution Prefix message causes the lower seven bits to be set, but note on is not performed.

Receipt of a Note On message causes the upper seven bits to be set with note on 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 by the Note On/Off message. 7-bit resolution note on 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. 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 is performed.

For information about the relationship between the Note Off message and High Resolution Velocity Prefix message, see "Instrument Velocity Resolution" at the beginning of part II.

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. 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 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 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 wheel or lever (01H)

```
Message Format:   BnH 01H 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.

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.

Receive Receipt changes the parameter assigned to RPN.

7.5 Volume (07H)

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

Transmit Sent when part volume is used.

Receive Receipt changes the 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 "13.4 Pan Setting Value Table" in "IV Setting Values and Send/Receive Values".

Receive Receipt changes the pan of the corresponding part.

7.7 Expression Controller (0BH)

Message Format:	BnH 0BH vvH

        n: MIDI Channel Number
       vv: Value

Receive   Receipt changes the Expression value.

7.8 Damper pedal (Sustain) (40H)

Message Format:	BnH 40H vvH

        n: MIDI Channel Number
       vv: Value

Transmit   Sent when a pedal that has a sustain 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 "13.1 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

  Note1: For information about the relationship between setting values and send/receive values, see the "13.1 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

- 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 "13.2 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 "13.1 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

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 "13.1 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 Pedal (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 "13.1 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 filter 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 "13.3 –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 "13.3 –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 Frequency (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 "13.3 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive   Receipt changes the filter cutoff frequency.

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 "13.3 –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 "13.3 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive   Receipt changes the depth 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 "13.3 –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   When Hi-Reso Velocity MIDI Out of this unit's MIDI setting is On, 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.
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 Level (5BH)

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

Transmit Sent when GM tone is selected.

Receive Receipt changes the reverb send of the corresponding part.

7.22 Chorus Send Level (5DH)

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

Transmit Sent when GM tone is selected.
    Sent when Chorus Type is changed.

Receive Receipt changes the chorus send of the corresponding part.

7.23 Delay Send Level (5EH)

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

Transmit Sent when GM tone is selected.

Receive Receipt changes the delay send of the corresponding part.

7.24 RPN (Registered Parameter Number) LSB/MSB (64H,65H)

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

7.24.1 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)
```

Receive Receipt changes Bend Range of the corresponding part.

7.24.2 Channel Fine Tuning

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

Receive Receipt changes the fine tuning of the corresponding part.

7.24.3 Channel Coarse Tuning

```
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)
```

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.

7.24.4 RPN NULL

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

Receive Receipt de-selects RPN.

7.25 All Sound Off (78H)

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

Transmit Sent when MIDI send related settings are changed.

Receive Receipt stops all voices that are sounding.

7.26 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.

7.27   All Notes Off (7BH)

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

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

7.28   Omni Mode Off (All Notes Off) (7CH)

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

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

7.29   Omni Mode On (All Notes Off) (7DH)

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

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

7.30   Mono Mode On (Poly Mode Off) (All Notes Off) (7EH)

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

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

7.31   Poly Mode On (Mono Mode Off) (All Notes Off) (7FH)

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

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

8   Program Change

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

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

Transmit Sent when a tone 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.

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 depressed amount of damper pedal. 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 depressed amount of damper pedal. 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 Damper Pedal (Sustain), Channel Coarse Tune, and Master Coarse Tune messages are ignored if they are received.

9   Channel Pressure (Aftertouch)

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

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

Part III
System Message

11 Active Sensing

```
Message Format:   FEH
```

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 7FH....F7H
```
```
                  ii:  ID Number
```

The Instrument sends and receives standard universal system exclusive messages, and system exclusive messages that have Instrument-specific formats (CASIO General System Exclusive).

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

12.1 Universal Real Time System Exclusive Message

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

12.1.1 Master Volume

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

Receive Receipt changes the Song Volume.

12.1.2 Master Fine Tuning

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

Note1: For information about the relationship between setting values and send/receive values, see "13.5 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 7FH 04H 04H llH mmH F7H
            ll:   LSB Value(Transmit:00H,Receive:Ignored)
            mm:   MSB Value(28H - 58H)
```

Receive   Receipt changes the Patch Master Coarse Tune parameter.

12.1.4   Reverb Type

```
Message Format:   F0H 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 "13.6 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 7FH 04H 05H 01H 01H 01H 01H 01H 01H vvH F7H
            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
            vv:   Value(Note1)
```

Note1: For information about the relationship between setting values and send/receive values, see "13.7 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 7FH 04H 05H 01H 01H 01H 01H 02H 01H vvH F7H
            vv:   Value
```

Receive   Receipt changes the Chorus Rate.

12.1.8   Modulation Depth

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

Receive   Receipt changes the chorus level setting.

12.1.9   Send To Reverb

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

Receive   Receipt changes the Chorus Sent To Reverb setting.

12.2   Universal Non Real Time System Exclusive Message

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

12.2.1   GM System On

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

Receive   Receipt resets various parameters to the Instrument presetting.

12.2.2   GM System Off

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

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

12.2.3   GM2 System On

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

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.

12.3   CASIO General System Exclusive

Message Format:	F0H 44H 7EH 7FH iiH ccH ssH ggH ppH ddH ... F7H
ii:	Device ID (7FH)
cc:	Category ID
ss:	Sub Category ID
gg:	Group ID (00H)
pp:	Parameter ID
dd ...:	Data

This message can be used to perform sound source parameter operations.

12.3.1 Reverb Type

```
Message Format:   F0H 44H 7EH 7FH 7FH 04H 00H 00H 00H ccH ttH F7H
            cc:   Channel(Note1)
            tt:   Type(Note2)
```

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Note2: For information about the relationship between setting values and send/receive values, see "13.8 Reverb Type (CASIO General System Exclusive) Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit   Sent when Hall Simulator/Reverb Type is changed.

Receive   Receipt changes the reverb type.

12.3.2 Chorus Type

```
Message Format:   F0H 44H 7EH 7FH 7FH 04H 01H 00H 00H ccH ttH F7H
            cc:   Channel(Note1)
            tt:   Type(Note2)
```

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Note2: For information about the relationship between setting values and send/receive values, see "13.9 Chorus Type (CASIO General System Exclusive) Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit   Sent when Chorus Type is changed.

Receive   Receipt changes the chorus type.

12.4   CASIO General System Exclusive for CASIO Apps

```
Message Format:   F0H 7FH 44H....F7H
```

This instrument sends the following dedicated message for communication with CASIO application. It can only be used with CASIO apps.

12.4.1   Operation Lock

```
Message Format:   F0H 44H 7EH 7EH 7FH 0FH 01H 78H 06H 01H 00H 01H 00H vvH 00H F7H
            vv:   Value
```

Transmit   Sent when the operation lock setting is changed.

12.4.2 Current Mode

Message Format:	F0H 44H 7EH 7EH 7FH 0FH 01H 08H 00H 01H 00H 01H 00H vvH 00H F7H
vv:	Value

Transmit   Sent when the instrument mode is changed.

12.4.3 MIDI Recorder State

Message Format:	F0H 44H 7EH 7EH 7FH 0FH 01H 25H 00H 01H 02H 01H 00H vvH 00H 00H
	00H 00H F7H
vv:	Value

Transmit   Sent when the MIDI recorder status is changed.

12.4.4 Demo Play/Stop

Message Format:	F0H 44H 7EH 7EH 7FH 0FH 01H 3AH 00H 01H 00H 01H 00H vvH 00H F7H
vv:	Value

Transmit   Sent when the demo plays/stops.

12.4.5 Hall Simulator On/Off

Message Format:	F0H 44H 7EH 7EH 7FH 0FH 01H 52H 03H 01H 00H 01H 00H vvH 00H F7H
vv:	Value

Transmit   Sent when the hall simulator On/Off is changed.

12.4.6 Surround On/Off

Message Format:	F0H 44H 7EH 7EH 7FH 0FH 01H 58H 00H 01H 00H 01H 00H vvH 00H F7H
vv:	Value

Transmit   Sent when the surround On/Off is changed.

Part IV
Setting Values and Send/ Receive Values

13 Setting Value Tables

13.1 Off/On Setting Value Table

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

13.2 Sustain Pedal Setting Value Table

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

13.3 −64 - 0 - +63 Setting Value Table

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

13.4 Pan Setting Value Table

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

13.5   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
```

13.6   Reverb Type Setting Value Table

```
Transmit Value   Receive Value   Parameter
-                00H             Small Room
-                01H             Medium Room
-                02H             Large Room
-                03H             Medium Hall
-                04H             Large Hall
-                08H             Plate
```

13.7   Chorus Type Setting Value Table

```
Transmit Value   Receive Value   Parameter
-                00H             Chorus1
-                01H             Chorus2
-                02H             Chorus3
-                03H             Chorus4
-                04H             FB Chorus
-                05H             Flanger
```

13.8   Reverb Type (CASIO General System Exclusive) Setting Value Table

Transmit Value	Receive Value	Parameter	Category
00H	00H	Room1	Reverb
01H	01H	Room2	Reverb
02H	02H	Room3	Reverb
03H	03H	Hall1	Reverb
04H	04H	Hall2	Reverb
0AH	0AH	Large Room	Reverb
0CH	0CH	Stadium1	Reverb
17H	17H	Hall3	Reverb
20H	20H	Off	Reverb
21H	21H	NY Club	Hall Siulator
25H	25H	Opera Hall	Hall Siulator
28H	28H	Berlin Hall	Hall Siulator
2AH	2AH	British Stadium	Hall Siulator
2DH	2DH	Tone	Reverb

13.9   Chorus Type (CASIO General System Exclusive) Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Light Chorus
02H	02H	Chorus
07H	07H	Flanger
0FH	0FH	Deep Chorus
10H	10H	Tone

Part V
MIDI Implementation Notation

14 Value Notation

14.1 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

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