MIDI Implementation

Model: FP-30
Date: Aug. 1. 2016
Version: 1.00

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)

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

* 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 (llH) is ignored.

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

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	llH

n = MIDI channel number: 0H–FH (ch.1–ch.16)
mm = upper byte (MSB) of parameter number specified by RPN
ll = 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	
MSB LSB	MSB LSB	Explanation
00H 00H	mmH ---	Pitch Bend Sensitivity mm: 00H–18H (0–24 semitones), Initial Value = 02H (2 semitones) ll: ignored (processed as 00h) specify up to 2 octaves in semitone steps
00H 01H	mmH llH	Master Fine Tuning mm, ll: 00 00H–40 00H–7F 7FH (-100–0–+99.99 cents), Initial Value = 40 00H (0 cent) ll: ignored (processed as 00h) specify up to 2 octaves in semitone steps Refer to 4. Supplementary Material, "About Tuning"
00H 02H	mmH ---	Master Coarse Tuning mm: 28H–40H–58H (-24–0–+24 semitones), Initial Value = 40H (0 cent) ll: ignored (processed as 00h)
00H 05H	mmH llH	Modulation Depth Range mm: 00H–04H (0–4 semitones) ll: 00H–7FH (0–100 cents) 100/128 Cent/Value
7FH 7FH	--- ---	RPN null 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). Settings already made will not change. mm, ll: 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	llH	mmH

n = MIDI channel number: 0H–FH (ch.1–ch.16)
mm, ll = 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 (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, llH, 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)
llH	Master Coarse Tuning LSB
mmH	Master Coarse Tuning MSB
F7H	EOX (End Of Exclusive)

llH: 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 [%]

○ 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	
	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 [%]

○ 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 bits 0 to 1 = channel 15 to 16 bits 2 to 6 = Undefined
ggH	Channel byte2 bits 0 to 6 = channel 8 to 14
hhH	Channel byte3 bits 0 to 6 = channel 1 to 7
ssH	12 byte tuning offset of 12 semitones from C to B 00H = -64 [cents] 40H = 0 [cents] (equal temperament) 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	
	vv = 00H–7FH	0–200 [%] (Relative)
nn=0AH	Pan	
	vv = 00H–7FH	Left–Right (Absolute)
nn=5BH	Reverb Send	
	vv = 00H–7FH	0–127 (Absolute)
nn=5DH	Chorus Send	
	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.

Status	Data byte	Status
F0H	41H, 10H, 42H, 12H, aaH, bbH, ccH, ddH, ... eeH, sum	F7H

Byte	Explanation
F0H	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

Status	2nd byte	3rd byte
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

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)

●Control Change

○ 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)

○ 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)

○ 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 = OFF, 127 = 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)

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

Status	2nd byte	3rd byte
BnH	5BH	vvH

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

●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)

■ System Exclusive Messages

○ Identity Reply

Status	Data byte	Status
F0H	7EH, 10H, 06H, 02H, 41H, 42H, 00H, 00H, 20H, 00H, 01H, 00H, 00H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
10H	Device ID (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)
20H	Device family number code (MSB)
00H	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 40 01 3F	SYSTEM PARAMETERS	Individual
40 1x 00 40 2x 5A	PART PARAMETERS (x = 0-F)	Individual
41 m0 00 41 m8 7F	DRUM SETUP PARAMETERS (m = 0,1)	Individual
48 00 00 48 01 0F	SYSTEM PARAMETERS	Bulk
48 01 10 48 1D 0F	PART PARAMETERS	Bulk
49 m0 00 49 mE 17	DRUM SETUP PARAMETERS (m = 0,1)	Bulk

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 40 00 01# 40 00 02# 40 00 03#	00 00 04	0018–07E8	MASTER TUNE	-100.0–+100.0 [cent] Use nibblized data.	00 04 00 00	0 [cent]

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

40 00 04	00 00 01	00–7F	MASTER VOLUME (= 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, 127 = Exit GS mode (Rx. only)		

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

40 01 10	00 00 01	00–18	VOICE RESERVE	Part1	00	0
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	18	24
40 01 14	00 00 01	00–18	VOICE RESERVE	Part5	00	0
40 01 15	00 00 01	00–18	VOICE RESERVE	Part6	0A	10
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	06	6
40 01 19	00 00 01	00–18	VOICE RESERVE	Part10	14	20
40 01 1A	00 00 01	00–18	VOICE RESERVE	Part11	00	0

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 be equal or less than 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 01: Room 2 02: Room 3 03: Hall 1 04: Hall 2 05: Plate 06: Delay 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 01: Chorus 2 02: Chorus 3 03: Chorus 4 04: Feedback Chorus 05: Flanger 06: Short Delay 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	0–12	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 (= CC# 126 01 / CC# 127 00)	Mono/Poly	01	Poly
40 1x 15	00 00 01	00–02	USE FOR RHYTHM PART	0 = OFF 1 = MAP1 2 = MAP2	00 at x ≠0 01 at x = 0	OFF at x ≠0 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 (= CC# 7)	0–127	64	100

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 (= CC# 10, except RANDOM)	-64 (RANDOM) -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 (= CC# 93)	0–127	00	0
40 1x 22	00 00 01	00–7F	REVERB SEND LEVEL (= 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 Vibrato rate (= NRPN# 8)	-50–+50	40	0
40 1x 31	00 00 01	0E–72	TONE MODIFY 2 Vibrato depth (= NRPN# 9)	-50–+50	40	0
40 1x 32	00 00 01	0E–72	TONE MODIFY 3 TVF cutoff frequency (= NRPN# 32)	-50–+50	40	0
40 1x 33	00 00 01	0E–72	TONE MODIFY 4 TVF resonance (= NRPN# 33)	-50–+50	40	0
40 1x 34	00 00 01	0E–72	TONE MODIFY 5 TVF & TVA Env.attack (= NRPN# 99)	-50–+50	40	0
40 1x 35	00 00 01	0E–72	TONE MODIFY 6 TVF & TVA Env.decay (= NRPN# 100)	-50–+50	40	0
40 1x 36	00 00 01	0E–72	TONE MODIFY 7 TVF & TVA Env.release (= NRPN# 102)	-50–+50	40	0
40 1x 37	00 00 01	0E–72	TONE MODIFY 8 Vibrato delay (= NRPN# 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 TVF CUTOFF CONTROL	-9600–+9600 [cent]	40	0 [cent]
40 2x 22	00 00 01	00–7F	Rx. CH PRESSURE AMPLITUDE CONTROL	-100.0–+100.0 [%]	40	0 [%]
40 2x 23	00 00 01	00–7F	Rx. CH PRESSURE 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 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 TVF CUTOFF CONTROL		-9600–+9600 [cent]	40 0 [cent]
40 2x 32	00 00 01	00–7F	Rx. POLY PRESSURE AMPLITUDE CONTROL	-100.0–+100.0 [%]	40	0 [%]
40 2x 33	00 00 01	00–7F	Rx. POLY PRESSURE LFO1 RATE CONTROL		-10.0–+10.0 [Hz]	40 0 [Hz]
40 2x 34	00 00 01	00–7F	Rx. POLY PRESSURE 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 LFO2 RATE CONTROL	-10.0–+10.0 [Hz]	40	0 [Hz]
40 2x 38	00 00 01	00–7F	Rx. POLY PRESSURE 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.

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)

Address (H)	Size (H)	Data (H)	Parameter	Description
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) (= NRPN# 28, except RANDOM)
41 m5 rr	00 00 01	00–7F	REVERB SEND LEVEL	0.0–1.0 (= NRPN# 29) Multiplicand of the part reverb depth
41 m6 rr	00 00 01	00–7F	CHORUS SEND LEVEL	0.0–1.0 (= 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
16)   78... 10
16)    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 = sum
sum / 128 = quotient ... remainder
128 - remainder = 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 (sum)
115 (sum) / 128 = 0 (quotient) ... 115 (remainder)
checksum = 128 - 115 (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 01	MIDI ch.3, lower byte of RPN parameter number: 01H
(B2)	65 00	(MIDI ch.3) upper byte of RPN parameter number: 00H
(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 keynote.

○ 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 (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 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 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 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 Frequency range that will pass through each filter Lpf: Frequencies below the cutoff Bpf: Frequencies in the region of the cutoff Hpf: Frequencies above the cutoff Notch: Frequencies other than the region of the cutoff
2	Filter Slope	0–2	-12, -24, -36 dB	Amount of attenuation per octave -36 dB: Extremely steep -24 dB: Steep -12 dB: Gentle
3	Filter Cutoff #1	0–127	0–127	Cutoff frequency of the filter Increasing this value will raise the cutoff frequency.
4	Filter Resonance #2	0–100	0–100	Filter resonance level 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 Tri: Triangle wave Sqr: Square wave Sin: Sine wave Saw1: Sawtooth wave (upward) 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 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 Also changes the volume.
2	Amp Type #1	0–3	Small, Built-In, 2-Stack, 3-Stack	Type of guitar amp Small: small amp Built-In: single-unit type amp 2-Stack: large double stack amp 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."

●0112: Overdrive2

This is an overdrive that provides heavy distortion.

No	Parameter	Value		Description
1	Drive	0–127	0–127	Degree of distortion 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 Small: small amp Built-In: single-unit type amp 2-Stack: large double stack amp 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, MS1959I+II, 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 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 Off: No filter is used Lpf: Cuts the frequency range above the Cutoff Freq 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 Off: No filter is used Lpf: Cuts the frequency range above the Cutoff Freq 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	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 Lpf: The wah effect will be applied over a wide frequency range. 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. 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. Up: The filter will change toward a higher frequency. 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 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
11	Manual	0–100	0–100	Point at which Vowel 1/2 switch 49 or less: Vowel 1 will have a longer duration. 50: Vowel 1 and 2 will be of equal duration. 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 Tri: Triangle wave Sqr: Square wave Sin: Sine wave 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 Tri: triangle wave Sqr: square wave Sin: sine wave 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. 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. 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 Off: No filter is used Lpf: Cuts the frequency range above the Cutoff Freq 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. 0: All chorus sounds will be in the center. 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 Off: No filter is used Lpf: Cuts the frequency range above the Cutoff Freq 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. 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

●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. Slow: Slows down the rotation to the Slow Rate. Fast: Speeds up the rotation to the Fast Rate.
2	Woofer Slow Speed	1–127	0.05–10.00 Hz	Slow speed (Slow) of the low frequency rotor
3	Woofer Fast Speed	1–127	0.05–10.00 Hz	Fast speed (Fast) of the low frequency rotor
4	Woofer 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.
5	Woofer Level	0–127	0–127	Volume of the low frequency rotor
6	Tweeter Slow Speed	1–127	0.05–10.00 Hz	Settings of the high frequency rotor The parameters are the same as for the low frequency rotor
7	Tweeter Fast Speed	1–127	0.05–10.00 Hz	
8	Tweeter Acceleration	0–15	0–15	
9	Tweeter 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. When this is turned on, the rotation will gradually stop. When it is turned off, the rotation will gradually resume.
3	Woofer Slow Speed	1–127	0.05–10.00 Hz	Low-speed rotation speed of the woofer
4	Woofer Fast Speed	1–127	0.05–10.00 Hz	High-speed rotation speed of the woofer
5	Woofer 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	Woofer 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	Woofer Level	0–127	0–127	Volume of the woofer
8	Tweeter Slow Speed	1–127	0.05–10.00 Hz	Settings of the tweeter The parameters are the same as for the woofer.
9	Tweeter Fast Speed	1–127	0.05–10.00 Hz	
10	Tweeter Trans Up	0–127	0–127	
11	Tweeter Trans Down	0–127	0–127	
12	Tweeter 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 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 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) Slow: (Slow Rate) 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 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 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

●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 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 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

●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 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

●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 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

●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 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
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 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 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

●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 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 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 Select from three different heads with different delay times. S: short M: middle L: long
2	Repeat Rate #1	0–127	0–127	Tape speed 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
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 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 Off: no filter is used Lpf: cuts the frequency range above the Cutoff 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 Normal: conventional gated reverb Reverse: backwards reverb Sweep1: the reverberant sound moves from right to left 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 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 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

●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 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)
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.
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

Note No.	Name	MSB	LSB	PC
PIANO				
A0 (21)	Grand Piano 1	0	68	1
A#0 (22)	Grand Piano 2	16	67	1
B0 (23)	Grand Piano 3	8	66	2
C1 (24)	Ragtime Piano	0	64	4
C#1 (25)	Harpsichord 1	0	66	7
D1 (26)	Harpsichord 2	8	66	7
E. PIANO				
A0 (21)	E. Piano 1	16	67	5
A#0 (22)	E. Piano 2	0	70	6
B0 (23)	E. Piano 3	24	65	5
C1 (24)	Clav.	0	67	8
C#1 (25)	Vibraphone	0	0	12
D1 (26)	Celesta	0	0	9
D#1 (27)	Synth Bell	0	68	99
OTHER				
A0 (21)	Strings 1	0	71	50
A#0 (22)	Strings 2	0	64	49
B0 (23)	Harp	0	68	47
C1 (24)	Jazz Organ 1	0	70	19
C#1 (25)	Jazz Organ 2	0	69	19
D1 (26)	Church Organ 1	0	66	20
D#1 (27)	Church Organ 2	8	69	20
E1 (28)	Accordion	0	68	22
F1 (29)	Choir 1	8	64	53
F#1 (30)	Jazz Scat	0	65	55
G1 (31)	Choir 2	8	66	53
G#1 (32)	Choir 3	8	68	53
A1 (33)	Synth Pad	0	64	90
A#1 (34)	Nylon-str.Gt	0	0	25
B1 (35)	Steel-str.Gt	0	0	26
C2 (36)	Decay Strings	1	65	50
C#2 (37)	Decay Choir	1	64	53
D2 (38)	Decay Choir Pad	1	66	90
D#2 (39)	Acoustic Bass	0	0	33
E2 (40)	A.Bass + Cymbl	0	66	33
F2 (41)	Fingered Bass	0	0	34
F#2 (42)	Thum Voice	0	66	54

Digital Piano
Model FP-30

MIDI Implementation Chart

Date: Aug. 1. 2016
Version: 1.00

Function...		Transmitted	Recognized	Remarks
Basic	Default	1	1–16	
Channel	Changed	1–16	1–16	
Mode	Default	Mode 3	Mode 3	*2
	Messages	X	Mode 3, 4 (M = 1)	
	Altered	**********		
Note		15–113	0–127	
Number :	True Voice	**********	0–127	
Velocity	Note On	O	O	
	Note Off	O	O	
After	Key's	X	O *1	
Touch	Channel's	X	O *1	
Pitch Bend		X	O	
Control Change	0, 32	O	O *1	Bank select
	1	X	O *1	Modulation
	5	X	O *1	Portamento time
	6, 38	X	O *1	Data entry
	7	X	O *1	Volume
	10	X	O *1	Panpot
	11	X	O *1	Expression
	64	O	O *1	Hold 1
	65	X	O *1	Portamento
	66	O	O *1	Sostenuto
	67	O	O *1	Soft
	71	X	O *1	Resonance
	72	X	O *1	Release time
	73	X	O *1	Attack time
	74	X	O *1	Cutoff
	75	X	O *1	Decay time
	76	X	O *1	Vibrato rate
	77	X	O *1	Vibrato depth
	78	X	O *1	Vibrato delay
	84	X	O *1	Portamento control
	91	O	O (Reverb) *1	General purpose effects 1 depth
	93	X	O (Chorus) *1	General purpose effects 3 depth
	98, 99	X	O *1	NRPN LSB, MSB
	100, 101	X	O *1	RPN LSB, MSB
Program		O	O	
Change	: True Number	**********	0–127	Program No. 1–128
System Exclusive		O	O	
System	: Song Position	X	X	
Common	: Song Select	X	X	
	: Tune Request	X	X	
System	: Clock	X	X	
Real Time	: Commands	X	X	
Aux	: All Sound Off	X	O (120, 126, 127)	
	: Reset All Controllers	X	O	
Messages	: Local On/Off	O	O	
	: All Notes Off	X	O (123–125)	
	: Active Sensing	X	X	
	: System Reset	X	X	
Notes		*1 O X is selectable by Sys Ex. *2 Recognized as M = 1 even if M ≠ 1.		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

O : Yes
X : No