

PX-770/PX-870/AP-270/AP-470/PX-2000GP MIDI Implementation

CASIO COMPUTER CO., LTD.

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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.

1.2 Performance Controller Section

The Performance Controller Section performs generates performance messages in accordance with keyboard play and pedal operations, 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 part number.

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 general universal system exclusive messages, or the Instrument's system exclusive messages or all.

1.3.2 Instrument Part Block

The instrument part section consists of a total of 32 instrument parts. The settings of each part can be changed using channel messages or Instrument's system exclusive 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.

| 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 Keyboard Channel setting.

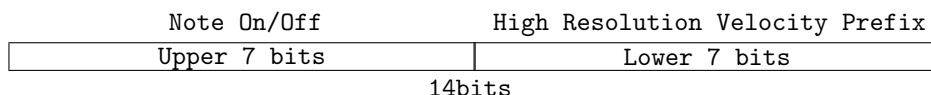
2 Conditions that Disable Message Send and Receive

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.



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 "3 Note Off", "4 Note On", and "5.18 High Resolution Velocity Prefix".

3 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 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.

4 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/Off message and High Resolution Velocity Prefix message, see "Instrument Velocity Resolution" at the beginning of part II.

5 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.

5.1 Bank Select (00H,20H)

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

n: MIDI Channel Number
mm: MSB Value(Note1)
11: LSB Value(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 number is selected. For information about numbers, see the Tone List in the User's Guide.

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 "6 Program Change".

5.2 Modulation (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.

5.3 Portamento Time(05H)

Message Format: BnH 05H vvH

n: MIDI Channel Number
vv: Value

Receive Receipt changes the portamento application time.

5.4 Data Entry (06H,26H)

Message Format: BnH 06H mmH (MSB)
BnH 26H 11H (LSB)

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

Transmit Sent when there is a change to the parameter assigned to RPN. For details about information assigned to parameters that correspond to RPN, see "5.22 RPN". This Instrument does not have a parameter that corresponds to NRPN.

Receive Receipt changes the parameter assigned to RPN.

5.5 Volume (07H)

Message Format: BnH 07H vvH

n: MIDI Channel Number
vv: Value

Transmit Sent when layer balance or lower volume is adjusted.

Receive Receipt changes the part volume.

5.6 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 “11.4 Pan Setting Value Table” in “IV Setting Values and Send/Receive Values”.

Transmit Sent when Music Library play is stopped.

Receive Receipt changes the pan of the corresponding part.

5.7 Expression (0BH)

Message Format: BnH 0BH vvH

n: MIDI Channel Number
vv: Value

Receive Receipt changes the Expression value.

5.8 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.

5.9 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 “11.1 Off/On Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the portamento on/off setting.

5.10 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 “11.1 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.

5.11 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 “11.1 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.

5.12 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 “11.3 -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.

5.13 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 “11.3 -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.

5.14 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 “11.3 -64 - 0 - +63 Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Receive Receipt changes the note vibrato rate.

5.15 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 “11.3 -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.

5.16 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 “11.3 -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.

5.17 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.

5.18 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. 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.

5.19 Reverb Send (5BH)

Message Format: BnH 5BH vvH

n: MIDI Channel Number
vv: Value

Transmit Sent when Music Library play (etc.) is operated.

Receive Receipt changes the reverb send of the corresponding part.

5.20 Chorus Send (5DH)

Message Format: BnH 5DH vvH

n: MIDI Channel Number
vv: Value

Transmit Sent when Music Library play (etc.) is operated.

Receive Receipt changes the chorus send of the corresponding part.

5.21 NRPN (62H,63H)

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

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

5.21.1 Assignable Functions to NRPN

This Instrument does not assign any parameters to NRPN.

5.22 RPN (64H,65H)

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

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

5.22.1 Pitch Bend Sensitivity

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

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

Receive Receipt changes Pitch Bend Sensitivity.

5.22.2 Fine Tune

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

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

Receive Receipt changes Channel Fine Tune.

5.22.3 Coarse Tune

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

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

Receive Receipt changes Channel Coarse Tune.

5.22.4 Null

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

n: MIDI Channel Number

Transmit Sent when an RPN message send operation is performed.

Receive Receipt de-selects RPN.

5.23 All Sound Off (78H)

Message Format: BnH 78H 00H

n: MIDI Channel Number

Receive Receipt stops all voices that are sounding.

5.24 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.

5.25 All Notes Off (7BH)

Message Format: BnH 7BH 00H

n: MIDI Channel Number

Transmit Sent when MIDI send related settings are changed.

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

5.26 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. Regardless of the reception of this message, the instrument always operates as Omni Off mode.

5.27 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. Regardless of the reception of this message, the instrument always operates as Omni Off mode.

5.28 Mono (7EH)

Message Format: BnH 7EH 00H

n: MIDI Channel Number

Receive Receipt performs the same operation as when All Notes Off is received. Regardless of the reception of this message, the instrument always operates as Poly mode.

5.29 Poly (7FH)

Message Format: BnH 7FH 00H

n: MIDI Channel Number

Receive Receipt performs the same operation as when All Notes Off is received. Regardless of the reception of this message, the instrument always operates as Poly mode.

6 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 tone 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.

7 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.

8 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. Pitch bend change sensitivity depends on the pitch bend sensitivity configured with RPN.

Part III

System Message

9 Active Sensing

Message Format: FEH

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

10 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. MIDI Device ID is one of Spec Parameter and can be changed by the System Exclusive Message. Device ID of MIDI System Exclusive Message in this case should be sent is set to 7FH.(Initial Value:7FH)

10.1 Universal Real Time System Exclusive Message

Message Format: F0H 7FH ddH...F7H

dd: Device ID

10.1.1 Master Volume

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

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

Receive Receipt changes the Master Volume.

10.1.2 Master Fine Tuning

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

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

Note1: For information about the relationship between setting values and send/receive values, see “11.5 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.

10.1.3 Master Coarse Tuning

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

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

Receive Receipt changes the Patch Master Coarse Tune parameter.

10.1.4 Reverb Type

Message Format: FOH 7FH ddH 04H 05H 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 “11.6 Reverb Type Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit This message is sent when the reverb type is changed. This Instrument treats a hall simulator as a reverb.

Receive Receipt changes the reverb type.

10.1.5 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.

10.1.6 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 “11.7 Chorus Type Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit This message is sent when the chorus type is changed.

Receive Receipt changes the chorus type.

10.1.7 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.

10.1.8 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.

10.1.9 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.

10.2 Universal Non Real Time System Exclusive Message

Message Format: F0H 7EH ddH...F7H

dd: Device ID

10.2.1 GM System On

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

dd: Device ID

Receive Receipt puts the settings of sound source into the default of this instrument.

10.2.2 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.

10.2.3 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

11 Setting Value Tables

11.1 Off/On Setting Value Table

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

11.2 Sustain Pedal Setting Value Table

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

11.3 -64 - 0 - +63 Setting Value Table

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

11.4 Pan Setting Value Table

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

11.5 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 |

11.6 Reverb Type Setting Value Table

| Transmit Value | Receive Value | Parameter |
|----------------|---------------|-----------------|
| 00H | 00H | Off |
| 01H | 01H | Hall Simulator1 |
| 02H | 02H | Hall Simulator2 |
| 03H | 03H | Hall Simulator3 |
| 04H | 04H | Hall Simulator4 |

11.7 Chorus Type Setting Value Table

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

Part V

MIDI Implementation Notation

12 Value Notation

12.1 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 |

12.2 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 |

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