

MIDI Implementation

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This document is the common MIDI implementation for the devices listed below.
Model : GP-9M/GP-9/GP-6/LX-9/LX-6/LX-5

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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 the drum part, this message is not received by certain instruments.

● 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

* 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)

* If "GM1 System On" is received, Bank Select is not received.

* Bank Select is transmitted at power-on and when "GM2 System On" is received.

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

○ 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)

* 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
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.

○ 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 might not be capable of being panned all the way to the left or right, or might not be able to respond to this

message.

○ 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.

○ 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)

○ 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

○ 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

○ 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)

* Some Tones will not exhibit any change.

○ Sound Variation (Controller Number 70)

Status	2nd byte	3rd byte
BnH	46H	vvH

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

* It can be used as a muffler pedal switch only for Upright tones.

○ 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)

* 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)

* 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)

* 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)

* 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)

* 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)

* 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)

* 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)

* Some Tones will not exhibit any change.

○ 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.

○ 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

* The value specified by RPN will not be reset even by messages such as Program Change or Reset All Controller.

****RPN****
 The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.

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

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

RPN	Data entry	Explanation
MSB LSB	MSB LSB	
00H 00H	mmH ---	Pitch Bend Sensitivity mm: 00H-18H (0-24 semitones), Initial Value = 02H (2 semitones) ll: ignored (processed as 00h)
00H 01H	mmH llH	specify up to 2 octaves in semitone steps Master Fine Tuning mm, ll: 00 00H-40 00H-7F 7FH (-100-0-+99.99 cents), Refer to 4. Supplementary Material, "About Tuning"
00H 02H	mmH ---	Master Coarse Tuning mm: 00H-40H-7FH (-64-0-+63 semitones), ll: ignored (processed as 00h)
00H 05H	mmH llH	Modulation Depth Range mm: 00H-04H (0-4 semitones) ll: 00H-7FH (0-100 cents)

7FH 7FH --- --- 100/128 Cent/Value
 RPN null
 Set a condition in which RPN is not specified. 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)

* The sound will change beginning with the next note-on after the Program Change is received.

● Channel Pressure

Status 2nd byte
 DnH vvH

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

* 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)

* 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)
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

● 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: 01H (1)

* The same processing will be carried out as when All Notes Off is received, and the corresponding channel will be set to Mode 4 (M=1). Only M=1 is supported.

● 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 Notes Off is received, and the corresponding channel will be set to Mode 3.

■ System Exclusive Message
 Status Data byte Status
 FOH iiH, ddH,, eeH F7H

FOH: 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, and Universal Non-realtime System Exclusive messages.

● System Exclusive Messages Related to Mode Settings
 These messages are used to initialize a device to GM mode. When creating performance data, you should insert "GM1 System On" at the beginning of a GM1 score, or "GM2 System On" at the beginning of a GM2 score. However, each song should contain only the single mode message that is appropriate for that song. (Do not insert multiple mode setting messages in the same song.) "GM System On" uses Universal Non-realtime Message format.

○ 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
FOH	7EH, 7FH, 09H, 01H	F7H
Byte	Explanation	
FOH	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)	

* Once this message is received, Bank Select is no longer received.
 * 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
FOH	7EH 7FH 09H 03H	F7H
Byte	Explanation	
FOH	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.

● Universal Realtime System Exclusive Messages

○ Master Volume

Status	Data byte	Status
FOH	7FH, 7FH, 04H, 01H, 11H, mmH	F7H
Byte	Explanation	
FOH	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)	
11H	Master volume lower byte	
mmH	Master volume upper byte	
F7H	EOX (End Of Exclusive)	

11H: ignored (processed as 00H)
 mmH: 00H-7FH 0-127

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

○ Master Fine Tuning
 Status Data byte Status
 FOH 7FH, 7FH, 04H, 03H, lIH, mmH F7H

Byte	Explanation
FOH	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)
lIH	Master Fine Tuning LSB
mmH	Master Fine Tuning MSB
F7H	EOX (End Of Exclusive)

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

○ Master Coarse Tuning
 Status Data byte Status
 FOH 7FH, 7FH, 04H, 04H, lIH, mmH F7H

Byte	Explanation
FOH	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)
lIH	Master Coarse Tuning LSB
mmH	Master Coarse Tuning MSB
F7H	EOX (End Of Exclusive)

lIH: 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.

○ Chorus Parameters
 Status Data byte Status
 FOH 7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 02H, ppH, vvH F7H

Byte	Explanation
FOH	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 = 00H Chorus1
 vv = 01H Chorus2
 vv = 02H Chorus3
 vv = 03H Chorus4
 vv = 04H FB Chorus
 vv = 05H 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
 FOH 7FH, 7FH, 09H, 01H, 0nH, ppH, rrH F7H

Byte	Explanation
FOH	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
FOH	7FH, 7FH, 09H, 03H, 0nH, ccH, ppH, rrH	F7H

Byte Explanation

FOH 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 (00-1FH, 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
FOH	7EH, 7FH, 08H, 08H, ffH, ggH, hhH, ssH...	F7H

Byte Explanation

FOH 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
FOH	7FH, 7FH, 0AH, 01H, 0nH, kkH, nnH, vvH...	F7H

Byte Explanation

FOH 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
FOH	7EH, 10H, 06H, 01H	F7H

Byte Explanation

FOH	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)

*Both 10H and 7FH (Broadcast) are available for the Device ID.

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)

○ 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)

○ 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)

○ 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

GP-9M Status F0H	Data byte 7EH, 10H, 06H, 02H, 41H, 19H, 03H, 00H, 00H, 2EH, 01H, 00H, 00H	Status F7H
Byte F0H 7EH 10H 06H 02H 41H 19H 03H 00H 00H 2EH 01H 00H 00H F7H	Explanation Exclusive status ID number (Universal Non-realtime Message) Device ID Sub ID#1 (General Information) Sub ID#2 (Identity Reply) ID number (Roland) Device family code (LSB) Device family code (MSB) Device family number code (LSB) Device family number code (MSB) Software revision level Software revision level Software revision level Software revision level EOX (End of Exclusive)	
GP-9 Status F0H	Data byte 7EH, 10H, 06H, 02H, 41H, 19H, 03H, 00H, 00H, 23H, 01H, 00H, 00H	Status F7H
Byte F0H 7EH 10H 06H 02H 41H 19H 03H 00H 00H 23H 01H 00H 00H F7H	Explanation Exclusive status ID number (Universal Non-realtime Message) Device ID Sub ID#1 (General Information) Sub ID#2 (Identity Reply) ID number (Roland) Device family code (LSB) Device family code (MSB) Device family number code (LSB) Device family number code (MSB) Software revision level Software revision level Software revision level Software revision level EOX (End of Exclusive)	
GP-6 Status F0H	Data byte 7EH, 10H, 06H, 02H, 41H, 19H, 03H, 00H, 00H, 24H, 01H, 00H, 00H	Status F7H
Byte F0H 7EH 10H 06H 02H 41H 19H 03H 00H 00H 24H 01H 00H 00H F7H	Explanation Exclusive status ID number (Universal Non-realtime Message) Device ID Sub ID#1 (General Information) Sub ID#2 (Identity Reply) ID number (Roland) Device family code (LSB) Device family code (MSB) Device family number code (LSB) Device family number code (MSB) Software revision level Software revision level Software revision level Software revision level EOX (End of Exclusive)	
LX-9 Status F0H	Data byte 7EH, 10H, 06H, 02H, 41H, 19H, 03H, 00H, 00H, 2AH, 01H, 00H, 00H	Status F7H
Byte F0H 7EH 10H 06H 02H 41H 19H 03H 00H 00H 2AH 01H 00H 00H F7H	Explanation Exclusive status ID number (Universal Non-realtime Message) Device ID Sub ID#1 (General Information) Sub ID#2 (Identity Reply) ID number (Roland) Device family code (LSB) Device family code (MSB) Device family number code (LSB) Device family number code (MSB) Software revision level Software revision level Software revision level Software revision level EOX (End of Exclusive)	
LX-6 Status F0H	Data byte 7EH, 10H, 06H, 02H, 41H, 19H, 03H, 00H, 00H, 2BH, 01H, 00H, 00H	Status F7H
Byte F0H 7EH	Explanation Exclusive status ID number (Universal Non-realtime Message)	

10H Device ID
 06H Sub ID#1 (General Information)
 02H Sub ID#2 (Identity Reply)
 41H ID number (Roland)
 19H Device family code (LSB)
 03H Device family code (MSB)
 00H Device family number code (LSB)
 00H Device family number code (MSB)
 2BH Software revision level
 01H Software revision level
 00H Software revision level
 00H Software revision level
 F7H EOX (End of Exclusive)

LX-5
 Status Data byte Status
 F0H 7EH, 10H, 06H, 02H, 41H, 19H, 03H, F7H
 00H, 00H, 2CH, 01H, 00H, 00H

Byte Explanation
 F0H Exclusive status
 7EH ID number (Universal Non-realtime Message)
 10H Device ID
 06H Sub ID#1 (General Information)
 02H Sub ID#2 (Identity Reply)
 41H ID number (Roland)
 19H Device family code (LSB)
 03H Device family code (MSB)
 00H Device family number code (LSB)
 00H Device family number code (MSB)
 2CH Software revision level
 01H Software revision level
 00H Software revision level
 00H Software revision level
 F7H EOX (End of Exclusive)

3. 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

$18 \times 128 + 52 = 2356$

<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

$((10 \times 16 + 3) \times 16 + 9) \times 16 + 13 = 41885$

<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 (= $64 \times 128 + 0 = 8192$) is 0, so this Pitch Bend Value is $28\ 00H - 40\ 00H = 40 \times 128 + 0 - (64 \times 128 + 0) = 5120 - 8192 = -3072$

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 $-200 \times (-3072) / (-8192) = -75$ 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, 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 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

● About Tuning

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

In MIDI, all parts can be tuned by sending RPN#1 to each of the MIDI channels that you are using.

RPN#1 allows you to specify the tuning with an accuracy of approximately 0.012 cents (to be precise, 100/8192 cents).

One cent is 1/100th of a semitone.

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
445.0	+19.56	4C 43 (+1603)
444.0	+15.67	4A 03 (+1283)
443.0	+11.76	47 44 (+ 964)
442.0	+7.85	45 03 (+ 643)
441.0	+3.93	42 42 (+ 322)
440.0	0.00	40 00 (0)
439.0	-3.94	3D 3D (- 323)

