

# MIDI Implementation

This MIDI implementation applies to the RP401R and the F-130R.

Model: RP401R/F-130R

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## 1. Receive Data

### ■ Channel Voice Messages

#### ● Note Off

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| 8nH    | kkH      | vvH      |
| 9nH    | kkH      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

kk = note number: 00H–7FH (0–127)

vv = note off velocity: 00H–7FH (0–127)

\* For Drum Parts, these messages are received when Rx. NOTE OFF = ON for each Instrument.

#### ● Note On

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| 9nH    | kkH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

kk = note number: 00H–7FH (0–127)

vv = note on velocity: 01H–7FH (1–127)

\* Not received when Rx. NOTE MESSAGE = OFF. (Initial value is ON)

\* For Drum Parts, not received when Rx. NOTE ON = OFF for each Instrument.

#### ● Polyphonic Key Pressure

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| AnH    | kkH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

kk = note number: 00H–7FH (0–127)

vv = key pressure: 00H–7FH (0–127)

\* Not received when Rx. POLY PRESSURE = OFF. (Initial value is ON)

\* The resulting effect is determined by System Exclusive messages. With the initial settings, there will be no effect.

#### ● Control Change

\* When Rx. CONTROL CHANGE = OFF, all control change messages except for Channel Mode messages will be ignored.

\* The value specified by a Control Change message will not be reset even by a Program Change, etc.

#### ○ Bank Select (Controller Number 0, 32)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 00H      | mmH      |
| BnH    | 20H      | llH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

mm, ll = Bank number: 00H, 00H–7FH, 7FH (bank.1–bank.16384), Initial Value = 00 00H (bank.1)

\* Not received when Rx. BANK SELECT = OFF.

\* "Rx. BANK SELECT" is set to OFF by "GM1 System On," and Bank Select message will be ignored.

\* "Rx. BANK SELECT" is set to ON by "GM2 System On."

\* "Rx. BANK SELECT" is set to ON by power-on Reset or by receiving "GS RESET."

\* When Rx. BANK SELECT LSB = OFF, Bank number LSB (llH) will be handled as 00H regardless of the received value. However, when sending Bank Select messages, you have to send both the MSB (mmH) and LSB (llH), the value should be 00H together.

\* Bank Select processing will be suspended until a Program Change message is received.

\* The GS format "Variation number" is the value of the Bank Select MSB (Controller number 0) expressed in decimal.

\* Some other GS devices do not recognize the Bank Select LSB (Controller number 32).

#### ○ Modulation (Controller Number 1)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 01H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Modulation depth: 00H–7FH (0–127)

\* Not received when Rx. MODULATION = OFF. (Initial value is ON)

\* The resulting effect is determined by System Exclusive messages. With the initial settings, this is Pitch Modulation Depth.

#### ○ Portamento Time (Controller Number 5)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 05H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Portamento Time: 00H–7FH (0–127), Initial value = 00H (0)

\* This adjusts the rate of pitch change when Portamento is ON or when using the Portamento Control. A value of 0 results in the fastest change.

#### ○ Data Entry (Controller Number 6, 38)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 06H      | mmH      |
| BnH    | 26H      | llH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

mm, ll = the value of the parameter specified by RPN/NRPN

mm = MSB, ll = LSB

#### ○ Volume (Controller Number 7)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 07H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Volume: 00H–7FH (0–127), Initial Value = 64H (100)

\* Volume messages are used to adjust the volume balance of each Part.

\* Not received when Rx. VOLUME = OFF. (Initial value is ON)

# MIDI Implementation

## ○ Pan (Controller Number 10)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 0AH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = pan: 00H–40H–7FH (Left–Center–Right),  
Initial Value = 40H (Center)

- \* For Rhythm Parts, this is a relative adjustment of each Instrument's pan setting.
- \* Some Tones are not capable of being panned all the way to the left or right.
- \* Not received when Rx. PANPOT = OFF. (Initial value is ON)

## ○ Expression (Controller Number 11)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 0BH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Expression: 00H–7FH (0–127), Initial Value = 7FH (127)

- \* This adjusts the volume of a Part. It can be used independently from Volume messages. Expression messages are used for musical expression within a performance; e.g., expression pedal movements, crescendo and decrescendo.
- \* Not received when Rx. EXPRESSION = OFF. (Initial value is ON)

## ○ Hold 1 (Controller Number 64)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 40H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Control value: 00H–7FH (0–127)

- \* Not received when Rx. HOLD1 = OFF. (Initial value is ON)

## ○ Portamento (Controller Number 65)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 41H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Control value: 00H–7FH (0–127)  
0–63 = OFF, 64–127 = ON

- \* Not received when Rx. PORTAMENTO = OFF. (Initial value is ON)

## ○ Sostenuto (Controller Number 66)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 42H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Control value: 00H–7FH (0–127)  
0–63 = OFF, 64–127 = ON

- \* Not received when Rx. SOSTENUTO = OFF. (Initial value is ON)

## ○ Soft (Controller Number 67)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 43H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Control value: 00H–7FH (0–127)

- \* Not received when Rx. SOFT = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

## ○ Resonance (Controller Number 71)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 47H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Resonance value (relative change): 00H–7FH(-64–0–+63),  
Initial value = 40H (no change)

- \* Not received when Rx. Resonance = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

## ○ Release Time (Controller Number 72)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 48H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Release Time value (relative change): 00H–7FH(-64–0–+63),  
Initial value = 40H (no change)

- \* Not received when Rx. Release Time = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

## ○ Attack Time (Controller Number 73)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 49H      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Attack time value (relative change): 00H–7FH(-64–0–+63),  
Initial value = 40H (no change)

- \* Not received when Rx. Attack Time = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

## ○ Cutoff (Controller Number 74)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 4AH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Cutoff value (relative change): 00H–7FH(-64–0–+63),  
Initial value = 40H (no change)

- \* Not received when Rx. Cutoff = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

## ○ Decay Time (Controller Number 75)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 4BH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Decay Time value (relative change): 00H–7FH(-64–0–+63),  
Initial value = 40H (no change)

- \* Not received when Rx. Decay Time = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

## ○ Vibrato Rate (Controller Number 76)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 4CH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
vv = Vibrato Rate value (relative change): 00H–7FH(-64–0–+63),  
Initial value = 40H (no change)

- \* Not received when Rx. Vibrato Rate = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

### ○ Vibrato Depth (Controller Number 77)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 4DH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 vv = Vibrato Depth Value (relative change):  
 00H–7FH (-64–0–+63),  
 Initial Value = 40H (no change)

- \* Not received when Rx. Vibrato Depth = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

### ○ Vibrato Delay (Controller Number 78)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 4EH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 vv = Vibrato Delay value (relative change): 00H–7FH (-64–0–+63),  
 Initial value=40H (no change)

- \* Not received when Rx. Vibrato Delay = OFF. (Initial value is ON)
- \* Some Tones will not exhibit any change.

### ○ Portamento Control (Controller Number 84)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 54H      | kkH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 kk = source note number: 00H–7FH (0–127)

- \* A Note-on received immediately after a Portamento Control message will change continuously in pitch, starting from the pitch of the Source Note Number.
- \* If a voice is already sounding for a note number identical to the Source Note Number, this voice will continue sounding (i.e., legato) and will, when the next Note-on is received, smoothly change to the pitch of that Note-on.
- \* The rate of the pitch change caused by Portamento Control is determined by the Portamento Time value.

Example 1.

| On MIDI  | Description                | Result                              |
|----------|----------------------------|-------------------------------------|
| 90 3C 40 | Note on C4                 | C4 on                               |
| B0 54 3C | Portamento Control from C4 | no change (C4 voice still sounding) |
| 90 40 40 | Note on E4                 | glide from C4 to E4                 |
| 80 3C 40 | Note off C4                | no change                           |
| 80 40 40 | Note off E4                | E4 off                              |

Example 2.

| On MIDI  | Description                | Result                                |
|----------|----------------------------|---------------------------------------|
| B0 54 3C | Portamento Control from C4 | no change                             |
| 90 40 40 | Note on E4                 | E4 is played with glide from C4 to E4 |
| 80 40 40 | Note off E4                | E4 off                                |

### ○ Effect 1 (Reverb Send Level) (Controller Number 91)

| Status | 2nd bytes | 3rd byte |
|--------|-----------|----------|
| BnH    | 5BH       | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 vv = Control value: 00H–7FH (0–127), Initial Value = 28H (40)

- \* This message adjusts the Reverb Send Level of each Part.

### ○ Effect 3 (Chorus Send Level) (Controller Number 93)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 5DH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 vv = Control value: 00H–7FH (0–127), Initial Value = 00H (0)

- \* This message adjusts the Chorus Send Level of each Part.

### ○ NRPN MSB/LSB (Controller Number 98, 99)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 63H      | mmH      |
| BnH    | 62H      | llH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 mm = upper byte (MSB) of the parameter number specified by NRPN  
 ll = lower byte (LSB) of the parameter number specified by NRPN

- \* Rx. NRPN is set to OFF by power-on reset or by receiving “GM1 System On” or “GM2 System On,” and NRPN message will be ignored. NRPN message will be received when Rx. NRPN = ON, or by receiving “GS RESET.”
- \* The value set by NRPN will not be reset even if Program Change or Reset All Controllers is received.

\*\*NRPN\*\*

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used.

To use these messages, you must first use NRPN MSB and NRPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH 7FH) when you have finished setting the value of the desired parameter. Refer to Section 4. Supplementary Material “Examples of actual MIDI messages” <Example 4>. On the GS devices, Data entry LSB (llH) of NRPN (controller number 38) is ignored, so it is no problem to send Data entry MSB (mmH) only without Data entry LSB (controller number 6).

On this instrument, NRPN can be used to modify the following parameters.

| NRPN    | Data entry | Description   |
|---------|------------|---|
| MSB LSB | MSB        |   |
| 01H 08H | mmH        | Vibrato Rate (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)   |
| 01H 09H | mmH        | Vibrato Depth (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)  |
| 01H 0AH | mmH        | Vibrato Delay (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)  |
| 01H 20H | mmH        | TVF Cutoff Frequency (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)   |
| 01H 21H | mmH        | TVF Resonance (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)  |
| 01H 63H | mmH        | TVF & TVA Envelope Attack Time (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)   |
| 01H 64H | mmH        | TVF & TVA Envelope Decay Time (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)  |
| 01H 66H | mmH        | TVF & TVA Envelope Release Time (relative change)<br>mm: 0EH–40H–72H (-50–0–+50)  |
| 18H rrH | mmH        | Drum Instrument Pitch Coarse (relative change)<br>rr: key number of drum instrument<br>mm: 00H–7FH (-63–0–+63 semitone)           |
| 1AH rrH | mmH        | Drum Instrument TVA Level (absolute change)<br>rr: key number of drum instrument<br>mm: 00H–7FH (zero-maximum)                    |
| 1CH rrH | mmH        | Drum Instrument Panpot (absolute change)<br>rr: key number of drum instrument<br>mm: 00H, 01H–40H–7FH (Random, Left–Center–Right) |
| 1DH rrH | mmH        | Drum Instrument Reverb Send Level (absolute change)<br>rr: key number of drum instrument<br>mm: 01H–7FH (zero-maximum)            |
| 1EH rrH | mmH        | Drum Instrument Chorus Send Level (absolute change)<br>rr: key number of drum instrument<br>mm: 01H–7FH (zero-maximum)            |

# MIDI Implementation

- \* Parameters marked "relative change" will change relatively to the preset value(40H). Even among different GS devices, "relative change" parameters may sometimes differ in the way the sound changes or in the range of change.
- \* Parameters marked "absolute change" will be set to the absolute value of the parameter, regardless of the preset value.
- \* Data entry LSB (IIH) is ignored.

## ○ RPN MSB/LSB (Controller Number 100, 101)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 65H      | mmH      |
| BnH    | 64H      | IIH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 mm = upper byte (MSB) of parameter number specified by RPN  
 II = lower byte (LSB) of parameter number specified by RPN

- \* Not received when Rx. RPN = OFF. (Initial value is ON)
- \* The value specified by RPN will not be reset even by messages such as Program Change or Reset All Controller.

**\*\*RPN\*\***  
 The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.  
 To use these messages, you must first use RPN MSB and RPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH 7FH) when you have finished setting the value of the desired parameter. Refer to Section 4. "Examples of actual MIDI messages" <Example 4>

On this instrument, RPN can be used to modify the following parameters.

| RPN     | Data entry | Explanation   |
|---------|------------|---|
| MSB LSB | MSB LSB    |   |
| 00H 00H | mmH ---    | Pitch Bend Sensitivity<br>mm: 00H–18H (0–24 semitones),<br>Initial Value = 02H (2 semitones)<br>II: ignored (processed as 00h)<br>specify up to 2 octaves in semitone steps   |
| 00H 01H | mmH IIH    | Master Fine Tuning<br>mm, II: 00 00H–40 00H–7F 7FH<br>(-100–0–+99.99 cents),<br>Initial Value = 40 00H (0 cent)<br>II: ignored (processed as 00h)<br>specify up to 2 octaves in semitone steps<br>Refer to 4. Supplementary Material,<br>"About Tuning" |
| 00H 02H | mmH ---    | Master Coarse Tuning<br>mm: 28H–40H–58H<br>(-24–0–+24 semitones),<br>Initial Value = 40H (0 cent)<br>II: ignored (processed as 00h)   |
| 00H 05H | mmH IIH    | Modulation Depth Range<br>mm: 00H–04H (0–4 semitones)<br>II: 00H–7FH (0–100 cents)<br>100/128 Cent/Value  |
| 7FH 7FH | --- ---    | RPN null<br>Set condition where RPN and NRPN are unspecified. The data entry messages after set RPN null will be ignored. (No Data entry messages are required after RPN null).<br>Settings already made will not change.<br>mm, II: ignored            |

## ● Program Change

| Status | 2nd byte |
|--------|----------|
| CnH    | ppH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 pp = Program number: 00H–7FH (prog.1–prog.128)

- \* Not received when Rx. PROGRAM CHANGE = OFF. (Initial value is ON)
- \* After a Program Change message is received, the sound will change beginning with the next Note-on. Voices already sounding when the Program Change message was received will not be affected.
- \* For Drum Parts, Program Change messages will not be received on bank numbers 129–16384 (the value of Controller Number 0 is other than 0 (00H)).

## ● Channel Pressure

| Status | 2nd byte |
|--------|----------|
| DnH    | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 vv = Channel Pressure : 00H–7FH (0–127)

- \* Not received when Rx. CH PRESSURE = OFF. (Initial value is ON)
- \* The resulting effect is determined by System Exclusive messages. With the initial settings there will be no effect.

## ● Pitch Bend Change

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| EnH    | IIH      | mmH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)  
 mm, II = Pitch Bend value: 00 00H–40 00H–7F 7FH  
 (-8192–0–+8191)

- \* Not received when Rx. PITCH BEND = OFF. (Initial value is ON)
- \* The resulting effect is determined by System Exclusive messages. With the initial settings the effect is Pitch Bend.

## ■ Channel Mode Messages

### ● All Sounds Off (Controller Number 120)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 78H      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

\* When this message is received, all currently-sounding notes on the corresponding channel will be turned off immediately.

### ● Reset All Controllers (Controller Number 121)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 79H      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

\* When this message is received, the following controllers will be set to their reset values.

| Controller              | Reset value                                |
|-------------------------|--|
| Pitch Bend Change       | ±0 (Center)                                |
| Polyphonic Key Pressure | 0 (off)                                    |
| Channel Pressure        | 0 (off)                                    |
| Modulation              | 0 (off)                                    |
| Expression              | 127 (max)                                  |
| Hold 1                  | 0 (off)                                    |
| Portamento              | 0 (off)                                    |
| Sostenuto               | 0 (off)                                    |
| Soft                    | 0 (off)                                    |
| RPN                     | unset; previously set data will not change |
| NRPN                    | unset; previously set data will not change |

### ● Local Control (Controller Number 122)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 7AH      | vvH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Control value:  
00H, 7FH (0,127)  
00H: Local Off  
7FH: Local On

### ● All Notes Off (Controller Number 123)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 7BH      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

\* When All Notes Off is received, all notes on the corresponding channel will be turned off.  
However if Hold 1 or Sostenuto is ON, the sound will be continued until these are turned off.

### ● OMNI OFF (Controller Number 124)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 7CH      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

\* The same processing will be carried out as when All Notes Off is received.

### ● OMNI ON (Controller Number 125)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 7DH      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

\* OMNI ON is only recognized as “All notes off”; the Mode doesn’t change (OMNI OFF remains).

### ● MONO (Controller Number 126)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 7EH      | mmH      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

mm = mono number: 00H–10H (0–16)

\* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 4 (M = 1) regardless of the value of “mono number.”

### ● POLY (Controller Number 127)

| Status | 2nd byte | 3rd byte |
|--------|----------|----------|
| BnH    | 7FH      | 00H      |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

\* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 3.

## ■ System Exclusive Message

| Status | Data byte            | Status |
|--------|----------------------|--------|
| F0H    | iiH, ddH, ....., eeH | F7H    |

F0H: System Exclusive Message status  
 ii = ID number: An ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H. ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).  
 dd, ..., ee = data: 00H–7FH (0–127)  
 F7H: EOX (End Of Exclusive)

The System Exclusive Messages received by this instrument are; messages related to mode settings, Universal Realtime System Exclusive messages, Universal Non-realtime System Exclusive messages and Data Set (DT1).

## ● System Exclusive Messages Related to Mode Settings

These messages are used to initialize a device to GS or General MIDI mode, or change the operating mode. When creating performance data, a "GM1 System On" message should be inserted at the beginning of a General MIDI 1 score, a "GM2 System On" message at the beginning of a General MIDI 2 score, and a "GS Reset" message at the beginning of a GS music data. Each song should contain only one mode message as appropriate for the type of data. (Do not insert two or more mode setting messages in a single song.)  
 "GM System On" uses Universal Non-realtime Message format. "GS Reset" uses Roland system Exclusive format "Data Set 1 (DT1)."

### ○ GM1 System On

This is a command message that resets the internal settings of the unit to the General MIDI initial state (General MIDI System-Level 1). After receiving this message, this instrument will automatically be set to the proper condition for correctly playing a GM1 score.

| Status | Data byte          | Status |
|--------|--------------------|--------|
| F0H    | 7EH, 7FH, 09H, 01H | F7H    |

| Byte | Explanation                                |
|------|--|
| F0H  | Exclusive status                           |
| 7EH  | ID number (Universal Non-realtime Message) |
| 7FH  | Device ID (Broadcast)                      |
| 09H  | Sub ID#1 (General MIDI Message)            |
| 01H  | Sub ID#2 (General MIDI 1 On)               |
| F7H  | EOX (End Of Exclusive)                     |

- \* When this message is received, Rx. BANK SELECT will be OFF and Rx. NRPN will be OFF.
- \* There must be an interval of at least 50 ms between this message and the next.

### ○ GM2 System On

This is a command message that resets the internal settings of the unit to the General MIDI initial state (General MIDI System-Level 2). After receiving this message, this instrument will automatically be set to the proper condition for correctly playing a GM2 score.

| Status | Data byte       | Status |
|--------|-----------------|--------|
| F0H    | 7EH 7FH 09H 03H | F7H    |

| Byte | Explanation                                |
|------|--|
| F0H  | Exclusive status                           |
| 7EH  | ID number (Universal Non-realtime Message) |
| 7FH  | Device ID (Broadcast)                      |
| 09H  | Sub ID#1 (General MIDI Message)            |
| 03H  | Sub ID#2 (General MIDI 2 On)               |
| F7H  | EOX (End Of Exclusive)                     |

- \* When this message is received, this instrument will be able to receive the messages specified by General MIDI 2, and use the General MIDI 2 soundmap.
- \* There must be an interval of at least 50 ms between this message and the next.

## ○ GS Reset

GS Reset is a command message that resets the internal settings of a device to the GS initial state.

This message will appear at the beginning of GS music data, and a GS device that receives this message will automatically be set to the proper state to correctly playback GS music data.

| Status | Data byte                                   | Status |
|--------|---|--------|
| F0H    | 41H, 10H, 42H, 12H, 40H, 00H, 7FH, 00H, 41H | F7H    |

| Byte | Explanation   |
|------|---|
| F0H  | Exclusive status  |
| 41H  | ID number (Roland)  |
| 10H  | Device ID<br>(dev: 00H–1FH (1–32), Initial value is 10H (17)) |
| 42H  | Model ID (GS)   |
| 12H  | Command ID (DT1)  |
| 40H  | Address MSB   |
| 00H  | Address   |
| 7FH  | Address LSB   |
| 00H  | Data (GS reset)   |
| 41H  | Checksum  |
| F7H  | EOX (End Of Exclusive)  |

- \* When this message is received, Rx. NRPN will be ON.
- \* There must be an interval of at least 50 ms between this message and the next.

## ● Universal Realtime System Exclusive Messages

### ○ Master Volume

| Status | Data byte                    | Status |
|--------|------------------------------|--------|
| F0H    | 7FH, 7FH, 04H, 01H, llH, mmH | F7H    |

| Byte | Explanation                            |
|------|--|
| F0H  | Exclusive status                       |
| 7FH  | ID number (universal realtime message) |
| 7FH  | Device ID (Broadcast)                  |
| 04H  | Sub ID#1 (Device Control messages)     |
| 01H  | Sub ID#2 (Master Volume)               |
| llH  | Master volume lower byte               |
| mmH  | Master volume upper byte               |
| F7H  | EOX (End Of Exclusive)                 |

llH: ignored (processed as 00H)  
 mmH: 00H–7FH 0–127

- \* The lower byte (llH) of Master Volume will be handled as 00H.

### ○ Master Fine Tuning

| Status | Data byte                    | Status |
|--------|------------------------------|--------|
| F0H    | 7FH, 7FH, 04H, 03H, llH, mmH | F7H    |

| Byte | Explanation                            |
|------|--|
| F0H  | Exclusive status                       |
| 7FH  | ID number (Universal Realtime Message) |
| 7FH  | Device ID (Broadcast)                  |
| 04H  | Sub ID#1 (Device Control)              |
| 03H  | Sub ID#2 (Master Fine Tuning)          |
| llH  | Master Fine Tuning LSB                 |
| mmH  | Master Fine Tuning MSB                 |
| F7H  | EOX (End Of Exclusive)                 |

llH, mmH: 00 00H–40 00H–7F 7FH (-100–0–+99.9 [cents])

○ Master Coarse Tuning

| Status | Data byte                    | Status |
|--------|------------------------------|--------|
| F0H    | 7FH, 7FH, 04H, 04H, 11H, mmH | F7H    |

  

| Byte | Explanation                            |
|------|--|
| F0H  | Exclusive status                       |
| 7FH  | ID number (Universal Realtime Message) |
| 7FH  | Device ID (Broadcast)                  |
| 04H  | Sub ID#1 (Device Control)              |
| 04H  | Sub ID#2 (Master Coarse Tuning)        |
| 11H  | Master Coarse Tuning LSB               |
| mmH  | Master Coarse Tuning MSB               |
| F7H  | EOX (End Of Exclusive)                 |

  

11H: ignored (processed as 00H)  
 mmH: 28H–40H–58H (-24–0–+24 [semitones])

● Global Parameter Control

Parameters of the Global Parameter Control are newly provided for the General MIDI 2.

○ Reverb Parameters

| Status | Data byte   | Status |
|--------|---|--------|
| F0H    | 7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 01H, 01H, ppH, vvH | F7H    |

  

| Byte | Explanation                            |
|------|--|
| F0H  | Exclusive status                       |
| 7FH  | ID number (Universal Realtime Message) |
| 7FH  | Device ID (Broadcast)                  |
| 04H  | Sub ID#1 (Device Control)              |
| 05H  | Sub ID#2 (Global Parameter Control)    |
| 01H  | Slot path length                       |
| 01H  | Parameter ID width                     |
| 01H  | Value width                            |
| 01H  | Slot path MSB                          |
| 01H  | Slot path LSB (Effect 0101: Reverb)    |
| ppH  | Parameter to be controlled.            |
| vvH  | Value for the parameter.               |
| F7H  | EOX (End Of Exclusive)                 |

  

pp=0

| Reverb Type |                     |
|-------------|---------------------|
| vv = 00H    | Small Room (Room1)  |
| vv = 01H    | Medium Room (Room2) |
| vv = 02H    | Large Room (Room3)  |
| vv = 03H    | Medium Hall (Hall1) |
| vv = 04H    | Large Hall (Hall2)  |
| vv = 08H    | Plate (Plate)       |

  

pp=1

| Reverb Time  |       |
|--------------|-------|
| vv = 00H–7FH | 0–127 |

○ Chorus Parameters

| Status | Data byte   | Status |
|--------|---|--------|
| F0H    | 7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 01H, 02H, ppH, vvH | F7H    |

  

| Byte | Explanation                            |
|------|--|
| F0H  | Exclusive status                       |
| 7FH  | ID number (Universal Realtime Message) |
| 7FH  | Device ID (Broadcast)                  |
| 04H  | Sub ID#1 (Device Control)              |
| 05H  | Sub ID#2 (Global Parameter Control)    |
| 01H  | Slot path length                       |
| 01H  | Parameter ID width                     |
| 01H  | Value width                            |
| 01H  | Slot path MSB                          |
| 02H  | Slot path LSB (Effect 0102: Chorus)    |
| ppH  | Parameter to be controlled.            |
| vvH  | Value for the parameter.               |
| F7H  | EOX (End Of Exclusive)                 |

  

pp=0

| Chorus Type |           |
|-------------|-----------|
| vv=0        | Chorus1   |
| vv=1        | Chorus2   |
| vv=2        | Chorus3   |
| vv=3        | Chorus4   |
| vv=4        | FB Chorus |
| vv=5        | Flanger   |

  

pp=1

| Mod Rate     |       |
|--------------|-------|
| vv = 00H–7FH | 0–127 |

  

pp=2

| Mod Depth    |       |
|--------------|-------|
| vv = 00H–7FH | 0–127 |

  

pp=3

| Feedback     |       |
|--------------|-------|
| vv = 00H–7FH | 0–127 |

  

pp=4

| Send To Reverb |       |
|----------------|-------|
| vv = 00H–7FH   | 0–127 |

○ Channel Pressure

| Status | Data byte                         | Status |
|--------|-----------------------------------|--------|
| F0H    | 7FH, 7FH, 09H, 01H, 0nH, ppH, rrH | F7H    |

  

| Byte | Explanation                               |
|------|---|
| F0H  | Exclusive status                          |
| 7FH  | ID number (Universal Realtime Message)    |
| 7FH  | Device ID (Broadcast)                     |
| 09H  | Sub ID#1 (Controller Destination Setting) |
| 01H  | Sub ID#2 (Channel Pressure)               |
| 0nH  | MIDI Channel (00H–0FH)                    |
| ppH  | Controlled parameter                      |
| rrH  | Controlled range                          |
| F7H  | EOX (End Of Exclusive)                    |

  

pp=0

| Pitch Control |                     |
|---------------|---------------------|
| rr = 28H–58H  | -24–+24 [semitones] |

  

pp=1

| Filter Cutoff Control |                     |
|-----------------------|---------------------|
| rr = 00H–7FH          | -9600–+9450 [cents] |

  

pp=2

| Amplitude Control |           |
|-------------------|-----------|
| rr = 00H–7FH      | 0–200 [%] |

  

pp=3

| LFO Pitch Depth |               |
|-----------------|---------------|
| rr = 00H–7FH    | 0–600 [cents] |

  

pp=4

| LFO Filter Depth |                |
|------------------|----------------|
| rr = 00H–7FH     | 0–2400 [cents] |

  

pp=5

| LFO Amplitude Depth |           |
|---------------------|-----------|
| rr = 00H–7FH        | 0–100 [%] |

# MIDI Implementation

## ○ Controller

| Status | Data byte                              | Status |
|--------|--|--------|
| F0H    | 7FH, 7FH, 09H, 03H, 0nH, ccH, ppH, rrH | F7H    |

| Byte | Explanation                               |
|------|---|
| F0H  | Exclusive status                          |
| 7FH  | ID number (Universal Realtime Message)    |
| 7FH  | Device ID (Broadcast)                     |
| 09H  | Sub ID#1 (Controller Destination Setting) |
| 03H  | Sub ID#2 (Control Change)                 |
| 0nH  | MIDI Channel (00H–0FH)                    |
| ccH  | Controller number (01–1FH, 40–5FH)        |
| ppH  | Controlled parameter                      |
| rrH  | Controlled range                          |
| F7H  | EOX (End Of Exclusive)                    |

|      |  |
|------|--|
| pp=0 | Pitch Control<br>rr = 28H–58H      -24–+24 [semitones]         |
| pp=1 | Filter Cutoff Control<br>rr = 00H–7FH      -9600–+9450 [cents] |
| pp=2 | Amplitude Control<br>rr = 00H–7FH      0–200 [%]               |
| pp=3 | LFO Pitch Depth<br>rr = 00H–7FH      0–600 [cents]             |
| pp=4 | LFO Filter Depth<br>rr = 00H–7FH      0–2400 [cents]           |
| pp=5 | LFO Amplitude Depth<br>rr = 00H–7FH      0–100 [%]             |

## ○ Scale/Octave Tuning Adjust

| Status | Data byte                                 | Status |
|--------|---|--------|
| F0H    | 7EH, 7FH, 08H, 08H, ffH, ggH, hhH, ssH... | F7H    |

| Byte | Explanation  |
|------|--|
| F0H  | Exclusive status   |
| 7EH  | ID number (Universal Non-realtime Message)   |
| 7FH  | Device ID (Broadcast)  |
| 08H  | Sub ID#1 (MIDI Tuning Standard)  |
| 08H  | Sub ID#2 (scale/octave tuning 1-byte form)   |
| ffH  | Channel/Option byte1<br>bits 0 to 1 = channel 15 to 16<br>bits 2 to 6 = Undefined  |
| ggH  | Channel byte2<br>bits 0 to 6 = channel 8 to 14   |
| hhH  | Channel byte3<br>bits 0 to 6 = channel 1 to 7  |
| ssH  | 12 byte tuning offset of 12 semitones from C to B<br>00H = -64 [cents]<br>40H = 0 [cents] (equal temperament)<br>7FH = +63 [cents] |
| F7H  | EOX (End Of Exclusive)   |

## ○ Key-Based Instrument Controllers

| Status | Data byte                                 | Status |
|--------|---|--------|
| F0H    | 7FH, 7FH, 0AH, 01H, 0nH, kkH, nnH, vvH... | F7H    |

| Byte | Explanation                             |
|------|---|
| F0H  | Exclusive status                        |
| 7FH  | ID number (Universal Realtime Message)  |
| 7FH  | Device ID (Broadcast)                   |
| 0AH  | Sub ID#1 (Key-Based Instrument Control) |
| 01H  | Sub ID#2 (Controller)                   |
| 0nH  | MIDI Channel (00–0FH)                   |
| kkH  | Key Number                              |
| nnH  | Controller Number                       |
| vvH  | Value                                   |
| F7H  | EOX (End Of Exclusive)                  |

|        |   |
|--------|---|
| nn=07H | Level<br>vv = 00H–7FH      0–200 [%] (Relative)   |
| nn=0AH | Pan<br>vv = 00H–7FH      Left–Right (Absolute)    |
| nn=5BH | Reverb Send<br>vv = 00H–7FH      0–127 (Absolute) |
| nn=5DH | Chorus Send<br>vv = 00H–7FH      0–127 (Absolute) |

\* This parameter effects drum instruments only.

## ● Universal Non-realtime System Exclusive Messages

### ○ Identity Request Message

| Status | Data byte          | Status |
|--------|--------------------|--------|
| F0H    | 7EH, 10H, 06H, 01H | F7H    |

| Byte | Explanation                                |
|------|--|
| F0H  | Exclusive status                           |
| 7EH  | ID number (Universal Non-realtime Message) |
| 10H  | Device ID                                  |
| 06H  | Sub ID#1 (General Information)             |
| 01H  | Sub ID#2 (Identity Request)                |
| F7H  | EOX (End Of Exclusive)                     |

\* Device ID = 10H or 7FH



## ● Data transmission

This instrument can receive the various parameters using System Exclusive messages.

The exclusive message of GS format data has a model ID of 42H and a device ID of 10H (17), and it is common to all the GS devices.

### ○ Data Set 1 (DT1)

This is the message that actually performs data transmission, and is used when you wish to transmit the data.

| <u>Status</u> | <u>Data byte</u>                                     | <u>Status</u> |
|---------------|--|---------------|
| FOH           | 41H, 10H, 42H, 12H, aaH, bbH, ccH, ddH, ... eeH, sum | F7H           |

  

| <u>Byte</u> | <u>Explanation</u>   |
|-------------|--|
| FOH         | Exclusive status   |
| 41H         | ID number (Roland)   |
| 10H         | Device ID  |
| 42H         | Model ID (GS)  |
| 12H         | Command ID (DT1)   |
| aaH         | Address MSB: upper byte of the starting address of the transmitted data                                    |
| bbH         | Address: middle byte of the starting address of the transmitted data                                       |
| ccH         | Address LSB: lower byte of the starting address of the transmitted data                                    |
| ddH         | Data: the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address. |
| :           | :  |
| eeH         | Data   |
| sum         | Checksum   |
| F7H         | EOX (End Of Exclusive)   |

\* The amount of data that can be transmitted at one time depends on the type of data, and data can be received only from the specified starting address and size. Refer to the Address and Size given in Section 3.

\* Data larger than 128 bytes must be divided into packets of 128 bytes or less. If "Data Set 1" is transmitted successively, there must be an interval of at least 40 ms between packets.

\* Regarding the checksum please refer to section 4 .

## 2. Transmit Data

### ■ Channel Voice Messages

#### ● Note Off

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| 8nH           | kkH             | vvH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

kk = note number: 00H–7FH (0–127)

vv = note off velocity: 00H–7FH (0–127)

#### ● Note On

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| 9nH           | kkH             | vvH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

kk = note number: 00H–7FH (0–127)

vv = note on velocity: 01H–7FH (1–127)

#### ● Control Change

##### ○ Bank Select (Controller Number 0, 32)

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| BnH           | 00H             | mmH             |
| BnH           | 20H             | llH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

mm, ll = Bank number: 00H, 00H–7FH, 7FH (bank.1–bank.16384)

##### ○ Hold 1 (Controller Number 64)

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| BnH           | 40H             | vvH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Control value: 00H–7FH (0–127)

##### ○ Sostenuto (Controller Number 66)

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| BnH           | 42H             | vvH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Control value: 00H, 7FH (0, 127)  
0 = OFF, 127 = ON

##### ○ Soft (Controller Number 67)

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| BnH           | 43H             | vvH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Control value: 00H–7FH (0–127)

##### ○ Effect 1 (Reverb Send Level) (Controller Number 91)

| <u>Status</u> | <u>2nd byte</u> | <u>3rd byte</u> |
|---------------|-----------------|-----------------|
| BnH           | 5BH             | vvH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

vv = Control value: 00H–7FH (0–127)

#### ● Program Change

| <u>Status</u> | <u>2nd byte</u> |
|---------------|-----------------|
| CnH           | ppH             |

n = MIDI channel number: 0H–FH (ch.1–ch.16)

pp = Program number: 00H–7FH (prog.1–prog.128)

## ■ System Exclusive Messages

### ○ Identity Reply

| <u>Status</u> | <u>Data byte</u>   | <u>Status</u> |
|---------------|--|---------------|
| F0H           | 7EH, 10H, 06H, 02H, 41H, 42H, 00H,<br>00H, 1EH, 08H, 01H, 00H, 00H | F7H           |

| <u>Byte</u> | <u>Explanation</u>                                     |
|-------------|--|
| F0H         | Exclusive status                                       |
| 7EH         | ID number (Universal Non-realtime Message)             |
| 10H         | Device ID<br>(use the same as the device ID of Roland) |
| 06H         | Sub ID#1 (General Information)                         |
| 02H         | Sub ID#2 (Identity Reply)                              |
| 41H         | ID number (Roland)                                     |
| 42H         | Device family code (LSB)                               |
| 00H         | Device family code (MSB)                               |
| 00H         | Device family number code (LSB)                        |
| 1EH         | Device family number code (MSB)                        |
| 08H         | Software revision level                                |
| 01H         | Software revision level                                |
| 00H         | Software revision level                                |
| 00H         | Software revision level                                |
| F7H         | EOX (End of Exclusive)                                 |

### 3. Parameter Address Map (Model ID = 42H)

This map indicates address, size, Data (range), Parameter, Description, and Default Value of parameters which can be transferred using and "Data set 1 (DT1)." All the numbers of address, size, Data, and Default Value are indicated in 7-bits Hexadecimal-form.

#### ■ Address Block Map

An outlined address map of the Exclusive Communication is as follows;

| Address (H) | Block                           |            |
|-------------|---------------------------------|------------|
| 40 00 00    | SYSTEM PARAMETERS               | Individual |
| 40 01 3F    |                                 |            |
| 40 1x 00    | PART PARAMETERS (x = 0-F)       | Individual |
| 40 2x 5A    |                                 |            |
| 41 m0 00    | DRUM SETUP PARAMETERS (m = 0,1) | Individual |
| 41 m8 7F    |                                 |            |
| 48 00 00    | SYSTEM PARAMETERS               | Bulk       |
| 48 01 0F    |                                 |            |
| 48 01 10    | PART PARAMETERS                 | Bulk       |
| 48 1D 0F    |                                 |            |
| 49 m0 00    | DRUM SETUP PARAMETERS (m = 0,1) | Bulk       |
| 49 mE 17    |                                 |            |

There are two ways in which GS data is transmitted: Individual Parameter Transmission in which individual parameters are transmitted one by one, and Bulk Dump Transmission in which a large amount of data is transmitted at once.

#### ■ Individual Parameters

Individual Parameter Transmission transmits data (or requests data) for one parameter as one exclusive message (one packet of "F0 .... F7").

In Individual Parameter Transmission, you must use the Address and Size listed in the following "Parameter Address Map." Addresses marked at "#" cannot be used as starting addresses.

#### ● System Parameters

Parameters related to the system of the device are called System Parameters.

| Address (H) | Size (H) | Data (H)  | Parameter   | Description          | Default Value (H) | Description |
|-------------|----------|-----------|-------------|----------------------|-------------------|-------------|
| 40 00 00    | 00 00 04 | 0018-07E8 | MASTER TUNE | -100.0-+100.0 [cent] | 00 04 00 00       | 0 [cent]    |
| 40 00 01#   |          |           |             | Use nibblized data.  |                   |             |
| 40 00 02#   |          |           |             |                      |                   |             |
| 40 00 03#   |          |           |             |                      |                   |             |

\*Refer to section 4. Supplementary Material, "About Tuning."

|          |          |       |  |  |    |               |
|----------|----------|-------|--|--|----|---------------|
| 40 00 04 | 00 00 01 | 00-7F | MASTER VOLUME<br>(= F0 7F 7F 04 01 00 vv F7) | 0-127  | 7F | 127           |
| 40 00 05 | 00 00 01 | 28-58 | MASTER KEY-SHIFT                             | -24-+24 [semitones]                                | 40 | 0 [semitones] |
| 40 00 06 | 00 00 01 | 01-7F | MASTER PAN                                   | -63 (LEFT)-+63 (RIGHT)                             | 40 | 0 (CENTER)    |
| 40 00 7F | 00 00 01 | 00-7F | MODE SET                                     | 00 = GS Reset,<br>127 = Exit GS mode<br>(Rx. only) |    |               |

\* Refer to "System Exclusive Messages Related to Mode Settings".

|          |          |       |               |        |    |    |
|----------|----------|-------|---------------|--------|----|----|
| 40 01 10 | 00 00 01 | 00-18 | VOICE RESERVE | Part1  | 18 | 24 |
| 40 01 11 | 00 00 01 | 00-18 | VOICE RESERVE | Part2  | 00 | 0  |
| 40 01 12 | 00 00 01 | 00-18 | VOICE RESERVE | Part3  | 04 | 4  |
| 40 01 13 | 00 00 01 | 00-18 | VOICE RESERVE | Part4  | 0A | 10 |
| 40 01 14 | 00 00 01 | 00-18 | VOICE RESERVE | Part5  | 00 | 0  |
| 40 01 15 | 00 00 01 | 00-18 | VOICE RESERVE | Part6  | 00 | 0  |
| 40 01 16 | 00 00 01 | 00-18 | VOICE RESERVE | Part7  | 00 | 0  |
| 40 01 17 | 00 00 01 | 00-18 | VOICE RESERVE | Part8  | 00 | 0  |
| 40 01 18 | 00 00 01 | 00-18 | VOICE RESERVE | Part9  | 00 | 0  |
| 40 01 19 | 00 00 01 | 00-18 | VOICE RESERVE | Part10 | 00 | 0  |
| 40 01 1A | 00 00 01 | 00-18 | VOICE RESERVE | Part11 | 00 | 0  |

# MIDI Implementation

|          |          |       |               |        |    |   |
|----------|----------|-------|---------------|--------|----|---|
| 40 01 1B | 00 00 01 | 00-18 | VOICE RESERVE | Part12 | 00 | 0 |
| 40 01 1C | 00 00 01 | 00-18 | VOICE RESERVE | Part13 | 00 | 0 |
| 40 01 1D | 00 00 01 | 00-18 | VOICE RESERVE | Part14 | 00 | 0 |
| 40 01 1E | 00 00 01 | 00-18 | VOICE RESERVE | Part15 | 00 | 0 |
| 40 01 1F | 00 00 01 | 00-18 | VOICE RESERVE | Part16 | 00 | 0 |

\* The sum total of voices in the voice reserve function must be equal to or less than the 64. For compatibility with other GS models, it is recommended that the maximum polyphony be equal or less than 24.

|          |          |       |                       |   |    |        |
|----------|----------|-------|-----------------------|---|----|--------|
| 40 01 30 | 00 00 01 | 00-07 | REVERB MACRO          | 00: Room 1<br>01: Room 2<br>02: Room 3<br>03: Hall 1<br>04: Hall 2<br>05: Plate<br>06: Delay<br>07: Panning Delay | 04 | Hall 2 |
| 40 01 31 | 00 00 01 | 00-07 | REVERB CHARACTER      | 0-7   | 04 | 4      |
| 40 01 32 | 00 00 01 | 00-07 | REVERB PRE-LPF        | 0-7   | 00 | 0      |
| 40 01 33 | 00 00 01 | 00-7F | REVERB LEVEL          | 0-127   | 40 | 64     |
| 40 01 34 | 00 00 01 | 00-7F | REVERB TIME           | 0-127   | 40 | 64     |
| 40 01 35 | 00 00 01 | 00-7F | REVERB DELAY FEEDBACK | 0-127   | 00 | 0      |

\* REVERB MACRO is a macro parameter that allows global setting of reverb parameters. When you select the reverb type with REVERB MACRO, each reverb parameter will be set to the most suitable value.

\* REVERB CHARACTER is a parameter that changes the reverb algorithm. The value of REVERB CHARACTER corresponds to the REVERB MACRO of the same number.

|          |          |       |                             |   |    |          |
|----------|----------|-------|-----------------------------|---|----|----------|
| 40 01 38 | 00 00 01 | 00-07 | CHORUS MACRO                | 00: Chorus 1<br>01: Chorus 2<br>02: Chorus 3<br>03: Chorus 4<br>04: Feedback Chorus<br>05: Flanger<br>06: Short Delay<br>07: Short Delay (FB) | 02 | Chorus 3 |
| 40 01 39 | 00 00 01 | 00-07 | CHORUS PRE-LPF              | 0-7   | 00 | 0        |
| 40 01 3A | 00 00 01 | 00-7F | CHORUS LEVEL                | 0-127   | 40 | 64       |
| 40 01 3B | 00 00 01 | 00-7F | CHORUS FEEDBACK             | 0-127   | 08 | 8        |
| 40 01 3C | 00 00 01 | 00-7F | CHORUS DELAY                | 0-127   | 50 | 80       |
| 40 01 3D | 00 00 01 | 00-7F | CHORUS RATE                 | 0-127   | 03 | 3        |
| 40 01 3E | 00 00 01 | 00-7F | CHORUS DEPTH                | 0-127   | 13 | 19       |
| 40 01 3F | 00 00 01 | 00-7F | CHORUS SEND LEVEL TO REVERB | 0-127   | 00 | 0        |

\* CHORUS MACRO is a macro parameter that allows global setting of chorus parameters. When you use CHORUS MACRO to select the chorus type, each chorus parameter will be set to the most suitable value.

|          |          |       |                     |             |       |      |
|----------|----------|-------|---------------------|-------------|-------|------|
| 40 03 00 | 00 00 02 | 00-7F | EFX TYPE (MSB, LSB) | 00 00-7F 7F | 00 00 | Thru |
|----------|----------|-------|---------------------|-------------|-------|------|

\* For details on each type, refer to "5. Effect List."

\* This EFX Type is current EFX type of this system. When part EFX type is same to this EFX type, that part connect to EFX.

|          |          |       |                  |
|----------|----------|-------|------------------|
| 40 03 03 | 00 00 01 | 00-7F | EFX Parameter 1  |
| 40 03 04 | 00 00 01 | 00-7F | EFX Parameter 2  |
| 40 03 05 | 00 00 01 | 00-7F | EFX Parameter 3  |
| 40 03 06 | 00 00 01 | 00-7F | EFX Parameter 4  |
| 40 03 07 | 00 00 01 | 00-7F | EFX Parameter 5  |
| 40 03 08 | 00 00 01 | 00-7F | EFX Parameter 6  |
| 40 03 09 | 00 00 01 | 00-7F | EFX Parameter 7  |
| 40 03 0A | 00 00 01 | 00-7F | EFX Parameter 8  |
| 40 03 0B | 00 00 01 | 00-7F | EFX Parameter 9  |
| 40 03 0C | 00 00 01 | 00-7F | EFX Parameter 10 |
| 40 03 0D | 00 00 01 | 00-7F | EFX Parameter 11 |
| 40 03 0E | 00 00 01 | 00-7F | EFX Parameter 12 |
| 40 03 0F | 00 00 01 | 00-7F | EFX Parameter 13 |
| 40 03 10 | 00 00 01 | 00-7F | EFX Parameter 14 |
| 40 03 11 | 00 00 01 | 00-7F | EFX Parameter 15 |
| 40 03 12 | 00 00 01 | 00-7F | EFX Parameter 16 |
| 40 03 13 | 00 00 01 | 00-7F | EFX Parameter 17 |
| 40 03 14 | 00 00 01 | 00-7F | EFX Parameter 18 |
| 40 03 15 | 00 00 01 | 00-7F | EFX Parameter 19 |
| 40 03 16 | 00 00 01 | 00-7F | EFX Parameter 20 |

\* Each parameter will be changed by EFX type. Refer to EFX Parameter Map.

40 03 17      00 00 01      00–7F      EFX Send Level to Reverb

\* Set to 0 when EFX type is changed.

40 03 18      00 00 01      00–7F      EFX Send Level to Chorus

\* Set to 0 when EFX type is changed.

40 03 1A      00 00 01      00–7F      EFX Depth      Dry 100%–EFX 100%      7F

## ● Part Parameters

This instrument has 16 parts. Parameters that can be set individually for each Part are called Part parameters.

If you use exclusive messages to set Part parameters, specify the address by Block number rather than Part Number (normally the same number as the MIDI channel). The Block number can be specified as one of 16 blocks, from 0 (H) to F (H).

The relation between Part number and Block number is as follows.

|                         |                             |
|-------------------------|-----------------------------|
| x...BLOCK NUMBER (0–F), | Part 1 (MIDI ch = 1) x = 1  |
|                         | Part 2 (MIDI ch = 2) x = 2  |
|                         | : : :                       |
|                         | Part 9 (MIDI ch = 9) x = 9  |
|                         | Part10 (MIDI ch = 10) x = 0 |
|                         | Part11 (MIDI ch = 11) x = A |
|                         | Part12 (MIDI ch = 12) x = B |
|                         | : : :                       |
|                         | Part16 (MIDI ch = 16) x = F |

\* The controller numbers are indicated as “CC#” in the following map.

| Address (H) | Size (H) | Data (H) | Parameter          | Description       | Default Value (H)       | Description |
|-------------|----------|----------|--------------------|-------------------|-------------------------|-------------|
| 40 1x 00    | 00 00 02 | 00–7F    | TONE NUMBER        | CC#00 VALUE 0–127 | 00                      | 0           |
| 40 1x 01#   |          | 00–7F    | P.C. VALUE         | 1–128             | 00                      | 1           |
| 40 1x 02    | 00 00 01 | 00–10    | Rx. CHANNEL        | 1–16, OFF         | Same as the Part Number |             |
| 40 1x 03    | 00 00 01 | 00–01    | Rx. PITCH BEND     | OFF/ON            | 01                      | ON          |
| 40 1x 04    | 00 00 01 | 00–01    | Rx. CH PRESSURE    | OFF/ON            | 01                      | ON          |
| 40 1x 05    | 00 00 01 | 00–01    | Rx. PROGRAM CHANGE | OFF/ON            | 01                      | ON          |
| 40 1x 06    | 00 00 01 | 00–01    | Rx. CONTROL CHANGE | OFF/ON            | 01                      | ON          |
| 40 1x 07    | 00 00 01 | 00–01    | Rx. POLY PRESSURE  | OFF/ON            | 01                      | ON          |
| 40 1x 08    | 00 00 01 | 00–01    | Rx. NOTE MESSAGE   | OFF/ON            | 01                      | ON          |
| 40 1x 09    | 00 00 01 | 00–01    | Rx. RPN            | OFF/ON            | 01                      | ON          |
| 40 1x 0A    | 00 00 01 | 00–01    | Rx. NRPN           | OFF/ON            | 00 (01*)                | OFF (ON*)   |

\* When “GM1 System On” and “GM2 System On” are received, Rx. NRPN will be set OFF. When “GS Reset” is received, it will be set ON.

|          |          |       |   |                                 |                            |                               |
|----------|----------|-------|---|---------------------------------|----------------------------|-------------------------------|
| 40 1x 0B | 00 00 01 | 00–01 | Rx. MODULATION                                | OFF/ON                          | 01                         | ON                            |
| 40 1x 0C | 00 00 01 | 00–01 | Rx. VOLUME                                    | OFF/ON                          | 01                         | ON                            |
| 40 1x 0D | 00 00 01 | 00–01 | Rx. PANPOT                                    | OFF/ON                          | 01                         | ON                            |
| 40 1x 0E | 00 00 01 | 00–01 | Rx. EXPRESSION                                | OFF/ON                          | 01                         | ON                            |
| 40 1x 0F | 00 00 01 | 00–01 | Rx. HOLD1                                     | OFF/ON                          | 01                         | ON                            |
| 40 1x 10 | 00 00 01 | 00–01 | Rx. PORTAMENTO                                | OFF/ON                          | 01                         | ON                            |
| 40 1x 11 | 00 00 01 | 00–01 | Rx. SOSTENUTO                                 | OFF/ON                          | 01                         | ON                            |
| 40 1x 12 | 00 00 01 | 00–01 | Rx. SOFT                                      | OFF/ON                          | 01                         | ON                            |
| 40 1x 13 | 00 00 01 | 00–01 | MONO/POLY MODE<br>(= CC# 126 01 / CC# 127 00) | Mono/Poly                       | 01                         | Poly                          |
| 40 1x 15 | 00 00 01 | 00–02 | USE FOR RHYTHM PART                           | 0 = OFF<br>1 = MAP1<br>2 = MAP2 | 00 at x ≠ 0<br>01 at x = 0 | OFF at x ≠ 0<br>MAP1 at x ≠ 0 |

\* This parameter sets the Drum Map of the Part used as the Drum Part. This instrument can simultaneously (in different Parts) use up to two Drum Maps (MAP1, MAP2). With the initial settings, Part10 (MIDI CH = 10, x = 0) is set to MAP1 (1), and other Parts are set to normal instrumental Parts (OFF (0)).

|           |          |             |                   |                     |            |               |
|-----------|----------|-------------|-------------------|---------------------|------------|---------------|
| 40 1x 16  | 00 00 01 | 28–58       | PITCH KEY SHIFT   | –24–+24 [semitones] | 40         | 0 [semitones] |
| 40 1x 17  | 00 00 02 | 00 08–0F 08 | PITCH OFFSET FINE | –12.0–+12.0 [Hz]    | 08 00 (80) | 0 [Hz]        |
| 40 1x 18# |          | (08–F8)     |                   | Use nibblized data. |            |               |

\* PITCH OFFSET FINE allows you to alter, by a specified frequency amount, the pitch at which notes will sound. This parameter differs from the conventional Fine Tuning (RPN #1) parameter in that the amount of frequency alteration (in Hertz) will be identical no matter which note is played. When a multiple number of Parts, each of which has been given a different setting for PITCH OFFSET FINE, are sounded by means of an identical note number, you can obtain a Celeste effect.

|          |          |       |                         |       |    |     |
|----------|----------|-------|-------------------------|-------|----|-----|
| 40 1x 19 | 00 00 01 | 00–7F | PART LEVEL<br>(= CC# 7) | 0–127 | 64 | 100 |
|----------|----------|-------|-------------------------|-------|----|-----|

## MIDI Implementation

|          |          |       |  |   |          |            |
|----------|----------|-------|--|---|----------|------------|
| 40 1x 1A | 00 00 01 | 00-7F | VELOCITY SENSE DEPTH                     | 0-127                                   | 40       | 64         |
| 40 1x 1B | 00 00 01 | 00-7F | VELOCITY SENSE OFFSET                    | 0-127                                   | 40       | 64         |
| 40 1x 1C | 00 00 01 | 00-7F | PART PANPOT<br>(= CC# 10, except RANDOM) | -64 (RANDOM)<br>-63 (LEFT)--+63 (RIGHT) | 40       | 0 (CENTER) |
| 40 1x 1D | 00 00 01 | 00-7F | KEY RANGE LOW                            | (C-1)-(G9)                              | 00       | C-1        |
| 40 1x 1E | 00 00 01 | 00-7F | KEY RANGE HIGH                           | (C-1)-(G9)                              | 7F       | G 9        |
| 40 1x 1F | 00 00 01 | 00-5F | CC1 CONTROLLER NUMBER                    | 0-95                                    | 10       | 16         |
| 40 1x 20 | 00 00 01 | 00-5F | CC2 CONTROLLER NUMBER                    | 0-95                                    | 11       | 17         |
| 40 1x 21 | 00 00 01 | 00-7F | CHORUS SEND LEVEL<br>(= CC# 93)          | 0-127                                   | 00       | 0          |
| 40 1x 22 | 00 00 01 | 00-7F | REVERB SEND LEVEL<br>(= CC# 91)          | 0-127                                   | 28       | 40         |
| 40 1x 23 | 00 00 01 | 00-01 | Rx. BANK SELECT                          | OFF/ON                                  | 01 (00*) | ON (OFF*)  |

\* "Rx. BANK SELECT" is set to OFF by "GM1 System On," and Bank Select message will be ignored.

\* "Rx. BANK SELECT" is set to ON by "GM2 System On."

\* "Rx. BANK SELECT" is set to ON by power-on Reset or by receiving "GS RESET."

|          |          |       |                     |        |    |     |
|----------|----------|-------|---------------------|--------|----|-----|
| 40 1x 24 | 00 00 01 | 00-01 | Rx. BANK SELECT LSB | OFF/ON | 00 | OFF |
|----------|----------|-------|---------------------|--------|----|-----|

\* This instrument can be recognized Bank Select LSB (40H-43H) even if this message is OFF.

|           |          |       |   |                |    |          |
|-----------|----------|-------|---|----------------|----|----------|
| 40 1x 25  | 00 00 01 | 00-01 | TONE REMAIN   | OFF/ON         | 01 | ON       |
| 40 1x 28  | 00 00 03 | 00-7F | Bank Select LSB Range                               | LSB (from)     | 40 | 40H      |
| 40 1x 29# |          |       |   | LSB (to)       | 43 | 43H      |
| 40 1x 30  | 00 00 01 | 0E-72 | TONE MODIFY 1<br>Vibrato rate (= NRP# 8)            | -50-+50        | 40 | 0        |
| 40 1x 31  | 00 00 01 | 0E-72 | TONE MODIFY 2<br>Vibrato depth (= NRP# 9)           | -50-+50        | 40 | 0        |
| 40 1x 32  | 00 00 01 | 0E-72 | TONE MODIFY 3<br>TVF cutoff frequency (= NRP# 32)   | -50-+50        | 40 | 0        |
| 40 1x 33  | 00 00 01 | 0E-72 | TONE MODIFY 4<br>TVF resonance (= NRP# 33)          | -50-+50        | 40 | 0        |
| 40 1x 34  | 00 00 01 | 0E-72 | TONE MODIFY 5<br>TVF & TVA Env.attack (= NRP# 99)   | -50-+50        | 40 | 0        |
| 40 1x 35  | 00 00 01 | 0E-72 | TONE MODIFY 6<br>TVF & TVA Env.decay (= NRP# 100)   | -50-+50        | 40 | 0        |
| 40 1x 36  | 00 00 01 | 0E-72 | TONE MODIFY 7<br>TVF & TVA Env.release (= NRP# 102) | -50-+50        | 40 | 0        |
| 40 1x 37  | 00 00 01 | 0E-72 | TONE MODIFY 8<br>Vibrato delay (= NRP# 10)          | -50-+50        | 40 | 0        |
| 40 1x 40  | 00 00 0C | 00-7F | SCALE TUNING C                                      | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 41# |          | 00-7F | SCALE TUNING C#                                     | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 42# |          | 00-7F | SCALE TUNING D                                      | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 43# |          | 00-7F | SCALE TUNING D#                                     | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 44# |          | 00-7F | SCALE TUNING E                                      | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 45# |          | 00-7F | SCALE TUNING F                                      | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 46# |          | 00-7F | SCALE TUNING F#                                     | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 47# |          | 00-7F | SCALE TUNING G                                      | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 48# |          | 00-7F | SCALE TUNING G#                                     | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 49# |          | 00-7F | SCALE TUNING A                                      | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 4A# |          | 00-7F | SCALE TUNING A#                                     | -64-+63 [cent] | 40 | 0 [cent] |
| 40 1x 4B# |          | 00-7F | SCALE TUNING B                                      | -64-+63 [cent] | 40 | 0 [cent] |

\* SCALE TUNING is a function that allows fine adjustment to the pitch of each note in the octave. The pitch of each identically-named note in all octaves will change simultaneously. A setting of +/- 0 cent (40H) is equal temperament. Refer to section 4. Supplementary Material, "The Scale Tune Feature."

|          |          |       |                        |                    |    |               |
|----------|----------|-------|------------------------|--------------------|----|---------------|
| 40 2x 00 | 00 00 01 | 28-58 | MOD PITCH CONTROL      | -24-+24 [semitone] | 40 | 0 [semitones] |
| 40 2x 01 | 00 00 01 | 00-7F | MOD TVF CUTOFF CONTROL | -9600-+9600 [cent] | 40 | 0 [cent]      |
| 40 2x 02 | 00 00 01 | 00-7F | MOD AMPLITUDE CONTROL  | -100.0-+100.0 [%]  | 40 | 0 [%]         |
| 40 2x 03 | 00 00 01 | 00-7F | MOD LFO1 RATE CONTROL  | -10.0-+10.0 [Hz]   | 40 | 0 [Hz]        |
| 40 2x 04 | 00 00 01 | 00-7F | MOD LFO1 PITCH DEPTH   | 0-600 [cent]       | 0A | 47 [cent]     |
| 40 2x 05 | 00 00 01 | 00-7F | MOD LFO1 TVF DEPTH     | 0-2400 [cent]      | 00 | 0 [cent]      |
| 40 2x 06 | 00 00 01 | 00-7F | MOD LFO1 TVA DEPTH     | 0-100 [%]          | 00 | 0 [%]         |
| 40 2x 07 | 00 00 01 | 00-7F | MOD LFO2 RATE CONTROL  | -10.0-+10.0 [Hz]   | 40 | 0 [Hz]        |
| 40 2x 08 | 00 00 01 | 00-7F | MOD LFO2 PITCH DEPTH   | 0-600 [cent]       | 00 | 0 [cent]      |
| 40 2x 09 | 00 00 01 | 00-7F | MOD LFO2 TVF DEPTH     | 0-2400 [cent]      | 00 | 0 [cent]      |
| 40 2x 0A | 00 00 01 | 00-7F | MOD LFO2 TVA DEPTH     | 0-100.0 [%]        | 00 | 0 [%]         |
| 40 2x 10 | 00 00 01 | 40-58 | BEND PITCH CONTROL     | 0-24 [semitone]    | 42 | 2 [semitones] |

|           |          |       |   |                   |       |               |
|-----------|----------|-------|---|-------------------|-------|---------------|
| 40 2x 11  | 00 00 01 | 00-7F | BEND TVF CUTOFF CONTROL                 | -9600+9600 [cent] | 40    | 0 [cent]      |
| 40 2x 12  | 00 00 01 | 00-7F | BEND AMPLITUDE CONTROL                  | -100.0+100.0 [%]  | 40    | 0 [%]         |
| 40 2x 13  | 00 00 01 | 00-7F | BEND LFO1 RATE CONTROL                  | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 14  | 00 00 01 | 00-7F | BEND LFO1 PITCH DEPTH                   | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 15  | 00 00 01 | 00-7F | BEND LFO1 TVF DEPTH                     | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 16  | 00 00 01 | 00-7F | BEND LFO1 TVA DEPTH                     | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 17  | 00 00 01 | 00-7F | BEND LFO2 RATE CONTROL                  | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 18  | 00 00 01 | 00-7F | BEND LFO2 PITCH DEPTH                   | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 19  | 00 00 01 | 00-7F | BEND LFO2 TVF DEPTH                     | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 1A  | 00 00 01 | 00-7F | BEND LFO2 TVA DEPTH                     | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 20  | 00 00 01 | 28-58 | Rx. CH PRESSURE PITCH CONTROL           | -24+24 [semitone] | 40    | 0 [semitones] |
| 40 2x 21  | 00 00 01 | 00-7F | Rx. CH PRESSURE<br>TVF CUTOFF CONTROL   | -9600+9600 [cent] | 40    | 0 [cent]      |
| 40 2x 22  | 00 00 01 | 00-7F | Rx. CH PRESSURE<br>AMPLITUDE CONTROL    | -100.0+100.0 [%]  | 40    | 0 [%]         |
| 40 2x 23  | 00 00 01 | 00-7F | Rx. CH PRESSURE<br>LFO1 RATE CONTROL    | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 24  | 00 00 01 | 00-7F | Rx. CH PRESSURE LFO1 PITCH DEPTH        | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 25  | 00 00 01 | 00-7F | Rx. CH PRESSURE LFO1 TVF DEPTH          | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 26  | 00 00 01 | 00-7F | Rx. CH PRESSURE LFO1 TVA DEPTH          | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 27  | 00 00 01 | 00-7F | Rx. CH PRESSURE<br>LFO2 RATE CONTROL    | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 28  | 00 00 01 | 00-7F | Rx. CH PRESSURE LFO2 PITCH DEPTH        | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 29  | 00 00 01 | 00-7F | Rx. CH PRESSURE LFO2 TVF DEPTH          | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 2A  | 00 00 01 | 00-7F | Rx. CH PRESSURE LFO2 TVA DEPTH          | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 30  | 00 00 01 | 28-58 | Rx. POLY PRESSURE PITCH CONTROL         | -24+24 [semitone] | 40    | 0 [semitones] |
| 40 2x 31  | 00 00 01 | 00-7F | Rx. POLY PRESSURE<br>TVF CUTOFF CONTROL | -9600+9600 [cent] | 40    | 0 [cent]      |
| 40 2x 32  | 00 00 01 | 00-7F | Rx. POLY PRESSURE<br>AMPLITUDE CONTROL  | -100.0+100.0 [%]  | 40    | 0 [%]         |
| 40 2x 33  | 00 00 01 | 00-7F | Rx. POLY PRESSURE<br>LFO1 RATE CONTROL  | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 34  | 00 00 01 | 00-7F | Rx. POLY PRESSURE<br>LFO1 PITCH DEPTH   | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 35  | 00 00 01 | 00-7F | Rx. POLY PRESSURE LFO1 TVF DEPTH        | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 36  | 00 00 01 | 00-7F | Rx. POLY PRESSURE LFO1 TVA DEPTH        | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 37  | 00 00 01 | 00-7F | Rx. POLY PRESSURE<br>LFO2 RATE CONTROL  | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 38  | 00 00 01 | 00-7F | Rx. POLY PRESSURE<br>LFO2 PITCH DEPTH   | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 39  | 00 00 01 | 00-7F | Rx. POLY PRESSURE LFO2 TVF DEPTH        | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 3A  | 00 00 01 | 00-7F | Rx. POLY PRESSURE LFO2 TVA DEPTH        | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 40  | 00 00 01 | 28-58 | CC1 PITCH CONTROL                       | -24+24 [semitone] | 40    | 0 [semitones] |
| 40 2x 41  | 00 00 01 | 00-7F | CC1 TVF CUTOFF CONTROL                  | -9600+9600 [cent] | 40    | 0 [cent]      |
| 40 2x 42  | 00 00 01 | 00-7F | CC1 AMPLITUDE CONTROL                   | -100.0+100.0 [%]  | 40    | 0 [%]         |
| 40 2x 43  | 00 00 01 | 00-7F | CC1 LFO1 RATE CONTROL                   | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 44  | 00 00 01 | 00-7F | CC1 LFO1 PITCH DEPTH                    | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 45  | 00 00 01 | 00-7F | CC1 LFO1 TVF DEPTH                      | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 46  | 00 00 01 | 00-7F | CC1 LFO1 TVA DEPTH                      | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 47  | 00 00 01 | 00-7F | CC1 LFO2 RATE CONTROL                   | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 48  | 00 00 01 | 00-7F | CC1 LFO2 PITCH DEPTH                    | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 49  | 00 00 01 | 00-7F | CC1 LFO2 TVF DEPTH                      | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 4A  | 00 00 01 | 00-7F | CC1 LFO2 TVA DEPTH                      | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 50  | 00 00 01 | 28-58 | CC2 PITCH CONTROL                       | -24+24 [semitone] | 40    | 0 [semitones] |
| 40 2x 51  | 00 00 01 | 00-7F | CC2 TVF CUTOFF CONTROL                  | -9600+9600 [cent] | 40    | 0 [cent]      |
| 40 2x 52  | 00 00 01 | 00-7F | CC2 AMPLITUDE CONTROL                   | -100.0+100.0 [%]  | 40    | 0 [%]         |
| 40 2x 53  | 00 00 01 | 00-7F | CC2 LFO1 RATE CONTROL                   | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 54  | 00 00 01 | 00-7F | CC2 LFO1 PITCH DEPTH                    | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 55  | 00 00 01 | 00-7F | CC2 LFO1 TVF DEPTH                      | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 56  | 00 00 01 | 00-7F | CC2 LFO1 TVA DEPTH                      | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 2x 57  | 00 00 01 | 00-7F | CC2 LFO2 RATE CONTROL                   | -10.0+10.0 [Hz]   | 40    | 0 [Hz]        |
| 40 2x 58  | 00 00 01 | 00-7F | CC2 LFO2 PITCH DEPTH                    | 0-600 [cent]      | 00    | 0 [cent]      |
| 40 2x 59  | 00 00 01 | 00-7F | CC2 LFO2 TVF DEPTH                      | 0-2400 [cent]     | 00    | 0 [cent]      |
| 40 2x 5A  | 00 00 01 | 00-7F | CC2 LFO2 TVA DEPTH                      | 0-100.0 [%]       | 00    | 0 [%]         |
| 40 4x 23  | 00 00 06 | 00-7F | PART EFX TYPE (MSB, LSB)                | 00 00-7F 7F       | 00 00 | 0             |
| 40 4x 24# |          |       |   |                   |       |               |

\* This EFX type is same to EFX type of System Parameter. When this EFX type is same to EFX type of System parameter, the part connect to EFX.

## MIDI Implementation

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|           |       |                   |       |    |   |
|-----------|-------|-------------------|-------|----|---|
| 40 4x 25# | 00-7F | PART EFX MACRO    | 00-7F | 00 | 0 |
| 40 4x 26# | 00-7F | PART EFX DEPTH    | 00-7F | 00 | 0 |
| 40 4x 27# | 00-7F | PART EFX CONTROL1 | 00-7F | 00 | 0 |
| 40 4x 28# | 00-7F | PART EFX CONTROL2 | 00-7F | 00 | 0 |

### ● Drum Setup Parameters

\* m: Map number (0 = MAP1, 1 = MAP2)

\* rr: drum part note number (00H-7FH)

| <u>Address (H)</u> | <u>Size (H)</u> | <u>Data (H)</u> | <u>Parameter</u>    | <u>Description</u>  |
|--------------------|-----------------|-----------------|---------------------|---|
| 41 m1 rr           | 00 00 01        | 00-7F           | PLAY NOTE NUMBER    | Pitch coarse  |
| 41 m2 rr           | 00 00 01        | 00-7F           | LEVEL               | TVA level (= NRPN# 26)  |
| 41 m3 rr           | 00 00 01        | 00-7F           | ASSIGN GROUP NUMBER | Non, 1-127  |
| 41 m4 rr           | 00 00 01        | 00-7F           | PANPOT              | -64 (RANDOM), -63 (LEFT) - +63 (RIGHT)<br>(= NRPN# 28, except RANDOM) |
| 41 m5 rr           | 00 00 01        | 00-7F           | REVERB SEND LEVEL   | 0.0-1.0<br>(= NRPN# 29) Multiplicand of the part reverb depth         |
| 41 m6 rr           | 00 00 01        | 00-7F           | CHORUS SEND LEVEL   | 0.0-1.0<br>(= NRPN# 30) Multiplicand of the part chorus depth         |
| 41 m7 rr           | 00 00 01        | 00-01           | Rx. NOTE OFF        | OFF/ON  |
| 41 m8 rr           | 00 00 01        | 00-01           | Rx. NOTE ON         | OFF/ON  |

\* When the Drum Set is changed, DRUM SETUP PARAMETER values will all be initialized.



## 4. Supplementary Material

### ● Decimal and Hexadecimal Table

In MIDI documentation, data values and addresses/sizes of exclusive messages etc. are expressed as hexadecimal values for each 7 bits.

The following table shows how these correspond to decimal numbers.

| D  | H   | D  | H   | D  | H   | D   | H   |
|----|-----|----|-----|----|-----|-----|-----|
| 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 |

D: decimal

H: hexadecimal

\* Decimal values such as MIDI channel, bank select, and program change are listed as one (1) greater than the values given in the above table.

\* A 7-bits byte can express data in the range of 128 steps. For data where greater precision is required, we must use two or more bytes. For example, two hexadecimal numbers aa bbH expressing two 7-bits bytes would indicate a value of aa x 128 + bb.

\* In the case of values which have a ± sign, 00H = -64, 40H = ±0, and 7FH = +63, so that the decimal expression would be 64 less than the value given in the above chart. In the case of two types, 00 00H = -8192, 40 00H = ±0, and 7F 7FH = +8191. For example if aa bbH were expressed as decimal, this would be aa bbH - 40 00H = aa x 128 + bb - 64 x 128.

\* Data marked "nibbled" is expressed in hexadecimal in 4-bits units. A value expressed as a 2-byte nibble 0a 0bH has the value of a x 16 + b.

<Example 1>

What is the decimal expression of 5AH?

>From the preceding table, 5AH = 90

<Example 2>

What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?

>From the preceding table, since 12H = 18 and 34H = 52

18 x 128 + 52 = 2356

<Example 3>

What is the decimal expression of the nibbled value 0A 03 09 0D?

>From the preceding table, since 0AH = 10, 03H = 3, 09H = 9, 0DH = 13

((10 x 16 + 3) x 16 + 9) x 16 + 13 = 41885

<Example 4>

What is the nibbled expression of the decimal value 1258?

```

16) 1258
   78... 10
   --
    4... 14
     0... 4

```

Since from the preceding table, 0 = 00H, 4 = 04H, 14 = 0EH, 10 = 0AH, the answer is 00 04 0E 0AH.

### ● Examples of Actual MIDI Messages

<Example 1> 92 3E 5F

9n is the Note-on status, and n is the MIDI channel number. Since 2H = 2, 3EH = 62, and 5FH = 95, this is a Note-on message with MIDI CH = 3, note number 62 (note name is D4), and velocity 95.

<Example 2> CE 49

CnH is the Program Change status, and n is the MIDI channel number. Since EH = 14 and 49H = 73, this is a Program Change message with MIDI CH = 15, program number 74 (Flute in GS).

<Example 3> EA 00 28

EnH is the Pitch Bend Change status, and n is the MIDI channel number. The 2nd byte (00H = 0) is the LSB and the 3rd byte (28H = 40) is the MSB, but Pitch Bend Value is a signed number in which 40 00H (= 64 x 128 + 0 = 8192) is 0, so this Pitch Bend Value is 28 00H - 40 00H = 40 x 128 + 0 - (64 x 128 + 0) = 5120 - 8192 = -3072

If the Pitch Bend Sensitivity is set to 2 semitones, -8192 (00 00H) will cause the pitch to change 200 cents, so in this case -200 x (-3072) / (-8192) = -75 cents of Pitch Bend is being applied to MIDI channel 11.

<Example 4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F

BnH is the Control Change status, and n is the MIDI channel number. For Control Changes, the 2nd byte is the controller number, and the 3rd byte is the value. In a case in which two or more messages consecutive messages have the same status, MIDI has a provision called "running status" which allows the status byte of the second and following messages to be omitted. Thus, the above messages have the following meaning.

```

B3  64 00  MIDI ch.4, lower byte of RPN parameter number: 00H
(B3) 65 00  (MIDI ch.4) upper byte of RPN parameter number: 00H
(B3) 06 0C  (MIDI ch.4) upper byte of parameter value: 0CH
(B3) 26 00  (MIDI ch.4) lower byte of parameter value: 00H
(B3) 64 7F  (MIDI ch.4) lower byte of RPN parameter number: 7FH
(B3) 65 7F  (MIDI ch.4) upper byte of RPN parameter number: 7FH

```

In other words, the above messages specify a value of 0C 00H for RPN parameter number 00 00H on MIDI channel 4, and then set the RPN parameter number to 7F 7FH.

RPN parameter number 00 00H is Pitch Bend Sensitivity, and the MSB of the value indicates semitone units, so a value of 0CH = 12 sets the maximum pitch bend range to +/- 12 semitones (1 octave). (On GS sound sources the LSB of Pitch Bend Sensitivity is ignored, but the LSB should be transmitted anyway (with a value of 0) so that operation will be correct on any device.)

Once the parameter number has been specified for RPN or NRPN, all Data Entry messages transmitted on that same channel will be valid, so after the desired value has been transmitted, it is a good idea to set the parameter number to 7F 7FH to prevent accidents. This is the reason for the (B3) 64 7F (B3) 65 7F at the end.

It is not desirable for performance data (such as Standard MIDI File data) to contain many events with running status as given in <Example 4>. This is because if playback is halted during the song and then rewound or fast-forwarded, the sequencer may not be able to transmit the correct status, and the sound source will then misinterpret the data. Take care to give each event its own status.

It is also necessary that the RPN or NRPN parameter number setting and the value setting be done in the proper order. On some sequencers, events occurring in the same (or consecutive) clock may be transmitted in an order different than the order in which they were received. For this reason it is a good idea to slightly skew the time of each event (about 1 tick for TPQN = 96, and about 5 ticks for TPQN = 480).

\* TPQN: Ticks Per Quarter Note

## ● Example of an Exclusive Message and Calculating a Checksum

Roland Exclusive messages are transmitted with a checksum at the end (before F7) to make sure that the message was correctly received. The value of the checksum is determined by the address and data (or size) of the transmitted exclusive message.

### ○ How to Calculate the Checksum (Hexadecimal Numbers are Indicated by 'H')

The checksum is a value derived by adding the address, size and checksum itself and inverting the lower 7 bits.

Here's an example of how the checksum is calculated. We will assume that in the exclusive message we are transmitting, the address is aa bb ccH and the data or size is dd ee ffH.

$$aa + bb + cc + dd + ee + ff = \text{sum}$$

$$\text{sum} / 128 = \text{quotient} \dots \text{remainder}$$

$$128 - \text{remainder} = \text{checksum}$$

(However, the checksum will be 0 if the remainder is 0.)

<Example> Setting REVERB MACRO to ROOM 3

According to the "Parameter Address Map," the REVERB MACRO Address is 40 01 30H, and ROOM

3 is a value of 02H. Thus,

|     |     |     |     |     |          |      |          |     |
|-----|-----|-----|-----|-----|----------|------|----------|-----|
| F0  | 41  | 10  | 42  | 12  | 40 01 30 | 02   | ??       | F7  |
| (1) | (2) | (3) | (4) | (5) | Address  | data | Checksum | (6) |

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),

(4) Model ID (GS), (5) Command ID (DT1), (6) End of Exclusive

Next we calculate the checksum.

$$40H + 01H + 30H + 02H = 64 + 1 + 48 + 2 = 115 \text{ (sum)}$$

$$115 \text{ (sum)} / 128 = 0 \text{ (quotient)} \dots 115 \text{ (remainder)}$$

$$\text{checksum} = 128 - 115 \text{ (remainder)} = 13 = 0DH$$

This means that F0 41 10 42 12 40 01 30 02 0D F7 is the message we transmit.

## ● About Tuning

In MIDI, individual Parts are tuned by sending RPN #1 (Master Fine Tuning) to the appropriate MIDI channel.

In MIDI, an entire device is tuned by either sending RPN #1 to all MIDI channels being used, or by sending a System Exclusive MASTER TUNE (address 40 00 00H). RPN #1 allows tuning to be specified in steps of approximately 0.012 cents (to be precise, 100/8192 cent), and System Exclusive MASTER TUNE allows tuning in steps of 0.1 cent. One cent is 1/100th of a semitone.

The values of RPN #1 (Master Fine Tuning) and System Exclusive MASTER TUNE are added together to determine the actual pitch sounded by each Part.

Frequently used tuning values are given in the following table for your reference. Values are in hexadecimal (decimal in parentheses).

| Hz in A4 | cent   | RPN #1        | Sys.Ex. 40 00 00   |
|----------|--------|---------------|--------------------|
| 445.0    | +19.56 | 4C 43 (+1603) | 00 04 0C 04 (+196) |
| 444.0    | +15.67 | 4A 03 (+1283) | 00 04 09 0D (+157) |
| 443.0    | +11.76 | 47 44 (+ 964) | 00 04 07 06 (+118) |
| 442.0    | +7.85  | 45 03 (+ 643) | 00 04 04 0F (+ 79) |
| 441.0    | +3.93  | 42 42 (+ 322) | 00 04 02 07 (+ 39) |
| 440.0    | 0.00   | 40 00 ( 0)    | 00 04 00 00 ( 0)   |
| 439.0    | -3.94  | 3D 3D (- 323) | 00 03 0D 09 (- 39) |
| 438.0    | -7.89  | 3A 7A (- 646) | 00 03 0B 01 (- 79) |

<Example> Set the tuning of MIDI channel 3 to A4 = 442.0 Hz

Send RPN#1 to MIDI channel 3. From the above table, the value is 45 03H.

|      |       |   |
|------|-------|---|
| B2   | 64 00 | MIDI ch.3, lower byte of RPN parameter number: 00H  |
| (B2) | 65 01 | (MIDI ch.3) upper byte of RPN parameter number: 01H |
| (B2) | 06 45 | (MIDI ch.3) upper byte of parameter value: 45H      |
| (B2) | 26 03 | (MIDI ch.3) lower byte of parameter value: 03H      |
| (B2) | 64 7F | (MIDI ch.3) lower byte of RPN parameter number: 7FH |
| (B2) | 65 7F | (MIDI ch.3) upper byte of RPN parameter number: 7FH |

## ● The Scale Tune Feature (Address: 40 1x 40)

The scale Tune feature allows you to finely adjust the individual pitch of the notes from C through B. Though the settings are made while working with one octave, the fine adjustments will affect all octaves. By making the appropriate Scale Tune settings, you can obtain a complete variety of tuning methods other than equal temperament. As examples, three possible types of scale setting are explained below.

### ○ Equal Temperament

This method of tuning divides the octave into 12 equal parts. It is currently the most widely used form of tuning, especially in occidental music. On this instrument, the default settings for the Scale Tune feature produce equal temperament.

### ○ Just Temperament (Keytone C)

The three main chords resound much more beautifully than with equal temperament, but this benefit can only be obtained in one key. If transposed, the chords tend to become ambiguous.

The example given involves settings for a key in which C is the keytone.

### ○ Arabian Scale

By altering the setting for Scale Tune, you can obtain a variety of other tunings suited for ethnic music. For example, the settings introduced below will set the unit to use the Arabian Scale.

#### Example Settings

| Note name | Equal Temperament | Just Temperament<br>(Keytone C) | Arabian Scale |
|-----------|-------------------|---------------------------------|---------------|
| C         | 0                 | 0                               | -6            |
| C#        | 0                 | -8                              | +45           |
| D         | 0                 | +4                              | -2            |
| D#        | 0                 | +16                             | -12           |
| E         | 0                 | -14                             | -51           |
| F         | 0                 | -2                              | -8            |
| F#        | 0                 | -10                             | +43           |
| G         | 0                 | +2                              | -4            |
| G#        | 0                 | +14                             | +47           |
| A         | 0                 | -16                             | 0             |
| A#        | 0                 | +14                             | -10           |
| B         | 0                 | -12                             | -49           |

The values in the table are given in cents. Refer to the explanation of Scale Tuning to convert these values to hexadecimal, and transmit them as exclusive data.

For example, to set the tune (C-B) of the Part1 Arabian Scale, send the data as follows:

```
F0 41 10 42 12 40 11 40 3A 6D 3E 34 0D 38 6B 3C 6F 40 36 0F 76 F7
```

## 5. Effect List

- 0100: Equalizer
- 0101: Spectrum
- 0102: Enhancer
- 0104: Isolator
- 0105: Low Boost
- 0106: High Pass Filter
- 0110: Overdrive
- 0111: Distortion
- 0112: Overdrive2
- 0113: Distortion2
- 0107: Speaker Simulator
- 0114: Guitar Amp Simulator
- 0120: Phaser
- 0129: Multi Stage Phaser
- 012a: Infinite Phaser
- 0123: Stereo Flanger
- 0127: 3D Flanger
- 0128: 2Band Flanger
- 0121: Auto Wah
- 0103: Humanizer
- 012b: Ring Modulator
- 0125: Tremolo
- 0126: Auto Pan
- 012c: Slicer
- 0130: Compressor
- 0131: Limiter
- 0142: Stereo Chorus
- 0140: Hexa Chorus
- 0141: Tremolo Chorus
- 0143: Space D
- 0144: 3D Chorus
- 0145: 2Band Chorus
- 0122: Rotary
- 012d: Rotary2
- 0300: Rotary Multi
- 015b: Stereo Delay1
- 015c: Stereo Delay2
- 015d: Stereo Delay3
- 015e: Stereo Delay4
- 015f: Stereo Delay5
- 0150: Monaural Delay
- 0151: Modulation Delay
- 0152: Triple Tap Delay
- 0157: 3D Delay
- 0159: Tape Echo
- 015a: Reverse Delay
- 0172: Lo-Fi
- 0175: Telephone
- 0156: Gate Reverb
- 0200: Overdrive → Chorus
- 0201: Overdrive → Flanger
- 0202: Overdrive → Delay
- 0203: Distortion → Chorus
- 0204: Distortion → Flanger
- 0205: Distortion → Delay
- 0206: Enhancer → Chorus
- 0207: Enhancer → Flanger
- 0208: Enhancer → Delay
- 0209: Chorus → Delay
- 020a: Flanger → Delay
- 020b: Chorus → Flanger

## EFX Parameter Map

The parameters with "#1" or "#2" at the end of parameter name can be controlled with each exclusive message "PART EFX CONTROL 1" and "PART EFX CONTROL 2."

### 0100: Equalizer

This is a four-band stereo equalizer (low, mid x 2, high).

| No | Parameter    | Value |                         | Description   |
|----|--------------|-------|-------------------------|---|
| 1  | Low Freq     | 0–1   | 200, 400 Hz             | Frequency of the low range  |
| 2  | Low Gain #1  | 0–30  | -15–+15 dB              | Gain of the low range   |
| 3  | Mid1 Freq    | 0–16  | 200–8000 Hz             | Frequency of the middle range 1   |
| 4  | Mid1 Gain    | 0–30  | -15–+15 dB              | Gain of the middle range 1  |
| 5  | Mid1 Q       | 0–4   | 0.5, 1.0, 2.0, 4.0, 8.0 | Width of the middle range 1<br>Set a higher value for Q to narrow the range to be affected. |
| 6  | Mid2 Freq    | 0–16  | 200–8000 Hz             | Frequency of the middle range 2   |
| 7  | Mid2 Gain    | 0–30  | -15–+15 dB              | Gain of the middle range 2  |
| 8  | Mid2 Q       | 0–4   | 0.5, 1.0, 2.0, 4.0, 8.0 | Width of the middle range 2<br>Set a higher value for Q to narrow the range to be affected. |
| 9  | High Freq    | 0–2   | 2000, 4000, 8000 Hz     | Frequency of the high range   |
| 10 | High Gain #2 | 0–30  | -15–+15 dB              | Gain of the high range  |
| 11 | Level        | 0–127 | 0–127                   | Output Level  |

### 0101: Spectrum

This is a stereo spectrum. Spectrum is a type of filter which modifies the timbre by boosting or cutting the level at specific frequencies.

| No | Parameter         | Value |                         | Description  |
|----|-------------------|-------|-------------------------|--|
| 1  | Band1 (250Hz)     | 0–30  | -15–+15 dB              | Gain of each frequency band  |
| 2  | Band2 (500Hz) #1  | 0–30  |                         |  |
| 3  | Band3 (1000Hz)    | 0–30  |                         |  |
| 4  | Band4 (1250Hz) #2 | 0–30  |                         |  |
| 5  | Band5 (2000Hz)    | 0–30  |                         |  |
| 6  | Band6 (3150Hz)    | 0–30  |                         |  |
| 7  | Band7 (4000Hz)    | 0–30  |                         |  |
| 8  | Band8 (8000Hz)    | 0–30  |                         |  |
| 9  | Q                 | 0–4   | 0.5, 1.0, 2.0, 4.0, 8.0 | Simultaneously adjusts the width of the adjusted ranges for all the frequency bands. |
| 10 | Level             | 0–127 | 0–127                   | Output Level   |

### 0102: Enhancer

Controls the overtone structure of the high frequencies, adding sparkle and tightness to the sound.

| No | Parameter | Value |            | Description                                      |
|----|-----------|-------|------------|--|
| 1  | Sens #1   | 0–127 | 0–127      | Sensitivity of the enhancer                      |
| 2  | Mix #2    | 0–127 | 0–127      | Level of the overtones generated by the enhancer |
| 3  | Low Gain  | 0–30  | -15–+15 dB | Gain of the low range                            |
| 4  | High Gain | 0–30  | -15–+15 dB | Gain of the high range                           |
| 5  | Level     | 0–127 | 0–127      | Output Level                                     |

## ● 0104: Isolator

This is an equalizer which cuts the volume greatly, allowing you to add a special effect to the sound by cutting the volume in varying ranges.

| No | Parameter            | Value |           | Description  |
|----|----------------------|-------|-----------|--|
| 1  | Boost/Cut Low        | 0-64  | -60-+4 dB | These boost and cut each of the High, Middle, and Low frequency ranges. At -60 dB, the sound becomes inaudible. 0 dB is equivalent to the input level of the sound.                              |
| 2  | Boost/Cut Mid #1     |       |           |  |
| 3  | Boost/Cut High #2    |       |           |  |
| 4  | Anti Phase Low Sw    | 0-1   | Off, On   | Turns the Anti-Phase function on and off for the Low frequency ranges. When turned on, the counter-channel of stereo sound is inverted and added to the signal.                                  |
| 5  | Anti Phase Low Level | 0-127 | 0-127     | Adjusts the level settings for the Low frequency ranges. Adjusting this level for certain frequencies allows you to lend emphasis to specific parts. (This is effective only for stereo source.) |
| 6  | Anti Phase Mid Sw    | 0-1   | Off, On   | Settings of the Anti-Phase function for the Middle frequency ranges<br>The parameters are the same as for the Low frequency ranges.  |
| 7  | Anti Phase Mid Level | 0-127 | 0-127     |  |
| 8  | Low Boost Sw         | 0-1   | Off, On   | Turns Low Booster on/off. This emphasizes the bottom to create a heavy bass sound.   |
| 9  | Low Boost Level      | 0-127 | 0-127     | Increasing this value gives you a heavier low end. Depending on the Isolator and filter settings this effect may be hard to distinguish.   |
| 10 | Level                | 0-127 | 0-127     | Output Level   |

## ● 0105: Low Boost

Boosts the volume of the lower range, creating powerful lows.

| No | Parameter          | Value |                   | Description   |
|----|--------------------|-------|-------------------|---|
| 1  | Boost Frequency #1 | 0-8   | 50-125 Hz         | Center frequency at which the lower range will be boosted |
| 2  | Boost Gain #2      | 0-12  | 0-+12 dB          | Amount by which the lower range will be boosted           |
| 3  | Boost Width        | 0-2   | Wide, Mid, Narrow | Width of the lower range that will be boosted             |
| 4  | Low Gain           | 0-30  | -15-+15 dB        | Gain of the low frequency range                           |
| 5  | High Gain          | 0-30  | -15-+15 dB        | Gain of the high frequency range                          |
| 6  | Level              | 0-127 | 0-127             | Output level  |

## ● 0106: High Pass Filter

This is a filter with an extremely sharp slope. The cutoff frequency can be varied cyclically.

| No | Parameter   | Value |                      | Description   |
|----|-------------|-------|----------------------|---|
| 1  | Filter Type | 0-3   | Lpf, Bpf, Hpf, Notch | Filter type<br>Frequency range that will pass through each filter<br>Lpf: Frequencies below the cutoff<br>Bpf: Frequencies in the region of the cutoff<br>Hpf: Frequencies above the cutoff<br>Notch: Frequencies other than the region of the cutoff |

| No | Parameter           | Value |                           | Description  |
|----|---------------------|-------|---------------------------|--|
| 2  | Filter Slope        | 0-2   | -12, -24, -36 dB          | Amount of attenuation per octave<br>-36 dB: Extremely steep<br>-24 dB: Steep<br>-12 dB: Gentle   |
| 3  | Filter Cutoff #1    | 0-127 | 0-127                     | Cutoff frequency of the filter<br>Increasing this value will raise the cutoff frequency.   |
| 4  | Filter Resonance #2 | 0-100 | 0-100                     | Filter resonance level<br>Increasing this value will emphasize the region near the cutoff frequency.   |
| 5  | Filter Gain         | 0-12  | 0-+12 dB                  | Amount of boost for the filter output  |
| 6  | Modulation Sw       | 0-1   | Off, On                   | On/off switch for cyclic change  |
| 7  | Modulation Wave     | 0-4   | Tri, Sqr, Sin, Saw1, Saw2 | How the cutoff frequency will be modulated<br>Tri: Triangle wave<br>Sqr: Square wave<br>Sin: Sine wave<br>Saw1: Sawtooth wave (upward)<br>Saw2: Sawtooth wave (downward) |
| 8  | Rate Mode           | 0-1   | Hz, note                  | When this is set to "note," the effect is synchronized with the tempo.   |
| 9  | Rate                | 1-127 | 0.05-10.00 Hz             | Rate of modulation (Hz)  |
| 10 | Rate                | 0-21  | note                      | Rate of modulation (note)  |
| 11 | Depth               | 0-127 | 0-127                     | Depth of modulation  |
| 12 | Attack              | 0-127 | 0-127                     | Speed at which the cutoff frequency will change<br>This is effective if Modulation Wave is SQR, SAW1, or SAW2.   |
| 13 | Level               | 0-127 | 0-127                     | Output level   |

## ● 0110: Overdrive

Creates a soft distortion similar to that produced by vacuum tube amplifiers.

| No | Parameter   | Value |                                   | Description  |
|----|-------------|-------|-----------------------------------|--|
| 1  | Drive       | 0-127 | 0-127                             | Degree of distortion<br>Also changes the volume.   |
| 2  | Amp Type #1 | 0-3   | Small, Built-In, 2-Stack, 3-Stack | Type of guitar amp<br>Small: small amp<br>Built-In: single-unit type amp<br>2-Stack: large double stack amp<br>3-Stack: large triple stack amp |
| 3  | Low Gain    | 0-30  | -15-+15 dB                        | Gain of the low range  |
| 4  | High Gain   | 0-30  | -15-+15 dB                        | Gain of the high range   |
| 5  | Pan         | 0-127 | L64-63R                           | Stereo location of the output sound  |
| 6  | Level #2    | 0-127 | 0-127                             | Output Level   |

## ● 0111: Distortion

Produces a more intense distortion than Overdrive. The parameters are the same as for "Overdrive."

## MIDI Implementation

### ● 0112: Overdrive2

This is an overdrive that provides heavy distortion.

| No | Parameter   | Value |                                   | Description  |
|----|-------------|-------|-----------------------------------|--|
| 1  | Drive       | 0–127 | 0–127                             | Degree of distortion<br>Also changes the volume.   |
| 2  | Tone        | 0–127 | 0–127                             | Sound quality of the Overdrive effect  |
| 3  | Amp Sw      | 0–1   | Off, On                           | Turns the Amp Simulator on/off.  |
| 4  | Amp Type #1 | 0–3   | Small, Built-In, 2-Stack, 3-Stack | Type of guitar amp<br>Small: small amp<br>Built-In: single-unit type amp<br>2-Stack: large double stack amp<br>3-Stack: large triple stack amp |
| 5  | Low Gain    | 0–30  | -15–+15 dB                        | Gain of the low range  |
| 6  | High Gain   | 0–30  | -15–+15 dB                        | Gain of the high range   |
| 7  | Pan         | 0–127 | L64–63R                           | Stereo location of the output sound  |
| 8  | Level #2    | 0–127 | 0–127                             | Output Level   |

### ● 0113: Distortion2

This is a distortion effect that provides heavy distortion. The parameters are the same as for "Overdrive2."

### ● 0107: Speaker Simulator

Simulates the speaker type and mic settings used to record the speaker sound.

| No | Parameter       | Value |                  | Description  |
|----|-----------------|-------|------------------|--|
| 1  | Speaker Type #1 | 0–15  | (See the table.) | Type of speaker  |
| 2  | Mic Setting     | 0–2   | 1, 2, 3          | Adjusts the location of the mic that is recording the sound of the speaker. This can be adjusted in three steps, with the mic becoming more distant in the order of 1, 2, and 3. |
| 3  | Mic Level       | 0–127 | 0–127            | Volume of the microphone   |
| 4  | Direct Level    | 0–127 | 0–127            | Volume of the direct sound   |
| 5  | Level #2        | 0–127 | 0–127            | Output Level   |

#### ○ Specifications of each Speaker Type

The speaker column indicates the diameter of each speaker unit (in inches) and the number of units.

| Type        | Cabinet                   | Speaker | Microphone |
|-------------|---------------------------|---------|------------|
| Small 1     | Small open-back enclosure | 10      | Dynamic    |
| Small 2     | Small open-back enclosure | 10      | Dynamic    |
| Middle      | Open back enclosure       | 12 x 1  | Dynamic    |
| JC-120      | Open back enclosure       | 12 x 2  | Dynamic    |
| Built-In 1  | Open back enclosure       | 12 x 2  | Dynamic    |
| Built-In 2  | Open back enclosure       | 12 x 2  | Condenser  |
| Built-In 3  | Open back enclosure       | 12 x 2  | Condenser  |
| Built-In 4  | Open back enclosure       | 12 x 2  | Condenser  |
| Built-In 5  | Open back enclosure       | 12 x 2  | Condenser  |
| BG Stack 1  | Sealed enclosure          | 12 x 2  | Condenser  |
| BG Stack 2  | Large sealed enclosure    | 12 x 2  | Condenser  |
| MS Stack 1  | Large sealed enclosure    | 12 x 4  | Condenser  |
| MS Stack 2  | Large sealed enclosure    | 12 x 4  | Condenser  |
| Metal Stack | Large double stack        | 12 x 4  | Condenser  |
| 2-Stack     | Large double stack        | 12 x 4  | Condenser  |
| 3-Stack     | Large triple stack        | 12 x 4  | Condenser  |

### ● 0114: Guitar Amp Simulator

This is an effect that simulates the sound of a guitar amplifier.

| No | Parameter        | Value |   | Description   |
|----|------------------|-------|---|---|
| 1  | Pre Amp Sw       | 0–1   | Off, On   | Turns the amp switch on/off.  |
| 2  | Pre Amp Type #1  | 0–13  | JC-120, Clean Twin, MATCH Drive, BG Lead, MS1959I, MS1959II, MS1959II+, SLDN Lead, Metal 5150, Metal Lead, OD-1, OD-2 Turbo, Distortion, Fuzz | Type of guitar amp  |
| 3  | Pre Amp Volume   | 0–127 | 0–127   | Volume and amount of distortion of the amp  |
| 4  | Pre Amp Master   | 0–127 | 0–127   | Volume of the entire pre-amp  |
| 5  | Pre Amp Gain     | 0–2   | Low, Middle, High   | Amount of pre-amp distortion  |
| 6  | Pre Amp Bass     | 0–127 | 0–127   | Tone of the bass/mid/treble frequency range<br>Middle cannot be set if "MATCH Drive" is selected as the Pre Amp Type.   |
| 7  | Pre Amp Middle   | 0–127 |   |   |
| 8  | Pre Amp Treble   | 0–127 |   |   |
| 9  | Pre Amp Presence | 0–127 | 0–127 (MATCH Drive: -127–0)   | Tone for the ultra-high frequency range   |
| 10 | Pre Amp Bright   | 0–1   | Off, On   | Turning this "On" produces a sharper and brighter sound. This parameter applies to the "JC-120," "Clean Twin," and "BG Lead" Pre Amp Types.   |
| 11 | Speaker Sw       | 0–1   | Off, On   | Determines whether the signal passes through the speaker (On), or not (Off).  |
| 12 | Speaker Type #2  | 0–15  | (See the table.)  | Type of speaker   |
| 13 | Mic Setting      | 0–2   | 1, 2, 3   | Adjusts the location of the mic that's capturing the sound of the speaker. This can be adjusted in three steps, from 1 to 3, with the mic becoming more distant as the value increases. |
| 14 | Mic Level        | 0–127 | 0–127   | Volume of the microphone  |
| 15 | Direct Level     | 0–127 | 0–127   | Volume of the direct sound  |
| 16 | Pan              | 0–127 | L64–63R   | Stereo location of the output   |
| 17 | Level            | 0–127 | 0–127   | Output level  |

## ○ Specifications of each Speaker Type

The speaker column indicates the diameter of each speaker unit (in inches) and the number of units.

| Type        | Cabinet                   | Speaker | Microphone |
|-------------|---------------------------|---------|------------|
| Small 1     | Small open-back enclosure | 10      | Dynamic    |
| Small 2     | Small open-back enclosure | 10      | Dynamic    |
| Middle      | Open back enclosure       | 12 x 1  | Dynamic    |
| JC-120      | Open back enclosure       | 12 x 2  | Dynamic    |
| Built-In 1  | Open back enclosure       | 12 x 2  | Dynamic    |
| Built-In 2  | Open back enclosure       | 12 x 2  | Condenser  |
| Built-In 3  | Open back enclosure       | 12 x 2  | Condenser  |
| Built-In 4  | Open back enclosure       | 12 x 2  | Condenser  |
| Built-In 5  | Open back enclosure       | 12 x 2  | Condenser  |
| BG Stack 1  | Sealed enclosure          | 12 x 2  | Condenser  |
| BG Stack 2  | Large sealed enclosure    | 12 x 2  | Condenser  |
| MS Stack 1  | Large sealed enclosure    | 12 x 4  | Condenser  |
| MS Stack 2  | Large sealed enclosure    | 12 x 4  | Condenser  |
| Metal Stack | Large double stack        | 12 x 4  | Condenser  |
| 2-Stack     | Large double stack        | 12 x 4  | Condenser  |
| 3-Stack     | Large triple stack        | 12 x 4  | Condenser  |

## ● 0120: Phaser

This is a stereo phaser. A phase-shifted sound is added to the original sound and modulated.

| No | Parameter      | Value |                            | Description  |
|----|----------------|-------|----------------------------|--|
| 1  | Mode           | 0–2   | 4-Stage, 8-Stage, 12-Stage | Number of stages in the phaser   |
| 2  | Manual #2      | 0–127 | 0–127                      | Adjusts the basic frequency from which the sound will be modulated.  |
| 3  | Rate Mode      | 0–1   | Hz, note                   | When this is set to “note,” the effect is synchronized with the tempo.   |
| 4  | Rate #1        | 1–127 | 0.05–10.00 Hz              | Frequency of modulation (Hz)   |
| 5  | Rate           | 0–21  | note                       | Frequency of modulation (note)   |
| 6  | Depth          | 0–127 | 0–127                      | Depth of modulation  |
| 7  | Polarity       | 0–1   | Inverse, Synchro           | Selects whether the left and right phase of the modulation will be the same or the opposite. Inverse: The left and right phase will be opposite. When using a mono source, this spreads the sound. Synchro: The left and right phase will be the same. Select this when inputting a stereo source. |
| 8  | Resonance      | 0–127 | 0–127                      | Amount of feedback   |
| 9  | Cross Feedback | 0–98  | -98–+98 %                  | Adjusts the proportion of the phaser sound that is fed back into the effect. Negative (-) settings will invert the phase.  |
| 10 | Mix            | 0–127 | 0–127                      | Level of the phase-shifted sound   |
| 11 | Low Gain       | 0–30  | -15–+15 dB                 | Gain of the low range  |
| 12 | High Gain      | 0–30  | -15–+15 dB                 | Gain of the high range   |
| 13 | Level          | 0–127 | 0–127                      | Output Level   |

## ● 0129: Multi Stage Phaser

Extremely high settings of the phase difference produce a deep phaser effect.

| No | Parameter | Value |  | Description  |
|----|-----------|-------|--|--|
| 1  | Mode      | 0–5   | 4-Stage, 8-Stage, 12-Stage, 16-Stage, 20-Stage, 24-Stage | Number of phaser stages  |
| 2  | Manual #2 | 0–127 | 0–127  | Adjusts the basic frequency from which the sound will be modulated.    |
| 3  | Rate Mode | 0–1   | Hz, note   | When this is set to “note,” the effect is synchronized with the tempo. |
| 4  | Rate #1   | 1–127 | 0.05–10.00 Hz  | Frequency of modulation (Hz)   |
| 5  | Rate      | 0–21  | note   | Frequency of modulation (note)   |
| 6  | Depth     | 0–127 | 0–127  | Depth of modulation  |
| 7  | Resonance | 0–127 | 0–127  | Amount of feedback   |
| 8  | Mix       | 0–127 | 0–127  | Level of the phase-shifted sound                                       |
| 9  | Pan       | 0–127 | L64–63R  | Stereo location of the output sound                                    |
| 10 | Low Gain  | 0–30  | -15–+15 dB   | Gain of the low range  |
| 11 | High Gain | 0–30  | -15–+15 dB   | Gain of the high range   |
| 12 | Level     | 0–127 | 0–127  | Output Level   |

## ● 012a: Infinite Phaser

A phaser that continues raising/lowering the frequency at which the sound is modulated.

| No | Parameter    | Value |            | Description  |
|----|--------------|-------|------------|--|
| 1  | Mode         | 0–3   | 1, 2, 3, 4 | Higher values will produce a deeper phaser effect.   |
| 2  | Speed #1     | 0–127 | -100–+100  | Speed at which to raise or lower the frequency at which the sound is modulated (+: upward / -: downward) |
| 3  | Resonance #2 | 0–127 | 0–127      | Amount of feedback   |
| 4  | Mix          | 0–127 | 0–127      | Volume of the phase-shifted sound  |
| 5  | Pan          | 0–127 | L64–63R    | Panning of the output sound  |
| 6  | Low Gain     | 0–30  | -15–+15 dB | Amount of boost/cut for the low-frequency range  |
| 7  | High Gain    | 0–30  | -15–+15 dB | Amount of boost/cut for the high-frequency range   |
| 8  | Level        | 0–127 | 0–127      | Output volume  |

## ● 0123: Stereo Flanger

This is a stereo flanger. (The LFO has the same phase for left and right.)

It produces a metallic resonance that rises and falls like a jet airplane taking off or landing. A filter is provided so that you can adjust the timbre of the flanged sound.

| No | Parameter   | Value |                 | Description  |
|----|-------------|-------|-----------------|--|
| 1  | Filter Type | 0-2   | Off, Lpf, Hpf   | Type of filter<br>Off: No filter is used<br>Lpf: Cuts the frequency range above the Cutoff Freq<br>Hpf: Cuts the frequency range below the Cutoff Freq |
| 2  | Cutoff Freq | 0-16  | 200-8000 Hz     | Basic frequency of the filter  |
| 3  | Pre Delay   | 0-125 | 0.0-100.0 ms    | Adjusts the delay time from when the direct sound begins until the flanger sound is heard.   |
| 4  | Rate Mode   | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.   |
| 5  | Rate #1     | 1-127 | 0.05-10.00 Hz   | Frequency of modulation (Hz)   |
| 6  | Rate        | 0-21  | note            | Frequency of modulation (note)   |
| 7  | Depth #2    | 0-127 | 0-127           | Depth of modulation  |
| 8  | Phase       | 0-90  | 0-180 deg       | Spatial spread of the sound  |
| 9  | Feedback    | 0-98  | -98-+98 %       | Adjusts the proportion of the flanger sound that is fed back into the effect. Negative (-) settings will invert the phase.                             |
| 10 | Low Gain    | 0-30  | -15-+15 dB      | Gain of the low range  |
| 11 | High Gain   | 0-30  | -15-+15 dB      | Gain of the high range   |
| 12 | Balance     | 0-100 | D100:0W-D0:100W | Volume balance between the direct sound (D) and the flanger sound (W)  |
| 13 | Level       | 0-127 | 0-127           | Output Level   |

## ● 0127: 3D Flanger

This applies a 3D effect to the flanger sound. The flanger sound will be positioned 90 degrees left and 90 degrees right.

| No | Parameter   | Value |               | Description  |
|----|-------------|-------|---------------|--|
| 1  | Filter Type | 0-2   | Off, Lpf, Hpf | Type of filter<br>Off: No filter is used<br>Lpf: Cuts the frequency range above the Cutoff Freq<br>Hpf: Cuts the frequency range below the Cutoff Freq |
| 2  | Cutoff Freq | 0-16  | 200-8000 Hz   | Basic frequency of the filter  |
| 3  | Pre Delay   | 0-125 | 0.0-100.0 ms  | Adjusts the delay time from when the direct sound begins until the flanger sound is heard.   |
| 4  | Rate Mode   | 0-1   | Hz, note      | When this is set to "note," the effect is synchronized with the tempo.   |
| 5  | Rate #1     | 1-127 | 0.05-10.00 Hz | Frequency of modulation (Hz)   |
| 6  | Rate        | 0-21  | note          | Frequency of modulation (note)   |
| 7  | Depth #2    | 0-127 | 0-127         | Depth of modulation  |
| 8  | Phase       | 0-90  | 0-180 deg     | Spatial spread of the sound  |
| 9  | Feedback    | 0-98  | -98-+98 %     | Adjusts the proportion of the flanger sound that is fed back into the effect. Negative (-) settings will invert the phase.                             |

| No | Parameter   | Value |                 | Description   |
|----|-------------|-------|-----------------|---|
| 10 | Output Mode | 0-1   | Speaker, Phones | Adjusts the method that will be used to hear the sound that is output to the Output jacks. The optimal 3D effect will be achieved if you select Speaker when using speakers, or Phones when using headphones. |
| 11 | Low Gain    | 0-30  | -15-+15 dB      | Gain of the low range   |
| 12 | High Gain   | 0-30  | -15-+15 dB      | Gain of the high range  |
| 13 | Balance     | 0-100 | D100:0W-D0:100W | Volume balance between the direct sound (D) and the flanger sound (W)   |
| 14 | Level       | 0-127 | 0-127           | Output Level  |

## ● 0128: 2Band Flanger

A flanger that lets you apply an effect independently to the low-frequency and high-frequency ranges.

| No | Parameter      | Value |                 | Description   |
|----|----------------|-------|-----------------|---|
| 1  | Split Freq     | 0-16  | 200-8000 Hz     | Frequency at which the low and high ranges will be divided  |
| 2  | Low Pre Delay  | 0-125 | 0.0-100.0 ms    | Delay time from when the original sound is heard to when the low-range flanger sound is heard                     |
| 3  | Low Rate Mode  | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.  |
| 4  | Low Rate #1    | 1-127 | 0.05-10.00 Hz   | Rate at which the low-range flanger sound is modulated (Hz)   |
| 5  | Low Rate       | 0-21  | note            | Rate at which the low-range flanger sound is modulated (note)   |
| 6  | Low Depth      | 0-127 | 0-127           | Modulation depth for the low-range flanger sound  |
| 7  | Low Phase      | 0-90  | 0-180 deg       | Spaciousness of the low-range flanger sound   |
| 8  | Low Feedback   | 0-98  | -98-+98 %       | Proportion of the low-range flanger sound that is to be returned to the input (negative values invert the phase)  |
| 9  | High Pre Delay | 0-125 | 0.0-100.0 ms    | Delay time from when the original sound is heard to when the high-range flanger sound is heard                    |
| 10 | High Rate Mode | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.  |
| 11 | High Rate #2   | 1-127 | 0.05-10.00 Hz   | Rate at which the high-range flanger sound is modulated (Hz)  |
| 12 | High Rate      | 0-21  | note            | Rate at which the high-range flanger sound is modulated (note)  |
| 13 | High Depth     | 0-127 | 0-127           | Modulation depth for the high-range flanger sound   |
| 14 | High Phase     | 0-90  | 0-180 deg       | Spaciousness of the high-range flanger sound  |
| 15 | High Feedback  | 0-98  | -98-+98 %       | Proportion of the high-range flanger sound that is to be returned to the input (negative values invert the phase) |
| 16 | Balance        | 0-100 | D100:0W-D0:100W | Volume balance of the original sound (D) and flanger sound (W)  |
| 17 | Level          | 0-127 | 0-127           | Output volume   |



## ● 0121: Auto Wah

Cyclically controls a filter to create cyclic change in timbre.

| No | Parameter   | Value |               | Description   |
|----|-------------|-------|---------------|---|
| 1  | Filter Type | 0–1   | Lpf, Bpf      | Type of filter<br>Lpf: The wah effect will be applied over a wide frequency range.<br>Bpf: The wah effect will be applied over a narrow frequency range.  |
| 2  | Manual #2   | 0–127 | 0–127         | Adjusts the center frequency at which the effect is applied.  |
| 3  | Peak        | 0–127 | 0–127         | Adjusts the amount of the wah effect that will occur in the range of the center frequency.<br>Set a higher value for Q to narrow the range to be affected.  |
| 4  | Sens        | 0–127 | 0–127         | Adjusts the sensitivity with which the filter is controlled.  |
| 5  | Polarity    | 0–1   | Up, Down      | Sets the direction in which the frequency will change when the auto-wah filter is modulated.<br>Up: The filter will change toward a higher frequency.<br>Down: The filter will change toward a lower frequency. |
| 6  | Rate Mode   | 0–1   | Hz, note      | When this is set to “note,” the effect is synchronized with the tempo.  |
| 7  | Rate #1     | 1–127 | 0.05–10.00 Hz | Frequency of modulation (Hz)  |
| 8  | Rate        | 0–21  | note          | Frequency of modulation (note)  |
| 9  | Depth       | 0–127 | 0–127         | Depth of modulation   |
| 10 | Phase       | 0–90  | 0–180 deg     | Adjusts the degree of phase shift of the left and right sounds when the wah effect is applied.  |
| 11 | Low Gain    | 0–30  | -15–+15 dB    | Gain of the low range   |
| 12 | High Gain   | 0–30  | -15–+15 dB    | Gain of the high range  |
| 13 | Level       | 0–127 | 0–127         | Output Level  |

## ● 0103: Humanizer

Adds a vowel character to the sound, making it similar to a human voice.

| No | Parameter            | Value |               | Description   |
|----|----------------------|-------|---------------|---|
| 1  | Drive Sw             | 0–1   | Off, On       | Turns Drive on/off.   |
| 2  | Drive #2             | 0–127 | 0–127         | Degree of distortion<br>Also changes the volume.  |
| 3  | Vowel1               | 0–4   | a, e, i, o, u | Selects the vowel.  |
| 4  | Vowel2               | 0–4   | a, e, i, o, u |   |
| 5  | Rate Mode            | 0–1   | Hz, note      | When this is set to “note,” the effect is synchronized with the tempo.                              |
| 6  | Rate                 | 1–127 | 0.05–10.00 Hz | Frequency at which the two vowels switch (Hz)   |
| 7  | Rate #1              | 0–21  | note          | Frequency at which the two vowels switch (note)   |
| 8  | Depth                | 0–127 | 0–127         | Effect depth  |
| 9  | Input Sync Sw        | 0–1   | Off, On       | Determines whether the LFO for switching the vowels is reset by the input signal (ON) or not (OFF). |
| 10 | Input Sync Threshold | 0–127 | 0–127         | Volume level at which reset is applied  |

| No | Parameter | Value |            | Description   |
|----|-----------|-------|------------|---|
| 11 | Manual    | 0–100 | 0–100      | Point at which Vowel 1/2 switch<br>49 or less: Vowel 1 will have a longer duration.<br>50: Vowel 1 and 2 will be of equal duration.<br>51 or more: Vowel 2 will have a longer duration. |
| 12 | Low Gain  | 0–30  | -15–+15 dB | Gain of the low frequency range   |
| 13 | High Gain | 0–30  | -15–+15 dB | Gain of the high frequency range  |
| 14 | Pan       | 0–127 | L64–63R    | Stereo location of the output   |
| 15 | Level     | 0–127 | 0–127      | Output level  |

## ● 012b: Ring Modulator

This is an effect that applies amplitude modulation (AM) to the input signal, producing bell-like sounds. You can also change the modulation frequency in response to changes in the volume of the sound sent into the effect.

| No | Parameter    | Value |                 | Description  |
|----|--------------|-------|-----------------|--|
| 1  | Frequency #1 | 0–127 | 0–127           | Adjusts the frequency at which modulation is applied.  |
| 2  | Sens         | 0–127 | 0–127           | Adjusts the amount of frequency modulation applied.  |
| 3  | Polarity     | 0–1   | Up, Down        | Determines whether the frequency modulation moves towards higher frequencies (Up) or lower frequencies (Down). |
| 4  | Low Gain     | 0–30  | -15–+15 dB      | Gain of the low frequency range  |
| 5  | High Gain    | 0–30  | -15–+15 dB      | Gain of the high frequency range   |
| 6  | Balance #2   | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the effect sound (W)   |
| 7  | Level        | 0–127 | 0–127           | Output level   |

## ● 0125: Tremolo

Cyclically modulates the volume to add tremolo effect to the sound.

| No | Parameter | Value |                           | Description  |
|----|-----------|-------|---------------------------|--|
| 1  | Mod Wave  | 0–4   | Tri, Sqr, Sin, Saw1, Saw2 | Modulation Wave<br>Tri: Triangle wave<br>Sqr: Square wave<br>Sin: Sine wave<br>Saw1/2: Sawtooth wave |
| 2  | Rate Mode | 0–1   | Hz, note                  | When this is set to “note,” the effect is synchronized with the tempo.                               |
| 3  | Rate #1   | 1–127 | 0.05–10.00 Hz             | Frequency of the change (Hz)   |
| 4  | Rate      | 0–21  | note                      | Frequency of the change (note)   |
| 5  | Depth #2  | 0–127 | 0–127                     | Depth to which the effect is applied   |
| 6  | Low Gain  | 0–30  | -15–+15 dB                | Gain of the low range  |
| 7  | High Gain | 0–30  | -15–+15 dB                | Gain of the high range   |
| 8  | Level     | 0–127 | 0–127                     | Output Level   |

## ● 0126: Auto Pan

Cyclically modulates the stereo location of the sound.

| No | Parameter | Value |                           | Description  |
|----|-----------|-------|---------------------------|--|
| 1  | Mod Wave  | 0–4   | Tri, Sqr, Sin, Saw1, Saw2 | Modulation Wave<br>Tri: triangle wave<br>Sqr: square wave<br>Sin: sine wave<br>Saw1/2: sawtooth wave |
| 2  | Rate Mode | 0–1   | Hz, note                  | When this is set to “note,” the effect is synchronized with the tempo.                               |
| 3  | Rate #1   | 1–127 | 0.05–10.00 Hz             | Frequency of the change (Hz)   |
| 4  | Rate      | 0–21  | note                      | Frequency of the change (note)   |
| 5  | Depth #2  | 0–127 | 0–127                     | Depth to which the effect is applied   |
| 6  | Low Gain  | 0–30  | -15–+15 dB                | Gain of the low range  |
| 7  | High Gain | 0–30  | -15–+15 dB                | Gain of the high range   |
| 8  | Level     | 0–127 | 0–127                     | Output Level   |

## ● 012c: Slicer

By applying successive cuts to the sound, this effect turns a conventional sound into a sound that appears to be played as a backing phrase. This is especially effective when applied to sustain-type sounds.

| No | Parameter            | Value |               | Description  |
|----|----------------------|-------|---------------|--|
| 1  | Rate Mode            | 0–1   | Hz, note      | When this is set to “note,” the effect is synchronized with the tempo.   |
| 2  | Rate                 | 1–127 | 0.05–10.00 Hz | Rate at which the 16-step sequence will cycle (Hz)   |
| 3  | Rate #1              | 12–21 | note          | Rate at which the 16-step sequence will cycle (note)   |
| 4  | Attack               | 0–127 | 0–127         | Speed at which the level changes between steps   |
| 5  | Input Sync Sw        | 0–1   | Off, On       | Specifies whether an input note will cause the sequence to resume from the first step of the sequence (On) or not (Off)  |
| 6  | Input Sync Threshold | 0–127 | 0–27          | Volume at which an input note will be detected   |
| 7  | Mode                 | 0–1   | Legato, Slash | Sets the manner in which the volume changes as one step progresses to the next.<br>Legato: The change in volume from one step’s level to the next remains unaltered. If the level of a following step is the same as the one preceding it, there is no change in volume.<br>Slash: The level is momentarily set to 0 before progressing to the level of the next step. This change in volume occurs even if the level of the following step is the same as the preceding step. |
| 8  | Shuffle #2           | 0–127 | 0–127         | Timing of volume changes for even-numbered steps (step 2, step 4, step 6...). The higher the value, the later the beat progresses.   |
| 9  | Level                | 0–127 | 0–127         | Output level   |

## ● 0130: Compressor

Flattens out high levels and boosts low levels, smoothing out fluctuations in volume.

| No | Parameter    | Value |            | Description                                    |
|----|--------------|-------|------------|--|
| 1  | Attack #2    | 0–127 | 0–127      | Sets the speed at which compression starts     |
| 2  | Threshold #1 | 0–127 | 0–127      | Adjusts the volume at which compression begins |
| 3  | Post Gain    | 0–18  | 0–+18 dB   | Adjusts the output gain.                       |
| 4  | Low Gain     | 0–30  | -15–+15 dB | Gain of the low frequency range                |
| 5  | High Gain    | 0–30  | -15–+15 dB | Gain of the high frequency range               |
| 6  | Level        | 0–127 | 0–127      | Output level                                   |

## ● 0131: Limiter

Compresses signals that exceed a specified volume level, preventing distortion from occurring.

| No | Parameter    | Value |                        | Description  |
|----|--------------|-------|------------------------|--|
| 1  | Release      | 0–127 | 0–127                  | Adjusts the time after the signal volume falls below the Threshold Level until compression is no longer applied. |
| 2  | Threshold #1 | 0–127 | 0–127                  | Adjusts the volume at which compression begins   |
| 3  | Ratio #2     | 0–3   | 1.5:1, 2:1, 4:1, 100:1 | Compression ratio  |
| 4  | Post Gain    | 0–18  | 0–+18 dB               | Adjusts the output gain.   |
| 5  | Low Gain     | 0–30  | -15–+15 dB             | Gain of the low frequency range  |
| 6  | High Gain    | 0–30  | -15–+15 dB             | Gain of the high frequency range   |
| 7  | Level        | 0–127 | 0–127                  | Output level   |

## ● 0142: Stereo Chorus

This is a stereo chorus. A filter is provided so that you can adjust the timbre of the chorus sound.

| No | Parameter   | Value |                 | Description  |
|----|-------------|-------|-----------------|--|
| 1  | Filter Type | 0–2   | Off, Lpf, Hpf   | Type of filter<br>Off: No filter is used<br>Lpf: Cuts the frequency range above the Cutoff Freq<br>Hpf: Cuts the frequency range below the Cutoff Freq |
| 2  | Cutoff Freq | 0–16  | 200–8000 Hz     | Basic frequency of the filter  |
| 3  | Pre Delay   | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard.  |
| 4  | Rate Mode   | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.   |
| 5  | Rate #1     | 1–127 | 0.05–10.00 Hz   | Frequency of modulation (Hz)   |
| 6  | Rate        | 0–21  | note            | Frequency of modulation (note)   |
| 7  | Depth #2    | 0–127 | 0–127           | Depth of modulation  |
| 8  | Phase       | 0–90  | 0–180 deg       | Spatial spread of the sound  |
| 9  | Low Gain    | 0–30  | -15–+15 dB      | Gain of the low range  |
| 10 | High Gain   | 0–30  | -15–+15 dB      | Gain of the high range   |
| 11 | Balance     | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the chorus sound (W)   |
| 12 | Level       | 0–127 | 0–127           | Output Level   |

### ● 0140: Hexa Chorus

Uses a six-phase chorus (six layers of chorused sound) to give richness and spatial spread to the sound.

| No | Parameter           | Value |                 | Description  |
|----|---------------------|-------|-----------------|--|
| 1  | Pre Delay           | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard.  |
| 2  | Rate Mode           | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.   |
| 3  | Rate #1             | 1–127 | 0.05–10.00 Hz   | Frequency of modulation (Hz)   |
| 4  | Rate                | 0–21  | note            | Frequency of modulation (note)   |
| 5  | Depth #2            | 0–127 | 0–127           | Depth of modulation  |
| 6  | Pre Delay Deviation | 0–20  | 0–20            | Adjusts the differences in Pre Delay between each chorus sound.  |
| 7  | Depth Deviation     | 0–40  | -20+20          | Adjusts the difference in modulation depth between each chorus sound.  |
| 8  | Pan Deviation       | 0–20  | 0–20            | Adjusts the difference in stereo location between each chorus sound.<br>0: All chorus sounds will be in the center.<br>20: Each chorus sound will be spaced at 60 degree intervals relative to the center. |
| 9  | Balance             | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the chorus sound (W)   |
| 10 | Level               | 0–127 | 0–127           | Output Level   |

### ● 0141: Tremolo Chorus

This is a chorus effect with added Tremolo (cyclic modulation of volume).

| No | Parameter          | Value |                 | Description   |
|----|--------------------|-------|-----------------|---|
| 1  | Pre Delay          | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard. |
| 2  | Chorus Rate Mode   | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.        |
| 3  | Chorus Rate        | 1–127 | 0.05–10.00 Hz   | Modulation frequency of the chorus effect (Hz)                                |
| 4  | Chorus Rate        | 0–21  | note            | Modulation frequency of the chorus effect (note)                              |
| 5  | Chorus Depth #1    | 0–127 | 0–127           | Modulation depth of the chorus effect   |
| 6  | Tremolo Rate Mode  | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.        |
| 7  | Tremolo Rate #2    | 1–127 | 0.05–10.00 Hz   | Modulation frequency of the tremolo effect (Hz)                               |
| 8  | Tremolo Rate       | 0–21  | note            | Modulation frequency of the tremolo effect (note)                             |
| 9  | Tremolo Separation | 0–127 | 0–127           | Spread of the tremolo effect  |
| 10 | Tremolo Phase      | 0–90  | 0–180 deg       | Spread of the tremolo effect  |
| 11 | Balance            | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the tremolo chorus sound (W)  |
| 12 | Level              | 0–127 | 0–127           | Output Level  |

### ● 0143: Space D

This is a multiple chorus that applies two-phase modulation in stereo. It gives no impression of modulation, but produces a transparent chorus effect.

| No | Parameter | Value |                 | Description   |
|----|-----------|-------|-----------------|---|
| 1  | Pre Delay | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard. |
| 2  | Rate Mode | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.        |
| 3  | Rate #1   | 1–127 | 0.05–10.00 Hz   | Frequency of modulation (Hz)  |
| 4  | Rate      | 0–21  | note            | Frequency of modulation (note)  |
| 5  | Depth #2  | 0–127 | 0–127           | Depth of modulation   |
| 6  | Phase     | 0–90  | 0–180 deg       | Spatial spread of the sound   |
| 7  | Low Gain  | 0–30  | -15+15 dB       | Gain of the low range   |
| 8  | High Gain | 0–30  | -15+15 dB       | Gain of the high range  |
| 9  | Balance   | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the chorus sound (W)          |
| 10 | Level     | 0–127 | 0–127           | Output Level  |

### ● 0144: 3D Chorus

This applies a 3D effect to the chorus sound. The chorus sound will be positioned 90 degrees left and 90 degrees right.

| No | Parameter   | Value |                 | Description  |
|----|-------------|-------|-----------------|--|
| 1  | Filter Type | 0–2   | Off, Lpf, Hpf   | Type of filter<br>Off: No filter is used<br>Lpf: Cuts the frequency range above the Cutoff Freq<br>Hpf: Cuts the frequency range below the Cutoff Freq   |
| 2  | Cutoff Freq | 0–16  | 200–8000 Hz     | Basic frequency of the filter  |
| 3  | Pre Delay   | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard.  |
| 4  | Rate Mode   | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.   |
| 5  | Rate #1     | 1–127 | 0.05–10.00 Hz   | Frequency of modulation (Hz)   |
| 6  | Rate        | 0–21  | note            | Frequency of modulation (note)   |
| 7  | Depth #2    | 0–127 | 0–127           | Modulation depth of the chorus effect  |
| 8  | Phase       | 0–90  | 0–180 deg       | Spatial spread of the sound  |
| 9  | Output Mode | 0–1   | Speaker, Phones | Adjusts the method that will be used to hear the sound that is output to the Output jacks.<br>The optimal 3D effect will be achieved if you select Speaker when using speakers, or Phones when using headphones. |
| 10 | Low Gain    | 0–30  | -15+15 dB       | Gain of the low range  |
| 11 | High Gain   | 0–30  | -15+15 dB       | Gain of the high range   |
| 12 | Balance     | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the chorus sound (W)   |
| 13 | Level       | 0–127 | 0–127           | Output Level   |

## MIDI Implementation

### ●0145: 2Band Chorus

A chorus effect that lets you apply an effect independently to the low-frequency and high-frequency ranges.

| No | Parameter      | Value |                 | Description   |
|----|----------------|-------|-----------------|---|
| 1  | Split Freq     | 0-16  | 200-8000 Hz     | Frequency at which the low and high ranges will be divided                                    |
| 2  | Low Pre Delay  | 0-125 | 0.0-100.0 ms    | Delay time from when the original sound is heard to when the low-range chorus sound is heard  |
| 3  | Low Rate Mode  | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.                        |
| 4  | Low Rate       | 1-127 | 0.05-10.00 Hz   | Rate at which the low-range chorus sound is modulated (Hz)                                    |
| 5  | Low Rate       | 0-21  | note            | Rate at which the low-range chorus sound is modulated (note)                                  |
| 6  | Low Depth #1   | 0-127 | 0-127           | Modulation depth for the low-range chorus sound   |
| 7  | Low Phase      | 0-90  | 0-180 deg       | Spaciousness of the low-range chorus sound  |
| 8  | High Pre Delay | 0-125 | 0.0-100.0 ms    | Delay time from when the original sound is heard to when the high-range chorus sound is heard |
| 9  | High Rate Mode | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.                        |
| 10 | High Rate      | 1-127 | 0.05-10.00 Hz   | Rate at which the low-range chorus sound is modulated (Hz)                                    |
| 11 | High Rate      | 0-21  | note            | Rate at which the low-range chorus sound is modulated (note)                                  |
| 12 | High Depth #2  | 0-127 | 0-127           | Modulation depth for the high-range chorus sound  |
| 13 | High Phase     | 0-90  | 0-180 deg       | Spaciousness of the high-range chorus sound   |
| 14 | Balance        | 0-100 | D100:0W-D0:100W | Volume balance of the original sound (D) and chorus sound (W)                                 |
| 15 | Level          | 0-127 | 0-127           | Output volume   |

### ●0122: Rotary

The Rotary effect simulates the sound of the rotary speakers often used with the electric organs of the past.

Since the movement of the high range and low range rotors can be set independently, the unique type of modulation characteristic of these speakers can be simulated quite closely. This effect is most suitable for electric organ tones.

| No | Parameter            | Value |               | Description  |
|----|----------------------|-------|---------------|--|
| 1  | Speed #1             | 0-1   | Slow, Fast    | Simultaneously switch the rotational speed of the low frequency rotor and high frequency rotor.<br>Slow: Slows down the rotation to the Slow Rate.<br>Fast: Speeds up the rotation to the Fast Rate. |
| 2  | Woofers Slow Speed   | 1-127 | 0.05-10.00 Hz | Slow speed (Slow) of the low frequency rotor   |
| 3  | Woofers Fast Speed   | 1-127 | 0.05-10.00 Hz | Fast speed (Fast) of the low frequency rotor   |
| 4  | Woofers Acceleration | 0-15  | 0-15          | Adjusts the time it takes the low frequency rotor to reach the newly selected speed when switching from fast to slow (or slow to fast) speed. Lower values will require longer times.                |

| No | Parameter             | Value |               | Description  |
|----|-----------------------|-------|---------------|--|
| 5  | Woofers Level         | 0-127 | 0-127         | Volume of the low frequency rotor  |
| 6  | Tweeters Slow Speed   | 1-127 | 0.05-10.00 Hz | Settings of the high frequency rotor<br>The parameters are the same as for the low frequency rotor |
| 7  | Tweeters Fast Speed   | 1-127 | 0.05-10.00 Hz |  |
| 8  | Tweeters Acceleration | 0-15  | 0-15          |  |
| 9  | Tweeters Level        | 0-127 | 0-127         |  |
| 10 | Separation #2         | 0-127 | 0-127         | Spatial dispersion of the sound  |
| 11 | Level                 | 0-127 | 0-127         | Output Level   |

### ●012d: Rotary2

This type provides modified response for the rotary speaker, with the low end boosted further.

This effect is a descendant of the Roland VK Series' built-in rotary speaker.

| No | Parameter           | Value |               | Description   |
|----|---------------------|-------|---------------|---|
| 1  | Speed #1            | 0-1   | Slow, Fast    | Rotational speed of the rotating speaker  |
| 2  | Brake #2            | 0-1   | Off, On       | Switches the rotation of the rotary speaker.<br>When this is turned on, the rotation will gradually stop.<br>When it is turned off, the rotation will gradually resume. |
| 3  | Woofers Slow Speed  | 1-127 | 0.05-10.00 Hz | Low-speed rotation speed of the woofer  |
| 4  | Woofers Fast Speed  | 1-127 | 0.05-10.00 Hz | High-speed rotation speed of the woofer   |
| 5  | Woofers Trans Up    | 0-127 | 0-127         | Adjusts the rate at which the woofer rotation speeds up when the rotation is switched from Slow to Fast.  |
| 6  | Woofers Trans Down  | 0-127 | 0-127         | Adjusts the rate at which the woofer rotation speeds up when the rotation is switched from Fast to Slow.  |
| 7  | Woofers Level       | 0-127 | 0-127         | Volume of the woofer  |
| 8  | Tweeters Slow Speed | 1-127 | 0.05-10.00 Hz | Settings of the tweeter<br>The parameters are the same as for the woofer.   |
| 9  | Tweeters Fast Speed | 1-127 | 0.05-10.00 Hz |   |
| 10 | Tweeters Trans Up   | 0-127 | 0-127         |   |
| 11 | Tweeters Trans Down | 0-127 | 0-127         |   |
| 12 | Tweeters Level      | 0-127 | 0-127         |   |
| 13 | Spread              | 0-10  | 0-10          | Sets the rotary speaker stereo image. The higher the value set, the wider the sound is spread out.  |
| 14 | Low Gain            | 0-30  | -15-+15 dB    | Gain of the low range   |
| 15 | High Gain           | 0-30  | -15-+15 dB    | Gain of the high range  |
| 16 | Level               | 0-127 | 0-127         | Output Level  |

### ● 0300: Rotary Multi

This is an effect combining the VK series internal effect with an organ effect with the same features.

It comprises vibrato/chorus, overdrive, and rotary effects.

| No | Parameter       | Value |                              | Description  |
|----|-----------------|-------|------------------------------|--|
| 1  | Vib/Cho Switch  | 0–1   | Off, On                      | Switches the vibrato and chorus effects  |
| 2  | Vib/Cho Type    | 0–5   | V-1, V-2, V-3, C-1, C-2, C-3 | Vibrato and chorus effect types<br>V-1, V-2, V-3: Adds a wavering (vibrato) that is created by changes in the pitch. The effect deepens as the value is increased<br>C-1, C-2, C-3: Adds a fullness and breadth (chorus) to the sound. The effect deepens as the value is increased. |
| 3  | Vib/Cho Vintage | 0–2   | '50, '60, '70                | This reproduces the subtle differences in the vibrato and chorus effects in organs built in different years.   |
| 4  | Vib/Cho Level   | 0–127 | 0–127                        | Vibrato/chorus effect volume   |
| 5  | OD Switch       | 0–1   | Off, On                      | Switches the overdrive effect  |
| 6  | OD Drive #2     | 0–127 | 0–127                        | Amount of distortion   |
| 7  | OD Level        | 0–127 | 0–127                        | Overdrive effect volume  |
| 8  | Rotary Switch   | 0–1   | Off, On                      | Switches the rotary effect   |
| 9  | Rotary Speed #1 | 0–1   | Slow, Fast                   | Low- and high-frequency rotation speeds (Rate)<br>Slow: (Slow Rate)<br>Fast: (Fast Rate)   |
| 10 | R-Wf Slow Sp    | 1–127 | 0.05–10.00 Hz                | Rate with low-frequency rotor set to Slow rate   |
| 11 | R-Wf Fast Sp    | 1–127 | 0.05–10.00 Hz                | Rate with low-frequency rotor set to Fast rate   |
| 12 | R-Wf Accel      | 0–15  | 0–15                         | Speed at which the low-frequency rotor's rotation rate changes when the rotation speed is switched   |
| 13 | R-Wf Level      | 0–127 | 0–127                        | Low-frequency rotor volume   |
| 14 | R-Tw Slow Sp    | 1–127 | 0.05–10.00 Hz                | High-frequency rotor setting<br>This parameter is the same as that for the low-frequency rotor.  |
| 15 | R-Tw Fast Sp    | 1–127 | 0.05–10.00 Hz                |  |
| 16 | R-Tw Accel      | 0–15  | 0–15                         |  |
| 17 | R-Tw Level      | 0–127 | 0–127                        |  |
| 18 | Rotary Separat  | 0–127 | 0–127                        | Amount of breadth in the sound   |
| 19 | Rotary Level    | 0–127 | 0–127                        | Output volume  |

### ● 015b: Stereo Delay1

This is a stereo delay.

| No | Parameter        | Value |                 | Description   |
|----|------------------|-------|-----------------|---|
| 1  | Delay Left Mode  | 0–1   | ms, note        | When this is set to "note," the effect is synchronized with the tempo.            |
| 2  | Delay Left       | 0–127 | 1–1270 ms       | Adjusts the time until the delay sound is heard. (Hz)                             |
| 3  | Delay Left       | 0–21  | note            | Adjusts the time until the delay sound is heard. (note)                           |
| 4  | Delay Right Mode | 0–1   | ms, note        | Settings of the Delay Right<br>The parameters are the same as for the Delay Left. |
| 5  | Delay Right      | 0–127 | 1–1270 ms       |   |
| 6  | Delay Right      | 0–21  | note            |   |
| 7  | Phase Left       | 0–1   | Normal, Inverse | Phase of the delay sound  |
| 8  | Phase Right      | 0–1   |                 |   |

| No | Parameter     | Value |                     | Description   |
|----|---------------|-------|---------------------|---|
| 9  | Feedback Mode | 0–1   | Normal, Cross       | Selects the way in which delay sound is fed back into the effect.   |
| 10 | Feedback #1   | 49–89 | 0–+80 %             | Adjusts the amount of the delay sound that's fed back into the effect.  |
| 11 | HF Damp       | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you don't want to filter out any high frequencies, set this parameter to Bypass. |
| 12 | Low Gain      | 0–30  | -15–+15 dB          | Gain of the low frequency range   |
| 13 | High Gain     | 0–30  | -15–+15 dB          | Gain of the high frequency range  |
| 14 | Balance #2    | 0–100 | D100:0W–D0:100W     | Volume balance between the direct sound (D) and the delay sound (W)   |
| 15 | Level         | 0–127 | 0–127               | Output level  |

### ● 015c: Stereo Delay2

This is a stereo delay.

| No | Parameter        | Value |                     | Description   |
|----|------------------|-------|---------------------|---|
| 1  | Delay Left Mode  | 0–1   | ms, note            | When this is set to "note," the effect is synchronized with the tempo.  |
| 2  | Delay Left       | 0–127 | 1–1270 ms           | Adjusts the time until the delay sound is heard. (Hz)   |
| 3  | Delay Left       | 0–21  | note                | Adjusts the time until the delay sound is heard. (note)   |
| 4  | Delay Right Mode | 0–1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.   |
| 5  | Delay Right      | 0–127 | 1–1270 ms           |   |
| 6  | Delay Right      | 0–21  | note                |   |
| 7  | Phase Left       | 0–1   | Normal, Inverse     | Phase of the delay sound  |
| 8  | Phase Right      | 0–1   |                     |   |
| 9  | Feedback Mode    | 0–1   | Normal, Cross       | Selects the way in which delay sound is fed back into the effect.   |
| 10 | Feedback #1      | 49–89 | 0–+80 %             | Adjusts the amount of the delay sound that's fed back into the effect.  |
| 11 | HF Damp          | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you don't want to filter out any high frequencies, set this parameter to Bypass. |
| 12 | Low Gain         | 0–30  | -15–+15 dB          | Gain of the low frequency range   |
| 13 | High Gain        | 0–30  | -15–+15 dB          | Gain of the high frequency range  |
| 14 | Balance #2       | 0–100 | D100:0W–D0:100W     | Volume balance between the direct sound (D) and the delay sound (W)   |
| 15 | Level            | 0–127 | 0–127               | Output level  |

## ● 015d: Stereo Delay3

This is a stereo delay.

| No | Parameter        | Value |                     | Description   |
|----|------------------|-------|---------------------|---|
| 1  | Delay Left Mode  | 0-1   | ms, note            | When this is set to "note," the effect is synchronized with the tempo.  |
| 2  | Delay Left       | 0-127 | 1-1270 ms           | Adjusts the time until the delay sound is heard. (Hz)   |
| 3  | Delay Left       | 0-21  | note                | Adjusts the time until the delay sound is heard. (note)   |
| 4  | Delay Right Mode | 0-1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.   |
| 5  | Delay Right      | 0-127 | 1-1270 ms           |   |
| 6  | Delay Right      | 0-21  | note                | Phase of the delay sound  |
| 7  | Phase Left       | 0-1   | Normal, Inverse     |   |
| 8  | Phase Right      | 0-1   |                     |   |
| 9  | Feedback Mode    | 0-1   | Normal, Cross       | Selects the way in which delay sound is fed back into the effect.   |
| 10 | Feedback #1      | 49-89 | 0-+80 %             | Adjusts the amount of the delay sound that's fed back into the effect.  |
| 11 | HF Damp          | 0-17  | 200-8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you don't want to filter out any high frequencies, set this parameter to Bypass. |
| 12 | Low Gain         | 0-30  | -15-+15 dB          | Gain of the low frequency range   |
| 13 | High Gain        | 0-30  | -15-+15 dB          | Gain of the high frequency range  |
| 14 | Balance #2       | 0-100 | D100:0W-D0:100W     | Volume balance between the direct sound (D) and the delay sound (W)   |
| 15 | Level            | 0-127 | 0-127               | Output level  |

## ● 015e: Stereo Delay4

This is a stereo delay.

| No | Parameter        | Value |                     | Description   |
|----|------------------|-------|---------------------|---|
| 1  | Delay Left Mode  | 0-1   | ms, note            | When this is set to "note," the effect is synchronized with the tempo.  |
| 2  | Delay Left       | 0-127 | 1-1270 ms           | Adjusts the time until the delay sound is heard. (Hz)   |
| 3  | Delay Left       | 0-21  | note                | Adjusts the time until the delay sound is heard. (note)   |
| 4  | Delay Right Mode | 0-1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.   |
| 5  | Delay Right      | 0-127 | 1-1270 ms           |   |
| 6  | Delay Right      | 0-21  | note                | Phase of the delay sound  |
| 7  | Phase Left       | 0-1   | Normal, Inverse     |   |
| 8  | Phase Right      | 0-1   |                     |   |
| 9  | Feedback Mode    | 0-1   | Normal, Cross       | Selects the way in which delay sound is fed back into the effect.   |
| 10 | Feedback #1      | 49-89 | 0-+80 %             | Adjusts the amount of the delay sound that's fed back into the effect.  |
| 11 | HF Damp          | 0-17  | 200-8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you don't want to filter out any high frequencies, set this parameter to Bypass. |
| 12 | Low Gain         | 0-30  | -15-+15 dB          | Gain of the low frequency range   |

| No | Parameter  | Value |                 | Description   |
|----|------------|-------|-----------------|---|
| 13 | High Gain  | 0-30  | -15-+15 dB      | Gain of the high frequency range                                    |
| 14 | Balance #2 | 0-100 | D100:0W-D0:100W | Volume balance between the direct sound (D) and the delay sound (W) |
| 15 | Level      | 0-127 | 0-127           | Output level  |

## ● 015f: Stereo Delay5

This is a stereo delay.

| No | Parameter        | Value |                     | Description   |
|----|------------------|-------|---------------------|---|
| 1  | Delay Left Mode  | 0-1   | ms, note            | When this is set to "note," the effect is synchronized with the tempo.  |
| 2  | Delay Left       | 0-127 | 1-1270 ms           | Adjusts the time until the delay sound is heard. (Hz)   |
| 3  | Delay Left       | 0-21  | note                | Adjusts the time until the delay sound is heard. (note)   |
| 4  | Delay Right Mode | 0-1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.   |
| 5  | Delay Right      | 0-127 | 1-1270 ms           |   |
| 6  | Delay Right      | 0-21  | note                | Phase of the delay sound  |
| 7  | Phase Left       | 0-1   | Normal, Inverse     |   |
| 8  | Phase Right      | 0-1   |                     |   |
| 9  | Feedback Mode    | 0-1   | Normal, Cross       | Selects the way in which delay sound is fed back into the effect.   |
| 10 | Feedback #1      | 49-89 | 0-+80 %             | Adjusts the amount of the delay sound that's fed back into the effect.  |
| 11 | HF Damp          | 0-17  | 200-8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you don't want to filter out any high frequencies, set this parameter to Bypass. |
| 12 | Low Gain         | 0-30  | -15-+15 dB          | Gain of the low frequency range   |
| 13 | High Gain        | 0-30  | -15-+15 dB          | Gain of the high frequency range  |
| 14 | Balance #2       | 0-100 | D100:0W-D0:100W     | Volume balance between the direct sound (D) and the delay sound (W)   |
| 15 | Level            | 0-127 | 0-127               | Output level  |

## ● 0150: Monaural Delay

A delay that provides a long delay time.

| No | Parameter     | Value |                     | Description   |
|----|---------------|-------|---------------------|---|
| 1  | Delay Mode    | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.                          |
| 2  | Delay Time    | 0–127 | 1–2540 ms           | Delay time from when the original sound is heard to when the delay sound is heard (Hz)          |
| 3  | Delay Time #1 | 0–21  | note                | Delay time from when the original sound is heard to when the delay sound is heard (note)        |
| 4  | Phase         | 0–1   | NORMAL, INVERSE     | Phase of the delay (NORMAL: non-inverted, INVERSE: inverted)                                    |
| 5  | Feedback      | 49–89 | 0–+80 %             | Proportion of the delay sound that is to be returned to the input                               |
| 6  | HF Damp       | 0–17  | 200–8000 Hz, Bypass | Frequency at which the high-frequency content of the delayed sound will be cut (Bypass: no cut) |
| 7  | Pan           | 0–127 | L64–63R             | Panning of the delay sound  |
| 8  | Low Gain      | 0–30  | -15–+15 dB          | Amount of boost/cut for the high-frequency range  |
| 9  | High Gain     | 0–30  | -15–+15 dB          | Amount of boost/cut for the high-frequency range  |
| 10 | Balance #2    | 0–100 | D100:0W–D0:100W     | Volume balance of the original sound (D) and the delay sound (W)                                |
| 11 | Level         | 0–127 | 0–127               | Output volume   |

## ● 0151: Modulation Delay

Adds modulation to the delayed sound.

| No | Parameter        | Value |                     | Description   |
|----|------------------|-------|---------------------|---|
| 1  | Delay Left Mode  | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 2  | Delay Left       | 0–127 | 1–1270 ms           | Adjusts the time until the delay sound is heard. (Hz)   |
| 3  | Delay Left       | 0–21  | note                | Adjusts the time until the delay sound is heard. (note)   |
| 4  | Delay Right Mode | 0–1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.   |
| 5  | Delay Right      | 0–127 | 1–1270 ms           |   |
| 6  | Delay Right      | 0–21  | note                |   |
| 7  | Feedback Mode    | 0–1   | Normal, Cross       | Selects the way in which delay sound is fed back into the effect.   |
| 8  | Feedback         | 49–89 | 0–+80 %             | Adjusts the amount of the delay sound that’s fed back into the effect.  |
| 9  | HF Damp          | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you don’t want to filter out any high frequencies, set this parameter to Bypass. |
| 10 | Rate Mode        | 0–1   | Hz, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 11 | Rate             | 1–127 | 0.05–10.00 Hz       | Frequency of modulation (Hz)  |
| 12 | Rate             | 0–21  | note                | Frequency of modulation (note)  |
| 13 | Depth #1         | 0–127 | 0–127               | Depth of modulation   |
| 14 | Phase            | 0–90  | 0–180 deg           | Spatial spread of the sound   |

| No | Parameter  | Value |                 | Description   |
|----|------------|-------|-----------------|---|
| 15 | Low Gain   | 0–30  | -15–+15 dB      | Gain of the low frequency range                                     |
| 16 | High Gain  | 0–30  | -15–+15 dB      | Gain of the high frequency range                                    |
| 17 | Balance #2 | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the delay sound (W) |
| 18 | Level      | 0–127 | 0–127           | Output level  |

## ● 0152: Triple Tap Delay

Produces three delay sounds; center, left and right.

| No | Parameter          | Value |                     | Description  |
|----|--------------------|-------|---------------------|--|
| 1  | Delay Left Mode    | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.   |
| 2  | Delay Left         | 0–127 | 1–2540 ms           | Adjusts the time until the delay sound is heard. (Hz)  |
| 3  | Delay Left         | 0–21  | note                | Adjusts the time until the delay sound is heard. (note)  |
| 4  | Delay Right Mode   | 0–1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.  |
| 5  | Delay Right        | 0–127 | 1–2540 ms           |  |
| 6  | Delay Right        | 0–21  | note                |  |
| 7  | Delay Center Mode  | 0–1   | ms, note            | Settings of the Delay Center<br>The parameters are the same as for the Delay Left.   |
| 8  | Delay Center       | 0–127 | 1–2540 ms           |  |
| 9  | Delay Center       | 0–21  | note                |  |
| 10 | Center Feedback #1 | 49–89 | 0–+80 %             | Adjusts the amount of the delay sound that’s fed back into the effect.   |
| 11 | HF Damp            | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect is filtered out. If you do not want to filter out any high frequencies, set this parameter to Bypass. |
| 12 | Left Level         | 0–127 | 0–127               | Volume of each delay   |
| 13 | Right Level        | 0–127 | 0–127               | Volume of each delay   |
| 14 | Center Level       | 0–127 | 0–127               | Volume of each delay   |
| 15 | Low Gain           | 0–30  | -15–+15 dB          | Gain of the low frequency range  |
| 16 | High Gain          | 0–30  | -15–+15 dB          | Gain of the high frequency range   |
| 17 | Balance #2         | 0–100 | D100:0W–D0:100W     | Volume balance between the direct sound (D) and the delay sound (W)  |
| 18 | Level              | 0–127 | 0–127               | Output level   |

## MIDI Implementation

### ● 0157: 3D Delay

This applies a 3D effect to the delay sound. The delay sound will be positioned 90 degrees left and 90 degrees right.

| No | Parameter          | Value |                     | Description   |
|----|--------------------|-------|---------------------|---|
| 1  | Delay Left Mode    | 0-1   | ms, note            | When this is set to "note," the effect is synchronized with the tempo.  |
| 2  | Delay Left         | 0-127 | 1-2540 ms           | Adjusts the delay time from the direct sound until the delay sound is heard. (Hz)   |
| 3  | Delay Left         | 0-21  | note                | Adjusts the delay time from the direct sound until the delay sound is heard. (note)   |
| 4  | Delay Right Mode   | 0-1   | ms, note            | Settings of the Delay Right<br>The parameters are the same as for the Delay Left.   |
| 5  | Delay Right        | 0-127 | 1-2540 ms           |   |
| 6  | Delay Right        | 0-21  | note                |   |
| 7  | Delay Center Mode  | 0-1   | ms, note            | Settings of the Delay Center<br>The parameters are the same as for the Delay Left.  |
| 8  | Delay Center       | 0-127 | 1-2540 ms           |   |
| 9  | Delay Center       | 0-21  | note                |   |
| 10 | Center Feedback #1 | 49-89 | 0-+80 %             | Adjusts the proportion of the delay sound that is fed back into the effect.   |
| 11 | HF Damp            | 0-17  | 200-8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect will be cut. If you do not want to cut the high frequencies, set this parameter to Bypass.   |
| 12 | Left Level         | 0-127 | 0-127               | Output level of the delay sound   |
| 13 | Right Level        | 0-127 |                     |   |
| 14 | Center Level       | 0-127 |                     |   |
| 15 | Output Mode        | 0-1   | Speaker, Phones     | Adjusts the method that will be used to hear the sound that is output to the Output jacks. The optimal 3D effect will be achieved if you select Speaker when using speakers, or Phones when using headphones. |
| 16 | Low Gain           | 0-30  | -15-+15 dB          | Gain of the low range   |
| 17 | High Gain          | 0-30  | -15-+15 dB          | Gain of the high range  |
| 18 | Balance #2         | 0-100 | D100:0W-D0:100W     | Volume balance between the direct sound (D) and the effect sound (W)  |
| 19 | Level              | 0-127 | 0-127               | Output Level  |

### ● 0159: Tape Echo

A virtual tape echo that produces a realistic tape delay sound. This simulates the tape echo section of a Roland RE-201 Space Echo.

| No | Parameter      | Value |                               | Description   |
|----|----------------|-------|-------------------------------|---|
| 1  | Mode           | 0-6   | S, M, L, S+M, S+L, M+L, S+M+L | Combination of playback heads to use<br>Select from three different heads with different delay times.<br>S: short<br>M: middle<br>L: long |
| 2  | Repeat Rate #1 | 0-127 | 0-127                         | Tape speed<br>Increasing this value will shorten the spacing of the delayed sounds.   |
| 3  | Intensity      | 0-127 | 0-127                         | Amount of delay repeats   |
| 4  | Bass           | 0-30  | -15-+15 dB                    | Boost/cut for the lower range of the echo sound   |
| 5  | Treble         | 0-30  | -15-+15 dB                    | Boost/cut for the upper range of the echo sound   |

| No | Parameter         | Value |         | Description   |
|----|-------------------|-------|---------|---|
| 6  | Head S Pan        | 0-127 | L64-63R | Independent panning for the short, middle, and long playback heads  |
| 7  | Head M Pan        | 0-127 |         |   |
| 8  | Head L Pan        | 0-127 |         |   |
| 9  | Tape Distortion   | 0-5   | 0-5     | Amount of tape-dependent distortion to be added<br>This simulates the slight tonal changes that can be detected by signal-analysis equipment. Increasing this value will increase the distortion. |
| 10 | Wow/Flutter Rate  | 0-127 | 0-127   | Speed of wow/flutter (complex variation in pitch caused by tape wear and rotational irregularity)   |
| 11 | Wow/Flutter Depth | 0-127 | 0-127   | Depth of wow/flutter  |
| 12 | Echo Level #2     | 0-127 | 0-127   | Volume of the echo sound  |
| 13 | Direct Level      | 0-127 | 0-127   | Volume of the original sound  |
| 14 | Level             | 0-127 | 0-127   | Output level  |

### ● 015a: Reverse Delay

This is a reverse delay that adds a reversed and delayed sound to the input sound. A tap delay is connected immediately after the reverse delay.

| No | Parameter          | Value |                     | Description   |
|----|--------------------|-------|---------------------|---|
| 1  | Threshold          | 0-127 | 0-127               | Volume at which the reverse delay will begin to be applied  |
| 2  | Rev Delay Mode     | 0-1   | ms, note            | When this is set to "note," the effect is synchronized with the tempo.                                  |
| 3  | Rev Delay Time #1  | 0-127 | 1-1270 ms           | Delay time from when sound is input into the reverse delay until the delay sound is heard (Hz)          |
| 4  | Rev Delay Time     | 0-21  | note                | Delay time from when sound is input into the reverse delay until the delay sound is heard (note)        |
| 5  | Rev Delay Feedback | 49-89 | 0-+80 %             | Proportion of the delay sound that is to be returned to the input of the reverse delay                  |
| 6  | Rev Delay HF Damp  | 0-17  | 200-8000 Hz, Bypass | Frequency at which the high-frequency content of the reverse-delayed sound will be cut (Bypass: no cut) |
| 7  | Rev Delay Pan      | 0-127 | L64-63R             | Panning of the reverse delay sound  |
| 8  | Rev Delay Level    | 0-127 | 0-127               | Volume of the reverse delay sound   |
| 9  | Low Gain           | 0-30  | -15-+15 dB          | Amount of boost/cut for the low-frequency range   |
| 10 | High Gain          | 0-30  | -15-+15 dB          | Amount of boost/cut for the high-frequency range  |
| 11 | Balance #2         | 0-100 | D100:0W-D0:100W     | Volume balance of the original sound (D) and the delay sound (W)  |
| 12 | Level              | 0-127 | 0-127               | Output volume   |



### ● 0172: Lo-Fi

This is an effect that intentionally degrades the sound quality for creative purposes.

| No | Parameter          | Value |                 | Description  |
|----|--------------------|-------|-----------------|--|
| 1  | Pre Filter Type    | 0-5   | 1-6             | Selects the type of filter applied to the sound before it passes through the Lo-Fi effect.   |
| 2  | LoFi Type #1       | 0-8   | 1-9             | Degrades the sound quality. The sound quality grows poorer as this value is increased.   |
| 3  | Post Filter Type   | 0-2   | Off, Lpf, Hpf   | Type of filter<br>Off: no filter is used<br>Lpf: cuts the frequency range above the Cutoff<br>Hpf: cuts the frequency range below the Cutoff |
| 4  | Post Filter Cutoff | 0-16  | 200-8000 Hz     | Basic frequency of the Post Filter   |
| 5  | Low Gain           | 0-30  | -15-+15 dB      | Gain of the low range  |
| 6  | High Gain          | 0-30  | -15-+15 dB      | Gain of the high range   |
| 7  | Balance #2         | 0-100 | D100:0W-D0:100W | Volume balance between the direct sound (D) and the effect sound (W)   |
| 8  | Level              | 0-127 | 0-127           | Output level   |

### ● 0175: Telephone

| No | Parameter        | Value |                | Description  |
|----|------------------|-------|----------------|--|
| 1  | Voice Quality #1 | 0-15  | 0-15           | Audio quality of the telephone voice                                 |
| 2  | Treble           | 0-30  | -15-+15 dB     | Bandwidth of the telephone voice                                     |
| 3  | Balance #2       | 0-100 | D100:0-D0:100W | Volume balance between the direct sound (D) and the effect sound (W) |
| 4  | Level            | 0-127 | 0-127          | Output level   |

### ● 0156: Gate Reverb

This is a special type of reverb in which the reverberant sound is cut off before its natural length.

| No | Parameter  | Value |                                 | Description  |
|----|------------|-------|---------------------------------|--|
| 1  | Type #1    | 0-3   | Normal, Reverse, Sweep1, Sweep2 | Type of reverb<br>Normal: conventional gated reverb<br>Reverse: backwards reverb<br>Sweep1: the reverberant sound moves from right to left<br>Sweep2: the reverberant sound moves from left to right |
| 2  | Pre Delay  | 0-125 | 0.0-100.0 ms                    | Adjusts the delay time from the direct sound until the reverb sound is heard.  |
| 3  | Gate Time  | 0-99  | 5-500 ms                        | Adjusts the time from when the reverb is heard until it disappears.  |
| 4  | Low Gain   | 0-30  | -15-+15 dB                      | Gain of the low range  |
| 5  | High Gain  | 0-30  | -15-+15 dB                      | Gain of the high range   |
| 6  | Balance #2 | 0-100 | D100:0W-D0:100W                 | Volume balance between the direct sound (D) and the reverb sound (W)   |
| 7  | Level      | 0-127 | 0-127                           | Output Level   |

### ● 0200: Overdrive → Chorus

This effect connects an overdrive and a chorus in series.

| No | Parameter         | Value |                 | Description   |
|----|-------------------|-------|-----------------|---|
| 1  | Overdrive Drive   | 0-127 | 0-127           | Degree of distortion<br>Also changes the volume.  |
| 2  | Overdrive Pan     | 0-127 | L64-63R         | Stereo location of the overdrive sound  |
| 3  | Chorus Pre Delay  | 0-125 | 0.0-100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard.   |
| 4  | Chorus Rate Mode  | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.  |
| 5  | Chorus Rate #1    | 1-127 | 0.05-10.00 Hz   | Frequency of modulation (Hz)  |
| 6  | Chorus Rate       | 0-21  | note            | Frequency of modulation (note)  |
| 7  | Chorus Depth      | 0-127 | 0-127           | Depth of modulation   |
| 8  | Chorus Balance #2 | 0-100 | D100:0W-D0:100W | Adjusts the volume balance between the sound that is sent through the chorus (W) and the sound that is not sent through the chorus (D). |
| 9  | Level             | 0-127 | 0-127           | Output Level  |

### ● 0201: Overdrive → Flanger

This effect connects an overdrive and a flanger in series.

| No | Parameter          | Value |                 | Description   |
|----|--------------------|-------|-----------------|---|
| 1  | Overdrive Drive    | 0-127 | 0-127           | Degree of distortion<br>Also changes the volume.  |
| 2  | Overdrive Pan      | 0-127 | L64-63R         | Stereo location of the overdrive sound  |
| 3  | Flanger Pre Delay  | 0-125 | 0.0-100.0 ms    | Adjusts the delay time from when the direct sound begins until the flanger sound is heard.  |
| 4  | Flanger Rate Mode  | 0-1   | Hz, note        | When this is set to "note," the effect is synchronized with the tempo.  |
| 5  | Flanger Rate #1    | 1-127 | 0.05-10.00 Hz   | Frequency of modulation (Hz)  |
| 6  | Flanger Rate       | 0-21  | note            | Frequency of modulation (note)  |
| 7  | Flanger Depth      | 0-127 | 0-127           | Depth of modulation   |
| 8  | Flanger Feedback   | 0-98  | -98-+98 %       | Adjusts the proportion of the flanger sound that is fed back into the effect. Negative (-) settings will invert the phase.                |
| 9  | Flanger Balance #2 | 0-100 | D100:0W-D0:100W | Adjusts the volume balance between the sound that is sent through the flanger (W) and the sound that is not sent through the flanger (D). |
| 10 | Level              | 0-127 | 0-127           | Output Level  |

## MIDI Implementation

### ● 0202: Overdrive → Delay

This effect connects an overdrive and a delay in series.

| No | Parameter          | Value |                     | Description   |
|----|--------------------|-------|---------------------|---|
| 1  | Overdrive Drive #1 | 0–127 | 0–127               | Degree of distortion<br>Also changes the volume.  |
| 2  | Overdrive Pan      | 0–127 | L64–63R             | Stereo location of the overdrive sound  |
| 3  | Delay Mode         | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 4  | Delay Time         | 0–127 | 1–2540 ms           | Adjusts the delay time from the direct sound until the delay sound is heard. (ms)   |
| 5  | Delay Time         | 0–21  | note                | Adjusts the delay time from the direct sound until the delay sound is heard. (note)   |
| 6  | Delay Feedback     | 49–89 | 0–+80 %             | Adjusts the proportion of the delay sound that is fed back into the effect.   |
| 7  | Delay HF Damp      | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect will be cut. If you do not want to cut the high frequencies, set this parameter to Bypass. |
| 8  | Delay Balance #2   | 0–100 | D100:0W–D0:100W     | Adjusts the volume balance between the sound that is sent through the delay (W) and the sound that is not sent through the delay (D).                     |
| 9  | Level              | 0–127 | 0–127               | Output Level  |

### ● 0203: Distortion → Chorus

The parameters are essentially the same as in “Overdrive → Chorus,” with the exception of the following two.  
Overdrive Drive → Distortion Drive  
Overdrive Pan → Distortion Pan

### ● 0204: Distortion → Flanger

The parameters are essentially the same as in “Overdrive → Flanger,” with the exception of the following two.  
Overdrive Drive → Distortion Drive  
Overdrive Pan → Distortion Pan

### ● 0205: Distortion → Delay

The parameters are essentially the same as in “Overdrive → Delay,” with the exception of the following two.  
Overdrive Drive → Distortion Drive  
Overdrive Pan → Distortion Pan

### ● 0206: Enhancer → Chorus

This effect connects an enhancer and a chorus in series.

| No | Parameter        | Value |               | Description   |
|----|------------------|-------|---------------|---|
| 1  | Enhancer Sens    | 0–127 | 0–127         | Sensitivity of the enhancer   |
| 2  | Enhancer Mix     | 0–127 | 0–127         | Level of the overtones generated by the enhancer                              |
| 3  | Chorus Pre Delay | 0–125 | 0.0–100.0 ms  | Adjusts the delay time from the direct sound until the chorus sound is heard. |
| 4  | Chorus Rate Mode | 0–1   | Hz, note      | When this is set to “note,” the effect is synchronized with the tempo.        |
| 5  | Chorus Rate #1   | 1–127 | 0.05–10.00 Hz | Frequency of modulation (Hz)  |
| 6  | Chorus Rate      | 0–21  | note          | Frequency of modulation (note)  |

| No | Parameter         | Value |                 | Description   |
|----|-------------------|-------|-----------------|---|
| 7  | Chorus Depth      | 0–127 | 0–127           | Depth of modulation   |
| 8  | Chorus Balance #2 | 0–100 | D100:0W–D0:100W | Adjusts the volume balance between the sound that is sent through the chorus (W) and the sound that is not sent through the chorus (D). |
| 9  | Level             | 0–127 | 0–127           | Output Level  |

### ● 0207: Enhancer → Flanger

This effect connects an enhancer and a flanger in series.

| No | Parameter          | Value |                 | Description   |
|----|--------------------|-------|-----------------|---|
| 1  | Enhancer Sens      | 0–127 | 0–127           | Sensitivity of the enhancer   |
| 2  | Enhancer Mix       | 0–127 | 0–127           | Level of the overtones generated by the enhancer  |
| 3  | Flanger Pre Delay  | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from when the direct sound begins until the flanger sound is heard.  |
| 4  | Flanger Rate Mode  | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.  |
| 5  | Flanger Rate #1    | 1–127 | 0.05–10.00 Hz   | Frequency of modulation (Hz)  |
| 6  | Flanger Rate       | 0–21  | note            | Frequency of modulation (note)  |
| 7  | Flanger Depth      | 0–127 | 0–127           | Depth of modulation   |
| 8  | Flanger Feedback   | 0–98  | -98–+98 %       | Adjusts the proportion of the flanger sound that is fed back into the effect. Negative (-) settings will invert the phase.                |
| 9  | Flanger Balance #2 | 0–100 | D100:0W–D0:100W | Adjusts the volume balance between the sound that is sent through the flanger (W) and the sound that is not sent through the flanger (D). |
| 10 | Level              | 0–127 | 0–127           | Output Level  |

## ● 0208: Enhancer → Delay

This effect connects an enhancer and a delay in series.

| No | Parameter        | Value |                     | Description   |
|----|------------------|-------|---------------------|---|
| 1  | Enhancer Sens #1 | 0–127 | 0–127               | Sensitivity of the enhancer   |
| 2  | Enhancer Mix     | 0–127 | 0–127               | Level of the overtones generated by the enhancer  |
| 3  | Delay Time Mode  | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 4  | Delay Time       | 0–127 | 1–2540 ms           | Adjusts the delay time from the direct sound until the delay sound is heard. (ms)   |
| 5  | Delay Time       | 0–21  | note                | Adjusts the delay time from the direct sound until the delay sound is heard. (note)   |
| 6  | Delay Feedback   | 49–89 | 0–+80 %             | Adjusts the proportion of the delay sound that is fed back into the effect.   |
| 7  | Delay HF Damp    | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect will be cut. If you do not want to cut the high frequencies, set this parameter to Bypass. |
| 8  | Delay Balance #2 | 0–100 | D100:0W–D0:100W     | Adjusts the volume balance between the sound that is sent through the delay (W) and the sound that is not sent through the delay (D).                     |
| 9  | Level            | 0–127 | 0–127               | Output Level  |

## ● 0209: Chorus → Delay

This effect connects a chorus and a delay in series.

| No | Parameter         | Value |                     | Description   |
|----|-------------------|-------|---------------------|---|
| 1  | Chorus Pre Delay  | 0–125 | 0.0–100.0 ms        | Adjusts the delay time from the direct sound until the chorus sound is heard.   |
| 2  | Chorus Rate Mode  | 0–1   | Hz, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 3  | Chorus Rate       | 1–127 | 0.05–10.00 Hz       | Frequency of modulation (Hz)  |
| 4  | Chorus Rate       | 0–21  | note                | Frequency of modulation (note)  |
| 5  | Chorus Depth      | 0–127 | 0–127               | Depth of modulation   |
| 6  | Chorus Balance #1 | 0–100 | D100:0W–D0:100W     | Volume balance between the direct sound (D) and the chorus sound (W)  |
| 7  | Delay Time Mode   | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 8  | Delay Time        | 0–127 | 1–2540 ms           | Adjusts the delay time from the direct sound until the delay sound is heard. (ms)   |
| 9  | Delay Time        | 0–21  | note                | Adjusts the delay time from the direct sound until the delay sound is heard. (note)   |
| 10 | Delay Feedback    | 49–89 | 0–+80 %             | Adjusts the proportion of the delay sound that is fed back into the effect.   |
| 11 | Delay HF Damp     | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect will be cut. If you do not want to cut the high frequencies, set this parameter to Bypass. |

| No | Parameter        | Value |                 | Description   |
|----|------------------|-------|-----------------|---|
| 12 | Delay Balance #2 | 0–100 | D100:0W–D0:100W | Adjusts the volume balance between the sound that is sent through the delay (W) and the sound that is not sent through the delay (D). |
| 13 | Level            | 0–127 | 0–127           | Output Level  |

## ● 020a: Flanger → Delay

This effect connects a flanger and a delay in series.

| No | Parameter          | Value |                     | Description   |
|----|--------------------|-------|---------------------|---|
| 1  | Flanger Pre Delay  | 0–125 | 0.0–100.0 ms        | Adjusts the delay time from when the direct sound begins until the flanger sound is heard.  |
| 2  | Flanger Rate Mode  | 0–1   | Hz, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 3  | Flanger Rate       | 1–127 | 0.05–10.00 Hz       | Frequency of modulation (Hz)  |
| 4  | Flanger Rate       | 0–21  | note                | Frequency of modulation (note)  |
| 5  | Flanger Depth      | 0–127 | 0–127               | Depth of modulation   |
| 6  | Flanger Feedback   | 0–98  | -98–+98 %           | Adjusts the proportion of the flanger sound that is fed back into the effect. Negative (-) settings will invert the phase.                                |
| 7  | Flanger Balance #1 | 0–100 | D100:0W–D0:100W     | Volume balance between the direct sound (D) and the flanger sound (W)   |
| 8  | Delay Time Mode    | 0–1   | ms, note            | When this is set to “note,” the effect is synchronized with the tempo.  |
| 9  | Delay Time         | 0–127 | 1–2540 ms           | Adjusts the delay time from the direct sound until the delay sound is heard. (ms)   |
| 10 | Delay Time         | 0–21  | note                | Adjusts the delay time from the direct sound until the delay sound is heard. (note)   |
| 11 | Delay Feedback     | 49–89 | 0–+80 %             | Adjusts the proportion of the delay sound that is fed back into the effect.   |
| 12 | Delay HF Damp      | 0–17  | 200–8000 Hz, Bypass | Adjusts the frequency above which sound fed back to the effect will be cut. If you do not want to cut the high frequencies, set this parameter to Bypass. |
| 13 | Delay Balance #2   | 0–100 | D100:0W–D0:100W     | Adjusts the volume balance between the sound that is sent through the delay (W) and the sound that is not sent through the delay (D).                     |
| 14 | Level              | 0–127 | 0–127               | Output Level  |

### ● 020b: Chorus → Flanger

This effect connects a chorus and a flanger in series.

| No | Parameter          | Value |                 | Description   |
|----|--------------------|-------|-----------------|---|
| 1  | Chorus Pre Delay   | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from the direct sound until the chorus sound is heard.   |
| 2  | Chorus Rate Mode   | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.  |
| 3  | Chorus Rate        | 1–127 | 0.05–10.00 Hz   | Modulation frequency of the chorus effect (Hz)  |
| 4  | Chorus Rate        | 0–21  | note            | Modulation frequency of the chorus effect (note)  |
| 5  | Chorus Depth       | 0–127 | 0–127           | Modulation depth of the chorus effect   |
| 6  | Chorus Balance #1  | 0–100 | D100:0W–D0:100W | Volume balance between the direct sound (D) and the chorus sound (W)  |
| 7  | Flanger Pre Delay  | 0–125 | 0.0–100.0 ms    | Adjusts the delay time from when the direct sound begins until the flanger sound is heard.  |
| 8  | Flanger Rate Mode  | 0–1   | Hz, note        | When this is set to “note,” the effect is synchronized with the tempo.  |
| 9  | Flanger Rate       | 1–127 | 0.05–10.00 Hz   | Modulation frequency of the flanger effect (Hz)   |
| 10 | Flanger Rate       | 0–21  | note            | Modulation frequency of the flanger effect (note)   |
| 11 | Flanger Depth      | 0–127 | 0–127           | Modulation depth of the flanger effect  |
| 12 | Flanger Feedback   | 0–98  | -98–+98 %       | Adjusts the proportion of the flanger sound that is fed back into the effect. Negative (-) settings will invert the phase.                |
| 13 | Flanger Balance #2 | 0–100 | D100:0W–D0:100W | Adjusts the volume balance between the sound that is sent through the flanger (W) and the sound that is not sent through the flanger (D). |
| 14 | Level              | 0–127 | 0–127           | Output Level  |

## 6. Tone List

| No.          | Name                | MSB | LSB | PC  |
|--------------|---------------------|-----|-----|-----|
| <b>Piano</b> |                     |     |     |     |
| 1            | Concert Piano       | 0   | 68  | 1   |
| 2            | Ballade Piano       | 16  | 67  | 1   |
| 3            | Bright Piano        | 8   | 66  | 2   |
| 4            | Magical Piano       | 47  | 65  | 3   |
| 5            | Piano + Strings     | 25  | 64  | 1   |
| 6            | Piano + Pad         | 47  | 64  | 3   |
| 7            | Piano + Choir       | 26  | 64  | 1   |
| 8            | Rock Piano          | 8   | 64  | 3   |
| 9            | Ragtime Piano       | 0   | 64  | 4   |
| 10           | Harpsichord         | 0   | 66  | 7   |
| 11           | Coupled Harpsichord | 8   | 66  | 7   |
| <b>Other</b> |                     |     |     |     |
| 1            | Trem. TineEP        | 0   | 64  | 5   |
| 2            | Pop E.Piano         | 16  | 67  | 5   |
| 3            | Tine EP             | 0   | 66  | 5   |
| 4            | FM E.Piano          | 0   | 70  | 6   |
| 5            | Bright FM EP        | 0   | 64  | 6   |
| 6            | Vib. ReedEP         | 24  | 69  | 5   |
| 7            | Clav.               | 0   | 67  | 8   |
| 8            | PhaserTineEP        | 0   | 71  | 5   |
| 9            | Vibraphone          | 0   | 0   | 12  |
| 10           | Marimba             | 0   | 64  | 13  |
| 11           | Celesta             | 0   | 0   | 9   |
| 12           | Mallet Isle         | 0   | 64  | 115 |
| 13           | Morning Lite        | 0   | 68  | 99  |
| 14           | SymphonicStr        | 1   | 67  | 50  |
| 15           | Rich Strings        | 0   | 71  | 50  |
| 16           | OrchestraStr        | 0   | 64  | 49  |
| 17           | DecayStrings        | 1   | 65  | 50  |
| 18           | Harp                | 0   | 68  | 47  |
| 19           | PizzicatoStr        | 0   | 0   | 46  |
| 20           | ChurchOrgan1        | 0   | 66  | 20  |
| 21           | ChurchOrgan2        | 8   | 69  | 20  |
| 22           | Combo Jz.Org        | 0   | 70  | 19  |
| 23           | Ballad Organ        | 0   | 69  | 19  |
| 24           | Full Stops          | 0   | 69  | 17  |
| 25           | Mellow Bars         | 32  | 68  | 17  |
| 26           | Accordion           | 0   | 68  | 22  |
| 27           | Aerial Choir        | 8   | 64  | 53  |
| 28           | Jazz Scat           | 0   | 65  | 55  |
| 29           | Female Aahs         | 8   | 66  | 53  |
| 30           | Male Aahs           | 8   | 68  | 53  |
| 31           | Decay Choir         | 1   | 64  | 53  |
| 32           | Thum Voice          | 0   | 66  | 54  |
| 33           | Soft Pad            | 0   | 64  | 90  |
| 34           | Dcy ChoirPad        | 1   | 66  | 90  |
| 35           | Nylon-str.Gt        | 0   | 0   | 25  |
| 36           | Steel-str.Gt        | 0   | 0   | 26  |
| 37           | Jazz Guitar         | 0   | 64  | 27  |
| 38           | AcousticBass        | 0   | 71  | 33  |
| 39           | A.Bass+Cymb1        | 0   | 66  | 33  |
| 40           | FingeredBass        | 0   | 0   | 34  |
| <b>GM2</b>   |                     |     |     |     |
| 41           | STANDARD Set        | 120 | 0   | 1   |

| No. | Name         | MSB | LSB | PC |
|-----|--------------|-----|-----|----|
| 42  | ROOM Set     | 120 | 0   | 9  |
| 43  | POWER Set    | 120 | 0   | 17 |
| 44  | ELEC.Set     | 120 | 0   | 25 |
| 45  | ANALOG Set   | 120 | 0   | 26 |
| 46  | JAZZ Set     | 120 | 0   | 33 |
| 47  | BRUSH Set    | 120 | 0   | 41 |
| 48  | ORCH.Set     | 120 | 0   | 49 |
| 49  | SFX Set      | 120 | 0   | 57 |
| 50  | Piano 1      | 121 | 0   | 1  |
| 51  | Piano 1w     | 121 | 1   | 1  |
| 52  | Piano 1d     | 121 | 2   | 1  |
| 53  | Piano 2      | 121 | 0   | 2  |
| 54  | Piano 2w     | 121 | 1   | 2  |
| 55  | Piano 3      | 121 | 0   | 3  |
| 56  | Piano 3w     | 121 | 1   | 3  |
| 57  | Honky-tonk   | 121 | 0   | 4  |
| 58  | Honky-tonk w | 121 | 1   | 4  |
| 59  | E.Piano 1    | 121 | 0   | 5  |
| 60  | Detuned EP 1 | 121 | 1   | 5  |
| 61  | Vintage EP   | 121 | 2   | 5  |
| 62  | '60s E.Piano | 121 | 3   | 5  |
| 63  | E.Piano 2    | 121 | 0   | 6  |
| 64  | Detuned EP 2 | 121 | 1   | 6  |
| 65  | St.FM EP     | 121 | 2   | 6  |
| 66  | EP Legend    | 121 | 3   | 6  |
| 67  | EP Phase     | 121 | 4   | 6  |
| 68  | Harpsi.      | 121 | 0   | 7  |
| 69  | Coupled Hps. | 121 | 1   | 7  |
| 70  | Harpsi.w     | 121 | 2   | 7  |
| 71  | Harpsi.o     | 121 | 3   | 7  |
| 72  | Clav.        | 121 | 0   | 8  |
| 73  | Pulse Clav.  | 121 | 1   | 8  |
| 74  | Celesta      | 121 | 0   | 9  |
| 75  | Glockenspiel | 121 | 0   | 10 |
| 76  | Music Box    | 121 | 0   | 11 |
| 77  | Vibraphone   | 121 | 0   | 12 |
| 78  | Vibraphone w | 121 | 1   | 12 |
| 79  | Marimba      | 121 | 0   | 13 |
| 80  | Marimba w    | 121 | 1   | 13 |
| 81  | Xylophone    | 121 | 0   | 14 |
| 82  | TubularBells | 121 | 0   | 15 |
| 83  | Church Bell  | 121 | 1   | 15 |
| 84  | Carillon     | 121 | 2   | 15 |
| 85  | Santur       | 121 | 0   | 16 |
| 86  | Organ 1      | 121 | 0   | 17 |
| 87  | TremoloOrgan | 121 | 1   | 17 |
| 88  | '60s Organ   | 121 | 2   | 17 |
| 89  | Organ 2      | 121 | 3   | 17 |
| 90  | Perc.Organ 1 | 121 | 0   | 18 |
| 91  | Chorus Organ | 121 | 1   | 18 |
| 92  | Perc.Organ 2 | 121 | 2   | 18 |
| 93  | Rock Organ   | 121 | 0   | 19 |
| 94  | Church Org.1 | 121 | 0   | 20 |
| 95  | Church Org.2 | 121 | 1   | 20 |
| 96  | Church Org.3 | 121 | 2   | 20 |
| 97  | Reed Organ   | 121 | 0   | 21 |

## MIDI Implementation

| No. | Name         | MSB | LSB | PC |
|-----|--------------|-----|-----|----|
| 98  | Puff Organ   | 121 | 1   | 21 |
| 99  | Accordion 1  | 121 | 0   | 22 |
| 100 | Accordion 2  | 121 | 1   | 22 |
| 101 | Harmonica    | 121 | 0   | 23 |
| 102 | Bandoneon    | 121 | 0   | 24 |
| 103 | Nylon-str.Gt | 121 | 0   | 25 |
| 104 | Ukulele      | 121 | 1   | 25 |
| 105 | Nylon Gt o   | 121 | 2   | 25 |
| 106 | Nylon Gt 2   | 121 | 3   | 25 |
| 107 | Steel-str.Gt | 121 | 0   | 26 |
| 108 | 12-str.Gt    | 121 | 1   | 26 |
| 109 | Mandolin     | 121 | 2   | 26 |
| 110 | Steel+Body   | 121 | 3   | 26 |
| 111 | Jazz Guitar  | 121 | 0   | 27 |
| 112 | Hawaiian Gt  | 121 | 1   | 27 |
| 113 | Clean Guitar | 121 | 0   | 28 |
| 114 | Chorus Gt 1  | 121 | 1   | 28 |
| 115 | Mid Tone Gt  | 121 | 2   | 28 |
| 116 | Muted Guitar | 121 | 0   | 29 |
| 117 | Funk Guitar1 | 121 | 1   | 29 |
| 118 | Funk Guitar2 | 121 | 2   | 29 |
| 119 | Chorus Gt 2  | 121 | 3   | 29 |
| 120 | Overdrive Gt | 121 | 0   | 30 |
| 121 | Guitar Pinch | 121 | 1   | 30 |
| 122 | DistortionGt | 121 | 0   | 31 |
| 123 | Gt Feedback1 | 121 | 1   | 31 |
| 124 | Dist.Rtm Gt  | 121 | 2   | 31 |
| 125 | Gt Harmonics | 121 | 0   | 32 |
| 126 | Gt Feedback2 | 121 | 1   | 32 |
| 127 | AcousticBass | 121 | 0   | 33 |
| 128 | FingeredBass | 121 | 0   | 34 |
| 129 | Finger Slap  | 121 | 1   | 34 |
| 130 | Picked Bass  | 121 | 0   | 35 |
| 131 | FretlessBass | 121 | 0   | 36 |
| 132 | Slap Bass 1  | 121 | 0   | 37 |
| 133 | Slap Bass 2  | 121 | 0   | 38 |
| 134 | Synth Bass 1 | 121 | 0   | 39 |
| 135 | WarmSyn.Bass | 121 | 1   | 39 |
| 136 | Synth Bass 3 | 121 | 2   | 39 |
| 137 | Clav.Bass    | 121 | 3   | 39 |
| 138 | Hammer       | 121 | 4   | 39 |
| 139 | Synth Bass 2 | 121 | 0   | 40 |
| 140 | Synth Bass 4 | 121 | 1   | 40 |
| 141 | RubberSyn.Bs | 121 | 2   | 40 |
| 142 | Attack Pulse | 121 | 3   | 40 |
| 143 | Violin       | 121 | 0   | 41 |
| 144 | Slow Violin  | 121 | 1   | 41 |
| 145 | Viola        | 121 | 0   | 42 |
| 146 | Cello        | 121 | 0   | 43 |
| 147 | Contrabass   | 121 | 0   | 44 |
| 148 | Tremolo Str. | 121 | 0   | 45 |
| 149 | PizzicatoStr | 121 | 0   | 46 |
| 150 | Harp         | 121 | 0   | 47 |
| 151 | Yang Qin     | 121 | 1   | 47 |
| 152 | Timpani      | 121 | 0   | 48 |
| 153 | Strings      | 121 | 0   | 49 |

| No. | Name         | MSB | LSB | PC |
|-----|--------------|-----|-----|----|
| 154 | Orchestra    | 121 | 1   | 49 |
| 155 | '60s Strings | 121 | 2   | 49 |
| 156 | Slow Strings | 121 | 0   | 50 |
| 157 | Syn.Strings1 | 121 | 0   | 51 |
| 158 | Syn.Strings3 | 121 | 1   | 51 |
| 159 | Syn.Strings2 | 121 | 0   | 52 |
| 160 | Choir 1      | 121 | 0   | 53 |
| 161 | Choir 2      | 121 | 1   | 53 |
| 162 | Voice        | 121 | 0   | 54 |
| 163 | Humming      | 121 | 1   | 54 |
| 164 | Synth Voice  | 121 | 0   | 55 |
| 165 | Analog Voice | 121 | 1   | 55 |
| 166 | OrchestraHit | 121 | 0   | 56 |
| 167 | Bass Hit     | 121 | 1   | 56 |
| 168 | 6th Hit      | 121 | 2   | 56 |
| 169 | Euro Hit     | 121 | 3   | 56 |
| 170 | Trumpet      | 121 | 0   | 57 |
| 171 | Dark Trumpet | 121 | 1   | 57 |
| 172 | Trombone 1   | 121 | 0   | 58 |
| 173 | Trombone 2   | 121 | 1   | 58 |
| 174 | Bright Tb    | 121 | 2   | 58 |
| 175 | Tuba         | 121 | 0   | 59 |
| 176 | MuteTrumpet1 | 121 | 0   | 60 |
| 177 | MuteTrumpet2 | 121 | 1   | 60 |
| 178 | French Horn1 | 121 | 0   | 61 |
| 179 | French Horn2 | 121 | 1   | 61 |
| 180 | Brass 1      | 121 | 0   | 62 |
| 181 | Brass 2      | 121 | 1   | 62 |
| 182 | Synth Brass1 | 121 | 0   | 63 |
| 183 | Synth Brass3 | 121 | 1   | 63 |
| 184 | AnalogBrass1 | 121 | 2   | 63 |
| 185 | Jump Brass   | 121 | 3   | 63 |
| 186 | Synth Brass2 | 121 | 0   | 64 |
| 187 | Synth Brass4 | 121 | 1   | 64 |
| 188 | AnalogBrass2 | 121 | 2   | 64 |
| 189 | Soprano Sax  | 121 | 0   | 65 |
| 190 | Alto Sax     | 121 | 0   | 66 |
| 191 | Tenor Sax    | 121 | 0   | 67 |
| 192 | Baritone Sax | 121 | 0   | 68 |
| 193 | Oboe         | 121 | 0   | 69 |
| 194 | English Horn | 121 | 0   | 70 |
| 195 | Bassoon      | 121 | 0   | 71 |
| 196 | Clarinet     | 121 | 0   | 72 |
| 197 | Piccolo      | 121 | 0   | 73 |
| 198 | Flute        | 121 | 0   | 74 |
| 199 | Recorder     | 121 | 0   | 75 |
| 200 | Pan Flute    | 121 | 0   | 76 |
| 201 | Bottle Blow  | 121 | 0   | 77 |
| 202 | Shakuhachi   | 121 | 0   | 78 |
| 203 | Whistle      | 121 | 0   | 79 |
| 204 | Ocarina      | 121 | 0   | 80 |
| 205 | Square Lead1 | 121 | 0   | 81 |
| 206 | Square Lead2 | 121 | 1   | 81 |
| 207 | Sine Lead    | 121 | 2   | 81 |
| 208 | Saw Lead 1   | 121 | 0   | 82 |
| 209 | Saw Lead 2   | 121 | 1   | 82 |

| No. | Name         | MSB | LSB | PC  |
|-----|--------------|-----|-----|-----|
| 210 | Doctor Solo  | 121 | 2   | 82  |
| 211 | Natural Lead | 121 | 3   | 82  |
| 212 | SequencedSaw | 121 | 4   | 82  |
| 213 | Syn.Calliope | 121 | 0   | 83  |
| 214 | Chiffer Lead | 121 | 0   | 84  |
| 215 | Charang      | 121 | 0   | 85  |
| 216 | Wire Lead    | 121 | 1   | 85  |
| 217 | Solo Vox     | 121 | 0   | 86  |
| 218 | 5th Saw Lead | 121 | 0   | 87  |
| 219 | Bass+Lead    | 121 | 0   | 88  |
| 220 | Delayed Lead | 121 | 1   | 88  |
| 221 | Fantasia     | 121 | 0   | 89  |
| 222 | Warm Pad     | 121 | 0   | 90  |
| 223 | Sine Pad     | 121 | 1   | 90  |
| 224 | Polysynth    | 121 | 0   | 91  |
| 225 | Space Voice  | 121 | 0   | 92  |
| 226 | Itopia       | 121 | 1   | 92  |
| 227 | Bowed Glass  | 121 | 0   | 93  |
| 228 | Metallic Pad | 121 | 0   | 94  |
| 229 | Halo Pad     | 121 | 0   | 95  |
| 230 | Sweep Pad    | 121 | 0   | 96  |
| 231 | Ice Rain     | 121 | 0   | 97  |
| 232 | Soundtrack   | 121 | 0   | 98  |
| 233 | Crystal      | 121 | 0   | 99  |
| 234 | Synth Mallet | 121 | 1   | 99  |
| 235 | Atmosphere   | 121 | 0   | 100 |
| 236 | Brightness   | 121 | 0   | 101 |
| 237 | Goblins      | 121 | 0   | 102 |
| 238 | Echo Drops   | 121 | 0   | 103 |
| 239 | Echo Bell    | 121 | 1   | 103 |
| 240 | Echo Pan     | 121 | 2   | 103 |
| 241 | Star Theme   | 121 | 0   | 104 |
| 242 | Sitar 1      | 121 | 0   | 105 |
| 243 | Sitar 2      | 121 | 1   | 105 |
| 244 | Banjo        | 121 | 0   | 106 |
| 245 | Shamisen     | 121 | 0   | 107 |
| 246 | Koto         | 121 | 0   | 108 |
| 247 | Taisho Koto  | 121 | 1   | 108 |
| 248 | Kalimba      | 121 | 0   | 109 |
| 249 | Bagpipe      | 121 | 0   | 110 |
| 250 | Fiddle       | 121 | 0   | 111 |
| 251 | Shanai       | 121 | 0   | 112 |
| 252 | Tinkle Bell  | 121 | 0   | 113 |
| 253 | Agogo        | 121 | 0   | 114 |
| 254 | Steel Drums  | 121 | 0   | 115 |
| 255 | Woodblock    | 121 | 0   | 116 |
| 256 | Castanets    | 121 | 1   | 116 |
| 257 | Taiko        | 121 | 0   | 117 |
| 258 | Concert BD   | 121 | 1   | 117 |
| 259 | Melodic Tom1 | 121 | 0   | 118 |
| 260 | Melodic Tom2 | 121 | 1   | 118 |
| 261 | Synth Drum   | 121 | 0   | 119 |
| 262 | TR-808 Tom   | 121 | 1   | 119 |
| 263 | Elec.Perc.   | 121 | 2   | 119 |
| 264 | Reverse Cym. | 121 | 0   | 120 |
| 265 | Gt FretNoise | 121 | 0   | 121 |

| No. | Name         | MSB | LSB | PC  |
|-----|--------------|-----|-----|-----|
| 266 | Gt Cut Noise | 121 | 1   | 121 |
| 267 | BsStringSlap | 121 | 2   | 121 |
| 268 | Breath Noise | 121 | 0   | 122 |
| 269 | Fl.Key Click | 121 | 1   | 122 |
| 270 | Seashore     | 121 | 0   | 123 |
| 271 | Rain         | 121 | 1   | 123 |
| 272 | Thunder      | 121 | 2   | 123 |
| 273 | Wind         | 121 | 3   | 123 |
| 274 | Stream       | 121 | 4   | 123 |
| 275 | Bubble       | 121 | 5   | 123 |
| 276 | Bird 1       | 121 | 0   | 124 |
| 277 | Dog          | 121 | 1   | 124 |
| 278 | Horse Gallop | 121 | 2   | 124 |
| 279 | Bird 2       | 121 | 3   | 124 |
| 280 | Telephone 1  | 121 | 0   | 125 |
| 281 | Telephone 2  | 121 | 1   | 125 |
| 282 | DoorCreaking | 121 | 2   | 125 |
| 283 | Door         | 121 | 3   | 125 |
| 284 | Scratch      | 121 | 4   | 125 |
| 285 | Wind Chimes  | 121 | 5   | 125 |
| 286 | Helicopter   | 121 | 0   | 126 |
| 287 | Car Engine   | 121 | 1   | 126 |
| 288 | Car Stop     | 121 | 2   | 126 |
| 289 | Car Pass     | 121 | 3   | 126 |
| 290 | Car Crash    | 121 | 4   | 126 |
| 291 | Siren        | 121 | 5   | 126 |
| 292 | Train        | 121 | 6   | 126 |
| 293 | Jetplane     | 121 | 7   | 126 |
| 294 | Starship     | 121 | 8   | 126 |
| 295 | Burst Noise  | 121 | 9   | 126 |
| 296 | Applause     | 121 | 0   | 127 |
| 297 | Laughing     | 121 | 1   | 127 |
| 298 | Screaming    | 121 | 2   | 127 |
| 299 | Punch        | 121 | 3   | 127 |
| 300 | Heart Beat   | 121 | 4   | 127 |
| 301 | Footsteps    | 121 | 5   | 127 |
| 302 | Gun Shot     | 121 | 0   | 128 |
| 303 | Machine Gun  | 121 | 1   | 128 |
| 304 | Laser Gun    | 121 | 2   | 128 |
| 305 | Explosion    | 121 | 3   | 128 |

Rhythm Set List

\* - - - -: No sound.

\* [EXC]: will not sound simultaneously with other percussion instruments of the same number.

|    | STANDARD Set                 | ROOM Set                  | POWER Set                 | ELECTRONIC Set            |
|----|------------------------------|---------------------------|---------------------------|---------------------------|
|    | 21 -----                     | -----                     | -----                     | -----                     |
|    | 22 -----                     | -----                     | -----                     | -----                     |
|    | 23 -----                     | -----                     | -----                     | -----                     |
| C1 | 24 -----                     | -----                     | -----                     | -----                     |
|    | 25 -----                     | -----                     | -----                     | -----                     |
|    | 26 -----                     | -----                     | -----                     | -----                     |
|    | 27 High-Q                    | High-Q                    | High-Q                    | High-Q                    |
|    | 28 Slap                      | Slap                      | Slap                      | Slap                      |
|    | 29 Scratch Push [EXC7]       | Scratch Push [EXC7]       | Scratch Push [EXC7]       | Scratch Push [EXC7]       |
|    | 30 Scratch Pull [EXC7]       | Scratch Pull [EXC7]       | Scratch Pull [EXC7]       | Scratch Pull [EXC7]       |
|    | 31 Sticks                    | Sticks                    | Sticks                    | Sticks                    |
|    | 32 Square Click              | Square Click              | Square Click              | Square Click              |
|    | 33 Metronome Click           | Metronome Click           | Metronome Click           | Metronome Click           |
|    | 34 Metronome Bell            | Metronome Bell            | Metronome Bell            | Metronome Bell            |
|    | 35 Kick Drum 2               | Room Kick 2               | Room Kick 1               | Power Kick                |
| C2 | 36 Kick Drum 1               | Room Kick 1               | Power Kick                | Electric Kick             |
|    | 37 Side Stick                | Side Stick                | Side Stick                | Side Stick                |
|    | 38 Snare Drum                | Room Snare                | Power Snare               | Electric Snare 1          |
|    | 39 Hand Clap                 | Hand Clap                 | Hand Clap                 | Hand Clap                 |
|    | 40 Electric Snare 3          | Electric Snare 4          | Electric Snare 5          | Electric Snare 2          |
|    | 41 Low Tom 2                 | Room Low Tom 2            | Power Low Tom 2           | Electric Low Tom 2        |
|    | 42 Closed Hi-Hat 1 [EXC1]    | Closed Hi-Hat 2 [EXC1]    | Closed Hi-Hat 2 [EXC1]    | Closed Hi-Hat 2 [EXC1]    |
|    | 43 Low Tom 1                 | Room Low Tom 1            | Power Low Tom 1           | Electric Low Tom 1        |
|    | 44 Pedal Hi-Hat 1 [EXC1]     | Pedal Hi-Hat 2 [EXC1]     | Pedal Hi-Hat 2 [EXC1]     | Pedal Hi-Hat 2 [EXC1]     |
|    | 45 Mid Tom 2                 | Room Mid Tom 2            | Power Mid Tom 2           | Electric Mid Tom 2        |
|    | 46 Open Hi-Hat 1 [EXC1]      | Open Hi-Hat 2 [EXC1]      | Open Hi-Hat 2 [EXC1]      | Open Hi-Hat 2 [EXC1]      |
|    | 47 Mid Tom 1                 | Room Mid Tom 1            | Power Mid Tom 1           | Electric Mid Tom 1        |
| C3 | 48 High Tom 2                | Room High Tom 2           | Power High Tom 2          | Electric High Tom 2       |
|    | 49 Crash Cymbal 1            | Crash Cymbal 3            | Crash Cymbal 3            | Crash Cymbal 3            |
|    | 50 High Tom 1                | Room High Tom 1           | Power High Tom 1          | Electric High Tom 1       |
|    | 51 Ride Cymbal 1             | Ride Cymbal 3             | Ride Cymbal 3             | Ride Cymbal 3             |
|    | 52 Chinese Cymbal 1          | Chinese Cymbal 2          | Chinese Cymbal 2          | Reverse Cymbal            |
|    | 53 Ride Bell 1               | Ride Bell 2               | Ride Bell 2               | Ride Bell 2               |
|    | 54 Tambourine                | Tambourine                | Tambourine                | Tambourine                |
|    | 55 Splash Cymbal             | Splash Cymbal             | Splash Cymbal             | Splash Cymbal             |
|    | 56 Cowbell                   | Cowbell                   | Cowbell                   | Cowbell                   |
|    | 57 Crash Cymbal 2            | Crash Cymbal 4            | Crash Cymbal 4            | Crash Cymbal 4            |
|    | 58 Vibraslap                 | Vibraslap                 | Vibraslap                 | Vibraslap                 |
|    | 59 Ride Cymbal 2             | Ride Cymbal 4             | Ride Cymbal 4             | Ride Cymbal 4             |
| C4 | 60 High Bongo 1              | High Bongo 2              | High Bongo 2              | High Bongo 2              |
|    | 61 Low Bongo 1               | Low Bongo 2               | Low Bongo 2               | Low Bongo 2               |
|    | 62 Mute High Conga 1         | Mute High Conga 2         | Mute High Conga 2         | Mute High Conga 2         |
|    | 63 Open High Conga           | Open High Conga           | Open High Conga           | Open High Conga           |
|    | 64 Low Conga                 | Low Conga                 | Low Conga                 | Low Conga                 |
|    | 65 High Timbale              | High Timbale              | High Timbale              | High Timbale              |
|    | 66 Low Timbale               | Low Timbale               | Low Timbale               | Low Timbale               |
|    | 67 High Agogo                | High Agogo                | High Agogo                | High Agogo                |
|    | 68 Low Agogo                 | Low Agogo                 | Low Agogo                 | Low Agogo                 |
|    | 69 Cabasa                    | Cabasa                    | Cabasa                    | Cabasa                    |
|    | 70 Maracas                   | Maracas                   | Maracas                   | Maracas                   |
|    | 71 Short High Whistle [EXC2] | Short High Whistle [EXC2] | Short High Whistle [EXC2] | Short High Whistle [EXC2] |
| C5 | 72 Long Low Whistle [EXC2]   | Long Low Whistle [EXC2]   | Long Low Whistle [EXC2]   | Long Low Whistle [EXC2]   |
|    | 73 Short Guiro [EXC3]        | Short Guiro [EXC3]        | Short Guiro [EXC3]        | Short Guiro [EXC3]        |
|    | 74 Long Guiro [EXC3]         | Long Guiro [EXC3]         | Long Guiro [EXC3]         | Long Guiro [EXC3]         |
|    | 75 Claves                    | Claves                    | Claves                    | Claves                    |
|    | 76 High Woodblock            | High Woodblock            | High Woodblock            | High Woodblock            |
|    | 77 Low Woodblock             | Low Woodblock             | Low Woodblock             | Low Woodblock             |
|    | 78 Mute Cuica [EXC4]         | Mute Cuica [EXC4]         | Mute Cuica [EXC4]         | Mute Cuica [EXC4]         |
|    | 79 Open Cuica [EXC4]         | Open Cuica [EXC4]         | Open Cuica [EXC4]         | Open Cuica [EXC4]         |
|    | 80 Mute Triangle [EXC5]      | Mute Triangle [EXC5]      | Mute Triangle [EXC5]      | Mute Triangle [EXC5]      |
|    | 81 Open Triangle [EXC5]      | Open Triangle [EXC5]      | Open Triangle [EXC5]      | Open Triangle [EXC5]      |
|    | 82 Shaker                    | Shaker                    | Shaker                    | Shaker                    |
|    | 83 Jingle Bell               | Jingle Bell               | Jingle Bell               | Jingle Bell               |
| C6 | 84 Bell Tree                 | Bell Tree                 | Bell Tree                 | Bell Tree                 |
|    | 85 Castanets                 | Castanets                 | Castanets                 | Castanets                 |
|    | 86 Mute Surdo [EXC6]         | Mute Surdo [EXC6]         | Mute Surdo [EXC6]         | Mute Surdo [EXC6]         |
|    | 87 Open Surdo [EXC6]         | Open Surdo [EXC6]         | Open Surdo [EXC6]         | Open Surdo [EXC6]         |
|    | 88 -----                     | -----                     | -----                     | -----                     |



\* - - - - : No sound.

\* [EXC]: will not sound simultaneously with other percussion instruments of the same number.

|    | ANALOG Set                | JAZZ Set                      | BRUSH Set                 | ORCHESTRA Set              |                         |
|----|---------------------------|-------------------------------|---------------------------|----------------------------|-------------------------|
| C1 | 21                        | ----                          | ----                      | ----                       |                         |
|    | 22                        | ----                          | ----                      | ----                       |                         |
|    | 23                        | ----                          | ----                      | ----                       |                         |
|    | 24                        | ----                          | ----                      | ----                       |                         |
|    | 25                        | ----                          | ----                      | ----                       |                         |
|    | 26                        | ----                          | ----                      | ----                       |                         |
|    | 27                        | High-Q                        | High-Q                    | High-Q                     | Closed Hi-Hat 2 [EXC1]  |
|    | 28                        | Slap                          | Slap                      | Slap                       | Pedal Hi-Hat 2 [EXC1]   |
|    | 29                        | Scratch Push [EXC7]           | Scratch Push [EXC7]       | Scratch Push [EXC7]        | Open Hi-Hat 2 [EXC1]    |
|    | 30                        | Scratch Pull [EXC7]           | Scratch Pull [EXC7]       | Scratch Pull [EXC7]        | Ride Cymbal 3           |
| 31 | Sticks                    | Sticks                        | Sticks                    | Sticks                     |                         |
| 32 | Square Click              | Square Click                  | Square Click              | Square Click               |                         |
| 33 | Metronome Click           | Metronome Click               | Metronome Click           | Metronome Click            |                         |
| 34 | Metronome Bell            | Metronome Bell                | Metronome Bell            | Metronome Bell             |                         |
| 35 | TR-808 Kick 2             | Room Kick 2                   | Room Kick 2               | Concert Bass Drum 2        |                         |
| C2 | 36                        | TR-808 Kick 1                 | Jazz Kick                 | Jazz Kick                  | Concert Bass Drum 1     |
|    | 37                        | TR-808 Rim shot               | Side Stick                | Side Stick                 | Side Stick              |
|    | 38                        | TR-808 Snare                  | Jazz Snare                | Brush Tap                  | Concert Snare Drum      |
|    | 39                        | Hand Clap                     | Hand Clap                 | Brush Slap1                | Castanets               |
|    | 40                        | Electric Snare 6              | Electric Snare 7          | Brush Swirl                | Concert Snare Drum      |
|    | 41                        | TR-808 Low Tom 2              | Jazz Low Tom              | Brush Low Tom 2            | Timpani F               |
|    | 42                        | TR-808 Closed Hi-Hat 1 [EXC1] | Closed Hi-Hat 2 [EXC1]    | Brush Closed Hi-Hat [EXC1] | Timpani F#              |
|    | 43                        | TR-808 Low Tom 1              | Low Tom 1                 | Brush Low Tom 1            | Timpani G               |
|    | 44                        | TR-808 Closed Hi-Hat 2 [EXC1] | Pedal Hi-Hat 2 [EXC1]     | Brush Pedal Hi-Hat [EXC1]  | Timpani G#              |
|    | 45                        | TR-808 Mid Tom 2              | Mid Tom 2                 | Brush Mid Tom 2            | Timpani A               |
| 46 | TR-808 Open Hi-Hat [EXC1] | Open Hi-Hat 2 [EXC1]          | Brush Open Hi-Hat [EXC1]  | Timpani A#                 |                         |
| 47 | TR-808 Mid Tom 1          | Jazz Mid Tom                  | Brush Mid Tom 1           | Timpani B                  |                         |
| C3 | 48                        | TR-808 High Tom 2             | Jazz High Tom 2           | Brush High Tom 2           | Timpani C               |
|    | 49                        | TR-808 Crash Cymbal           | Crash Cymbal 3            | Jazz Crash Cymbal          | Timpani C#              |
|    | 50                        | TR-808 High Tom 1             | Jazz High Tom 1           | Brush High Tom 1           | Timpani D               |
|    | 51                        | Ride Cymbal 3                 | Ride Cymbal 3             | Jazz Ride Cymbal 1         | Timpani D#              |
|    | 52                        | Chinese Cymbal 2              | Chinese Cymbal 2          | Chinese Cymbal 2           | Timpani E               |
|    | 53                        | Ride Bell 2                   | Ride Bell 2               | Jazz Ride Cymbal 2         | Timpani F               |
|    | 54                        | Tambourine                    | Tambourine                | Tambourine                 | Tambourine              |
|    | 55                        | Splash Cymbal                 | Splash Cymbal             | Splash Cymbal              | Splash Cymbal           |
|    | 56                        | TR-808 Cowbell                | Cowbell                   | Cowbell                    | Cowbell                 |
|    | 57                        | Crash Cymbal 4                | Crash Cymbal 4            | Crash Cymbal 4             | Concert Cymbal 2        |
| 58 | Vibraslap                 | Vibraslap                     | Vibraslap                 | Vibraslap                  |                         |
| 59 | Ride Cymbal4              | Ride Cymbal4                  | Ride Cymbal4              | Concert Cymbal 1           |                         |
| C4 | 60                        | High Bongo 2                  | High Bongo 2              | High Bongo 2               | High Bongo 2            |
|    | 61                        | Low Bongo 2                   | Low Bongo 2               | Low Bongo 2                | Low Bongo 2             |
|    | 62                        | TR-808 High Conga             | Mute High Conga 2         | Mute High Conga 2          | Mute High Conga 2       |
|    | 63                        | TR-808 Mid Conga              | Open High Conga           | Open High Conga            | Open High Conga         |
|    | 64                        | TR-808 Low Conga              | Low Conga                 | Low Conga                  | Low Conga               |
|    | 65                        | High Timbale                  | High Timbale              | High Timbale               | High Timbale            |
|    | 66                        | Low Timbale                   | Low Timbale               | Low Timbale                | Low Timbale             |
|    | 67                        | High Agogo                    | High Agogo                | High Agogo                 | High Agogo              |
|    | 68                        | Low Agogo                     | Low Agogo                 | Low Agogo                  | Low Agogo               |
|    | 69                        | Cabasa                        | Cabasa                    | Cabasa                     | Cabasa                  |
| 70 | TR-808 Maracas            | Maracas                       | Maracas                   | Maracas                    |                         |
| 71 | Short High Whistle [EXC2] | Short High Whistle [EXC2]     | Short High Whistle [EXC2] | Short High Whistle [EXC2]  |                         |
| C5 | 72                        | Long Low Whistle [EXC2]       | Long Low Whistle [EXC2]   | Long Low Whistle [EXC2]    | Long Low Whistle [EXC2] |
|    | 73                        | Short Guiro [EXC3]            | Short Guiro [EXC3]        | Short Guiro [EXC3]         | Short Guiro [EXC3]      |
|    | 74                        | Long Guiro [EXC3]             | Long Guiro [EXC3]         | Long Guiro [EXC3]          | Long Guiro [EXC3]       |
|    | 75                        | Claves                        | Claves                    | Claves                     | Claves                  |
|    | 76                        | High Woodblock                | High Woodblock            | High Woodblock             | High Woodblock          |
|    | 77                        | Low Woodblock                 | Low Woodblock             | Low Woodblock              | Low Woodblock           |
|    | 78                        | Mute Cuica [EXC4]             | Mute Cuica [EXC4]         | Mute Cuica [EXC4]          | Mute Cuica [EXC4]       |
|    | 79                        | Open Cuica [EXC4]             | Open Cuica [EXC4]         | Open Cuica [EXC4]          | Open Cuica [EXC4]       |
|    | 80                        | Mute Triangle [EXC5]          | Mute Triangle [EXC5]      | Mute Triangle [EXC5]       | Mute Triangle [EXC5]    |
|    | 81                        | Open Triangle [EXC5]          | Open Triangle [EXC5]      | Open Triangle [EXC5]       | Open Triangle [EXC5]    |
| 82 | Shaker                    | Shaker                        | Shaker                    | Shaker                     |                         |
| 83 | Jingle Bell               | Jingle Bell                   | Jingle Bell               | Jingle Bell                |                         |
| C6 | 84                        | Bell Tree                     | Bell Tree                 | Bell Tree                  | Bell Tree               |
|    | 85                        | Castanets                     | Castanets                 | Castanets                  | Castanets               |
|    | 86                        | Mute Surdo [EXC6]             | Mute Surdo [EXC6]         | Mute Surdo [EXC6]          | Mute Surdo [EXC6]       |
|    | 87                        | Open Surdo [EXC6]             | Open Surdo [EXC6]         | Open Surdo [EXC6]          | Open Surdo [EXC6]       |
| 88 | ----                      | ----                          | ----                      | Applause                   |                         |

# MIDI Implementation

\* - - - -: No sound.

\* [EXC]: will not sound simultaneously with other percussion instruments of the same number.

|    |    | SFX Set                    |        |
|----|----|----------------------------|--------|
|    | 21 | 22                         | -----  |
|    | 23 |                            | -----  |
| C1 | 24 |                            | -----  |
|    | 25 |                            | -----  |
|    | 26 |                            | -----  |
|    | 27 |                            | -----  |
|    | 28 |                            | -----  |
|    | 29 |                            | -----  |
|    | 30 |                            | -----  |
|    | 31 |                            | -----  |
|    | 32 |                            | -----  |
|    | 33 |                            | -----  |
|    | 34 |                            | -----  |
|    | 35 |                            | -----  |
| C2 | 36 |                            | -----  |
|    | 37 |                            | -----  |
|    | 38 |                            | -----  |
|    | 39 | High Q Slap                |        |
|    | 40 |                            |        |
|    | 41 | Scratch Push               | [EXC7] |
|    | 42 | Scratch Pull               | [EXC7] |
|    | 43 | Sticks                     |        |
|    | 44 | Square Click               |        |
|    | 45 | Metronome Click            |        |
|    | 46 | Metronome Bell             |        |
|    | 47 | Guitar Fret Noise          |        |
| C3 | 48 | Guitar Cutting Noise Up    |        |
|    | 49 | Guitar Cutting Noise Down  |        |
|    | 50 | String Slap of Double Bass |        |
|    | 51 | Fl.Key Click               |        |
|    | 52 | Laughing                   |        |
|    | 53 | Screaming                  |        |
|    | 54 | Punch                      |        |
|    | 55 | Heart Beat                 |        |
|    | 56 | Footsteps 1                |        |
|    | 57 | Footsteps 2                |        |
|    | 58 | Applause                   |        |
|    | 59 | Door Creaking              |        |
| C4 | 60 | Door                       |        |
|    | 61 | Scratch                    |        |
|    | 62 | Wind Chimes                |        |
|    | 63 | Car-Engine                 |        |
|    | 64 | Car-Stop                   |        |
|    | 65 | Car-Pass                   |        |
|    | 66 | Car-Crash                  |        |
|    | 67 | Siren                      |        |
|    | 68 | Train                      |        |
|    | 69 | Jet Plane                  |        |
|    | 70 | Helicopter                 |        |
|    | 71 | Starship                   |        |
| C5 | 72 | Gun Shot                   |        |
|    | 73 | Machine Gun                |        |
|    | 74 | Laser Gun                  |        |
|    | 75 | Explosion                  |        |
|    | 76 | Dog                        |        |
|    | 77 | Horse-Gallop               |        |
|    | 78 | Birds                      |        |
|    | 79 | Rain                       |        |
|    | 80 | Thunder                    |        |
|    | 81 | Wind                       |        |
|    | 82 | Seashore                   |        |
|    | 83 | Stream                     |        |
| C6 | 84 | Bubble                     |        |
|    | 85 |                            | -----  |
|    | 86 |                            | -----  |
|    | 87 |                            | -----  |
|    | 88 |                            | -----  |

