

# EM-25/15 MIDI Implementation

## 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 – 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.
- The velocity values of Note Off messages are ignored.

#### ● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n = MIDI channel number: 0H – FH (Ch.1 – 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, these messages are 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 – 16)  
 kk = note number: 00H – 7FH (0 – 127)  
 vv = key pressure: 00H – 7FH (0 – 127)

- Not received when Rx.POLY PRESSURE (PAf) = 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 – 16)  
 mm = Bank number MSB: 00H–7FH (GS Variation number 0~127)  
 Initial value = 00H  
 ll = Bank number LSB: 00H – 04H (MAP), Initial value = 00H

- Not received when Rx.BANK SELECT = OFF.
- "Rx.BANK SELECT" is set to OFF by "GM1 System On," and Bank Select messages will be ignored.
- 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.

#### ○ Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH

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

- The stereo position can be adjusted over 127 steps.
- For Rhythm Parts, this is a relative adjustment of each Instrument's pan setting.
- 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 – 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 – 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 – 16)  
 vv = Control value: 00H – 7FH (0 – 127) 0 – 63 = OFF, 64 – 127 = ON

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

#### ○ Sostenuato (Controller number 66)

Status	2nd byte	3rd byte
BnH	42H	vvH

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

- Not received when Rx.SOFT = OFF. (Initial value is ON)

#### ○ Portamento control (Controller number 84)

Status	2nd byte	3rd byte
BnH	54H	kkH

n = MIDI channel number: 0H – FH (Ch.1 – 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
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 a glide from C4 to E4
80 40 40	Note off E4	E4 off

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

Status	2nd byte	3rd byte
BnH	5BH	vvH

n = MIDI channel number: 0H – FH (Ch.1 – 16)  
 vv = Reverb Send Level: 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 – 16)  
 vv = Chorus Send Level: 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 – 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 "GM 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. On the EM-25/15, NRPN messages can be used to modify sound parameters, etc.

To use these messages, you must first use NRPN messages (Controller number 98 and 99, their order does not matter) to specify the parameter to be controlled, and then use Data Entry messages (Controller number 6) 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 "4. Supplementary material", Examples of actual MIDI messages, [Example 4] (page 11). On the EM-25/15, Data entry LSB (Controller number 38) of NRPN is ignored, so it is no problem to send Data entry MSB (Controller number 6) only (without Data entry LSB).

On the EM-25/15, NRPN can be used to modify the following parameters.

NRPN MSB LSB	Data entry MSB	Function and range
01H 08H	mmH	Vibrato Rate (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 09H	mmH	Vibrato Depth (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 0AH	mmH	Vibrato Delay (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 20H	mmH	TVF Cutoff Frequency (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 21H	mmH	TVF Resonance (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 63H	mmH	TVF&TVA Envelope Attack Time (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 64H	mmH	TVF&TVA Envelope Decay Time (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 66H	mmH	TVF&TVA Envelope Release Time (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
18H rrH	mmH	Drum Instrument Pitch Coarse (relative change) rr: Drum Instrument note number mm: 00H – 40H – 7FH (-64 – 0 – +63 semitone)
1AH rrH	mmH	Drum Instrument TVA Level (absolute change) rr: Drum Instrument note number mm: 00H – 7FH (0 – max)
1CH rrH	mmH	Drum Instrument Panpot (absolute change) rr: Drum Instrument note number mm: 00H, 01H – 40H – 7FH (random, left – center – right)
1DH rrH	mmH	Drum Instrument Reverb Send Level (absolute change) rr: Drum Instrument note number mm: 00H – 7FH (0 – max)
1EH rrH	mmH	Drum Instrument Chorus Send Level (absolute change) rr: Drum Instrument note number mm: 00H – 7FH (0 – max)

- 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.
- Part On/Off NRPN are received and transmitted through the Basic MIDI Channel.

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

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

n = MIDI channel number: 0H – FH (Ch.1 – 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.  
 • 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 (Controller number 101 and 100, their order does not matter) to specify the parameter to be controlled, and then use Data Entry messages (Controller number 6, 38) 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 "4. Supplementary material", Examples of actual MIDI messages, [Example 4] (page 11).

On the EM-25/15, RPN can be used to modify the following parameters.

RPN MSB LSB	Data Entry MSB	LSB	Explanation
00H 00H	mmH	---	Pitch Bend Sensitivity mm: 00H – 18H (0 – 24 semitones)
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)

Refer to "4. Supplementary material", About the Tuning (page 12).

00H 02H	mmH	---	Master Coarse Tuning mm: 28H – 40H – 58H (-24 – 0 – +24 semitones), Initial value = 40H (+/- 0 semitone) ll: ignored (processed as 00H)
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 – 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 message will not be received on lower byte of the bank numbers (the value of Control Number 0 is other than 0 (00H)).

## ○ Channel Pressure

Status	2nd byte
DnH	vvH

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

- Not received when Rx.CH PRESSURE (CAf) = 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 – 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 – 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 – 16)

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

Controller	Reset value
Pitch Bend	+/-0 (center)
Change	
Polyphonic Key	0 (off)
Pressure	
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 On/Off (Controller number 122)

Status	2nd byte	3rd byte
BnH	7AH	00H (Local Off)
BnH	7AH	7FH (Local On)

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

This parameter affects all parts.

When a Local Off message is received, the tone generator is disconnected from the keyboard, but the messages received via MIDI are still recognized and played.

- This message is sent to all parts, regardless of the set channel.

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

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

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

- The same processing will be carried out as when All Notes Off is received. OMNI ON will not be turned on.

### ● MONO (Controller number 126)

Status	2nd byte	3rd byte
BnH	7EH	mmH

n = MIDI channel number: 0H – FH (Ch.1 – 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 "mm (mono number)."

### ● POLY (Controller number 127)

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

n = MIDI channel number: 0H – FH (Ch.1 – 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 Realtime Message

### ● Active Sensing

Status

FEH

- When Active Sensing is received, the unit will begin monitoring the intervals of all further messages. While monitoring, if the interval between messages exceeds 420 ms, the same processing will be carried out as when All Sounds Off, All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

### ○ Song/Style Start

Status

FAH

- When "Sequencer Start" is received, the internal Recorder and/or the internal Arranger/Song start according to the following table.

### ○ Song/Style Stop

Status

FCH

- When "Sequencer Stop" is received, the internal Recorder and/or the internal arranger/Song stop.

### ○ Song Continue

Only in Song Mode

Status

FBH

- When "Sequencer Continue" is received, the internal Recorder continue to play from the current position.

### ○ Song Position Pointer

Only in Song Mode

Status	2nd byte	3rd byte
F2H	XXH	YYH

XX = Song Position ( Bar ) LSB

YY = Song Position ( Bar ) MSB

### ○ Timing Clock

Status

F8H

- When "Timing Clock" is received the internal recorder or the internal Arranger/Song is synchronized to an external clock according to the following table.

### Song/Style Sync RX Response

OFF= Internal A Style/Song will neither start/stop nor follow the tempo of the external Timing Clock (F8) and "Start/Stop" (FA/FC) messages.

ON= Auto If a Style/Song receives MIDI "Start/Stop" (FA/FC), it will follow automatically Internal or External "Timing" related to the presence or not of the incoming "MIDI Clock" (F8) messages.

## ■ 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 the EM-25/15 are; messages related to mode settings, Universal Realtime System Exclusive messages, Data Requests (RQ1), 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 "Turn General MIDI System System On" message should be inserted at the beginning of a General MIDI score, and a "GS Reset" message at the beginning of a GS music data. In the case of data for the EM-25/15, we recommend that a "System Mode Set" message be placed at the beginning of the song 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.)

"Turn General MIDI System On" uses the Universal Non-realtime Message format.

"System Mode Set" and "GS Reset" use the Roland system exclusive format "Data Set 1 (DT1)."

### ○ GM System Off

"GM System Off" is a command message that resets the internal state of the EM-25/15 from the GM state to its native condition. The EM-25/15 will reset to the GS default state.

Status	Data byte	Status
F0H	7EH,7F,09H,02H	F7H

Byte Explanation

F0H Exclusive status

7EH ID number (Universal Non-realtime Message)

7FH Device ID (Broadcast)

09H Sub ID#1 (General MIDI Message)

02H Sub ID#2 (General MIDI Off)

F7H EOX (End Of Exclusive)

- When this message is received, the EM-25/15 will reset to the GS default state.

### ○ GS Reset

GS Reset is a message that resets the internal settings of a device to the GS initial state. This message appears 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 play back GS music data.

Status	Data byte	Status
F0H	41H, dev, 42H, 12H, 40H, 00H, 7FH, 00H, 41H	F7H
Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	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.

### ○ Exit GS Mode

"Exit GS Mode" is a message that resets the internal settings of the unit to the Arranger Mode I initial state.

Status	Data byte	Status
F0H	41H, dev, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H	F7H
Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	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	
7FH	Data (Exit GS Mode)	
42H	Checksum	
F7H	EOX (End Of Exclusive)	

- When this message is received, the unit change from "General MIDI" mode to EM-25/15 default mode. (Arranger mode)
- There must be an interval of at least 100 ms between this message and the next message.

### ● Universal Realtime System Exclusive Messages

#### ○ Master Volume

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 01H, IIH, 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)	
IIH	Master Volume lower byte	
mmH	Master Volume upper byte	
F7H	EOX (End Of Exclusive)	

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

## 2. Transmit data

### ■ Channel Voice Messages

#### ● Note off

Status	2nd byte	3rd byte
9nH	kkH	00H
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
kk = note number:	00H – 7FH (0 – 127)	
vv = note off velocity:	00H (0)	

#### ● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH
n = MIDI channel number:	0H – FH (Ch.1 – 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	IIH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
mm = Bank number MSB:	00H – 7FH (GS Variation number 0 – 127)	
II = Bank number LSB:	00H – 04H (MAP)	

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

##### ○ Modulation (Controller number 1)

(only Style and Song parts)

Status	2nd byte	3rd byte
BnH	01H	vvH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
vv = Modulation depth:	00H – 7FH (0 – 127)	

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

(only Style and Song parts)

Status	2nd byte	3rd byte
BnH	05H	vvH

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

(only Style and Song parts)

Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	IIH

n = MIDI channel number: 0H – FH (Ch.1 – 16)  
 mm, II = the value of the parameter specified by RPN/NRPN  
 mm = MSB, II = LSB

##### ○ Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

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

(only Style and Song parts)

Status	2nd byte	3rd byte
BnH	0AH	vvH

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

- The stereo position can be adjusted over 127 steps.

##### ○ Expression (Controller number 11)

(only Style and Song parts)

Status	2nd byte	3rd byte
BnH	0BH	vvH

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

○ **Portamento (Controller number 65)** (only Song parts)

Status	2nd byte	3rd byte
BnH	41H	vvH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
vv = Control value:	00H – 7FH (0 – 127) 0 – 63 = OFF, 64 – 127 = ON	

○ **Sostenuto (Controller number 66)** (only Song parts)

Status	2nd byte	3rd byte
BnH	42H	vvH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
vv = Control value:	00H – 7FH (0 – 127) 0 – 63 = OFF, 64 – 127 = ON	

○ **Soft (Controller number 67)** (only Song parts)

Status	2nd byte	3rd byte
BnH	43H	vvH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
vv = Control value:	00H – 7FH (0 – 127) 0 – 63 = OFF, 64 – 127 = ON	

○ **Portamento control (Controller number 84)** (only Style and Song parts)

Status	2nd byte	3rd byte
BnH	54H	kkH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
kk = source note number:	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 – 16)	
vv = Reverb Send Level:	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 – 16)	
vv = Chorus Send Level:	00H – 7FH (0 – 127), Initial value = 00H (0)	
• This message adjusts the Chorus Send Level of each Part.		

○ **NRPN MSB/LSB (Controller number 99, 98)**

Status	2nd byte	3rd byte
BnH	63H	mmH
BnH	62H	llH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
mm = upper byte (MSB) of the parameter number specified by NRPN		
ll = lower byte (LSB) of the parameter number specified by NRPN		

**\*\*NRPN\*\*** (only Song parts)

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used, letting you use control functions which are not defined in the MIDI Specification. NRPNs provide a great deal of freedom, and can be used with any manufacturer's devices. As a result, any particular parameter number can easily mean one thing when used for a certain device, and mean something completely different on another device. Note that RPNs and NRPNs require that a multiple number of messages be processed in the correct order. However, a majority of the sequencers currently on the market cannot always be relied on to consistently send messages in the proper order if the messages are located at almost exactly the same point in time. On the GS instruments, NRPN can be used to modify the following parameters. The range of values for relative change parameters will be different with certain models. Please see the explanation that follows the chart.

NRPN	Data Entry	Function and range
MSB LSB	MSB	
01H 08H	mmH	Vibrato Rate (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 09H	mmH	Vibrato Depth (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 0AH	mmH	Vibrato Delay (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 20H	mmH	TVF Cutoff Frequency (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 21H	mmH	TVF Resonance (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 63H	mmH	TVF&TVA Envelope Attack Time (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 64H	mmH	TVF&TVA Envelope Decay Time (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
01H 66H	mmH	TVF&TVA Envelope Release Time (relative change) mm: 00H – 40H – 7FH (-64 – 0 – +63)
18H rrH	mmH	Drum Instrument Pitch Coarse (relative change) rr: Drum Instrument note number mm: 00H – 40H – 7FH (-64 – 0 – +63 semitone)
1AH rrH	mmH	Drum Instrument TVA Level (absolute change) rr: Drum Instrument note number mm: 00H – 7FH (0 – max)
1CH rrH	mmH	Drum Instrument Panpot (absolute change) rr: Drum Instrument note number mm: 00H, 01H – 40H – 7FH (random, left – center – right)
1DH rrH	mmH	Drum Instrument Reverb Send Level (absolute change)

NRPN	Data Entry	Function and range
MSB LSB	MSB	
1EH rrH	mmH	rr: Drum Instrument note number mm: 00H – 7FH (0 – max) Drum Instrument Chorus Send Level (absolute change) rr: Drum Instrument note number mm: 00H – 7FH (0 – max) Part 4 On / Off ( Upper 1)
4FH 10H	mmH	mm: 00H – 7FH (00-3FH =Off - 40-7FH= On)
4FH 11H	mmH	Part 11 On / Off ( Lower) mm: 00H – 7FH (00-3FH =Off - 40-7FH= On)
4FH 12H	mmH	Part 12 On / Off ( Man Bass) mm: 00H – 7FH (00-3FH =Off - 40-7FH= On)

- 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 101, 100)** (only Song parts)

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	llH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
mm = upper byte (MSB) of parameter number specified by RPN		
ll = lower byte (LSB) of parameter number specified by RPN		

**\*\*RPN\*\***

The RPN (Registered Parameter Number) message allows an extended range of control changes to be used, letting you use additional control functions which are part of the MIDI Specification.

On the EM-25/15, 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)		
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)		
Refer to "4. Supplementary material", About the Tuning (page 12).		
00H 02H	mmH	—
Master Coarse Tuning mm: 28H – 40H – 58H (-24 – 0 – +24 semitones), Initial value = 40H (+/-0 semitone) ll: ignored (processed as 00H)		
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 – 16)
pp = Program number:	00H – 7FH (prog.1 – prog.128)

● **Pitch Bend Change** (only Song Parts)

Status	2nd byte	3rd byte
EnH	llH	mmH
n = MIDI channel number:	0H – FH (Ch.1 – 16)	
mm, ll = Pitch Bend value:	00 00H – 40 00H – 7F 7FH (-8192 – 0 – +8191)	

## ■ Channel Mode Messages (only Song parts)

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

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

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

- When this message is transmitted, 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 – 16)

- When this message is transmitted, 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

### ● MONO (Controller number 126) (only Song parts)

Status	2nd byte	3rd byte
BnH	7EH	mmH

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

mm = mono number: 00H – 10H (0 – 16)

- The corresponding channel will be set to Mode 4 (M=1).

### ● POLY (Controller number 127) (only Song parts)

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

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

- The corresponding channel will be set to Mode 3.

## ■ System Realtime Messages

### ○ Active Sensing

Status

FEH

Transmitted about every 250ms.

### ○ Song/Style Start

Status

FAH

- This message is transmitted when the internal sequencer is started.

### ○ Song/Style Stop

Status

FCH

- This message is transmitted when the internal sequencer is stopped.

### ○ Song Continue

Status

FBH

- This message is transmitted when the sequencer is started not from the beginning.

### ○ Song Position Pointer

Status	2nd byte	3rd byte
F2H	XXH	YYH

XX = Song Position ( Bar ) LSB

YY = Song Position ( Bar ) MSB

### ○ Timing Clock

Status

F8H

### ● 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 "Turn General MIDI System On" message should be inserted at the beginning of a General MIDI score, and a "GS Reset" message at the beginning of GS music data. In the case of the EM-25/15, we recommend that a "System Mode set" message be placed at the beginning of the song 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.) "Turn General MIDI System On" uses the Universal Non-realtime Message format. "GS Reset" uses Roland system Exclusive format "Data Set 1 (DT1)."

### ○ GM System Off

"GM System Off" is a command message that resets the internal state of the VA-76 from the GM state to its native condition. The EM-25/15 will reset to the GS default state.

Status	Data byte	Status
F0H	7EH,7F,09H,02H	F7H

Byte Explanation

F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (General MIDI Message)
02H	Sub ID#2 (General MIDI Off)
F7H	EOX (End Of Exclusive)

- When this message is received, the VA-76 will reset to the GS default state.

### ○ GS Reset

GS Reset is a command message that resets the internal settings of a device to the GS initial state. This message appears 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 play back GS music data.

Status	Data byte	Status
F0H	41H, dev, 42H, 12H, 40H, 00H, 7FH, 00H, 41H	F7H

Byte Explanation

F0H	Exclusive status
41H	ID number (Roland)
dev	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.

## ■ System Exclusive Messages

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 Transmitted and received by the EM-25/15 are: messages related to Mode Setting, Universal Realtime System Exclusive messages, Data Requests (RQ1), and Data Set (DT1).

### 3. Individual Parameter Transmission (Model ID=42)

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 Realtime Message

##### ● Active sensing

Status

FEH

- This will be transmitted constantly at intervals of approximately 250 ms.

#### ■ System Exclusive messages

"Identity Reply" and "Data Set 1 (DT1)" are the only System Exclusive messages transmitted by the EM-25/15.

When an appropriate "Identity Request Message" and "Data Request 1 (RQ1)" message are received, the requested internal data will be transmitted.

##### ○ Identity Reply

Status	Data byte	Status
F0H	7EH, dev, 06H, 02H, 41H, 42H, 00H, 00H, 06H, ssH, ssH, ssH, ssH	F7H

Byte	Explanation
FOH	Exclusive status
7EH	ID number (Universal Non-realtime Message)
dev	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)
06H	Device family number code (MSB)
ssH	Software revision level
ssH	Software revision level
ssH	Software revision level
ssH	Software revision level
F7H	EOX (End of Exclusive)

- Reply the message by the unique device ID (dev) when the device has received the "Identity Request Message" in the Broadcast.

##### ○ Data set 1 DT1 (12H)

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

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H – 1FH, Initial value is 10H)
42H	Model ID (GS)
12H	Command ID (DT1)
aaH	Address MSB: upper byte of the starting address of the data to be sent
bbH	Address: middle byte of the starting address of the data to be sent
ccH	Address LSB: lower byte of the starting address of the data to be sent.
ddH	Data: the actual data to be sent. Multiple bytes of data are transmitted in order 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 will be transmitted from the specified starting address and size.
- Data larger than 128 bytes will be divided into packets of 128 bytes or less, and each packet will be sent at an interval of about 40 ms.
- Regarding the checksum, please refer to Section 5 (p.25)

### ● Patch parameters

#### ○ Patch common parameters

The parameters common to all Parts in each module are called Patch Common parameters.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 00 00	00 00 04	0018 – 07E8	MASTER TUNE	-100.0 – +100.0 [cents] Use nibblized data.	00 04 00 00	0 [cents]
40 00 01#						
40 00 02#						
40 00 03#						
• Refer to section "4. Supplementary material", About the Tuning (page 12).						
40 00 04	00 00 01	00 – 7F	MASTER VOLUME	0 – 127 (= F0 7F 7F 04 01 00 vv F7)	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	MODE SET	00 = GS Reset (Rx. only)		
40 01 00	00 00 10	20 – 7F	PATCH NAME	16 ASCII Characters		
40 01 :	#					
40 01 0F#						
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
40 01 36	00 00 01	00 – 7F	REVERB SEND LEVEL TO CHORUS	0 – 127 [ms]	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 their 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.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
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	0-127	40	64
40 01 3B	00 00 01	00 – 7F	CHORUS FEEDBACK	0-127	08	8
40 01 3C	00 00 01	00 – 7F	CHORUS DELAY	0-127	50	80
40 01 3D	00 00 01	00 – 7F	CHORUS RATE	0-127	03	3
40 01 3E	00 00 01	00 – 7F	CHORUS DEPTH	0-127	13	19
40 01 3F	00 00 01	00 – 7F	CHORUS SEND LEVEL TO REVERB	0-127	00	0

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

#### ○ Patch Part parameters

The EM-25/15 has 16 Parts assigned to the Arranger, Keyboard, and Songs.

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

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

n... MIDI channel number (0 – F) of the BLOCK.

In the following map, the control numbers of the control changes are indicated as CC#.

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(CAf)	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(PAf)	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.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
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	Mono/Poly (=CC# 126 01/CC# 127 00)	01	Poly
40 1x 14	00 00 01	00 – 02	ASSIGN MODE	0 = SINGLE 1 = LIMITED-MULTI 2 = FULL-MULTI		

Single : If the same note is played multiple times in succession, the previously-sounding note will be completely silenced, and then the new note will be sounded.

LimitedMulti : If the same note is played multiple times in succession, the previously-sounding note will be continued to a certain extent even after the new note is sounded. (Default setting)

FullMulti : If the same note is played multiple times in succession, the previously-sounding note(s) will continue sounding for their natural length even after the new note is sounded.

• ASSIGN MODE is the parameter that determines how voice assignment will be handled when sounds overlap on identical note numbers in the same channel (i.e., repeatedly struck notes). This is initialized to a mode suitable for each Part, so for general purposes there is no need to change this.

40 1x 15	00 00 01	00 – 02	USE FOR RHYTHM PART	0 = OFF 1 = MAP1 2 = MAP2	00 at=0 01 at x=0	OFF (Normal Part) MAP1 (Drum Part)
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• This parameter sets the Drum Map of the Part used as the Drum Part.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 1x 16	00 00 01	28 – 58	PITCH KEY SHIFT	-24 – +24 [semitones]	40	0 [semitones]
40 1x 17	00 00 02	08 – F8	PITCH OFFSET FINE	-12.0 – +12.0 [Hz] Use nibblized data.	08 00	0 [Hz]

• 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	0 – 127 (=CC# 7)	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	-64 (RANDOM), -63 (LEFT) – +63 (RIGHT) (=CC# 10, except RAN- DOM)	40	0 (CENTER)
40 1x 1D	00 00 01	00 – 7F	KEYBOARD RANGE LOW	(C-1) – (G9)	00	C-1
40 1x 1E	00 00 01	00 – 7F	KEYBOARD 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	0 – 127 (=CC# 93)	00	0
40 1x 22	00 00 01	00 – 7F	REVERB SEND LEVEL	0 – 127 (=CC# 91)	28	40

40 1x 23	00 00 01	00 – 01	Rx.BANK SELECT	OFF/ON	01(00*)	ON(OFF*)
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• When "GM System On" is received, Rx.BANK SELECT will be set to OFF.

• When "GS RESET" is received, Rx.BANK SELECT will be set ON.

40 1x 30	00 00 01	00 – 7F	TONE MODIFY1 Vibrato Rate	-64 – +63 (=NRP# 8/CC#76)	40	0
40 1x 31	00 00 01	00 – 7F	TONE MODIFY2 Vibrato Depth	-64 – +63 (=NRP# 9/CC#77)	40	0
40 1x 32	00 00 01	00 – 7F	TONE MODIFY3 TVF Cutoff Freq	-64 – +63 (=NRP# 32/CC#74)	40	0
40 1x 33	00 00 01	00 – 7F	TONE MODIFY4 TVF Resonance	-64 – +63 (=NRP# 33/CC#71)	40	0
40 1x 34	00 00 01	00 – 7F	TONE MODIFY5 TVF&TVA Env.attack	-64 – +63 (=NRP# 99/CC#73)	40	0
40 1x 35	00 00 01	00 – 7F	TONE MODIFY6 TVF&TVA Env.decay	-64 – +63 (=NRP# 100/CC#75)	40	0
40 1x 36	00 00 01	00 – 7F	TONE MODIFY7 TVF&TVA Env.release	-64 – +63 (=NRP# 102/CC#72)	40	0
40 1x 37	00 00 01	00 – 7F	TONE MODIFY8 Vibrato Delay	-64 – +63 (=NRP# 10/CC#78)	40	0
40 1x 40	00 00 0C	00 – 7F	SCALE TUNING C	-64 – +63 [cents]	40	0 [cents]
40 1x 41#		00 – 7F	SCALE TUNING C#	-64 – +63 [cents]	40	0 [cents]
40 1x 42#		00 – 7F	SCALE TUNING D	-64 – +63 [cents]	40	0 [cents]
40 1x 43#		00 – 7F	SCALE TUNING D#	-64 – +63 [cents]	40	0 [cents]
40 1x 44#		00 – 7F	SCALE TUNING E	-64 – +63 [cents]	40	0 [cents]
40 1x 45#		00 – 7F	SCALE TUNING F	-64 – +63 [cents]	40	0 [cents]
40 1x 46#		00 – 7F	SCALE TUNING F#	-64 – +63 [cents]	40	0 [cents]
40 1x 47#		00 – 7F	SCALE TUNING G	-64 – +63 [cents]	40	0 [cents]
40 1x 48#		00 – 7F	SCALE TUNING G#	-64 – +63 [cents]	40	0 [cents]
40 1x 49#		00 – 7F	SCALE TUNING A	-64 – +63 [cents]	40	0 [cents]
40 1x 4A#		00 – 7F	SCALE TUNING A#	-64 – +63 [cents]	40	0 [cents]
40 1x 4B#		00 – 7F	SCALE TUNING B	-64 – +63 [cents]	40	0 [cents]

• 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 cents (40H) is equal temperament (page 12).

40 2x 00	00 00 01	28 – 58	MOD PITCH CONTROL	-24 – +24 [semitones]	40	0 [semitones]
40 2x 01	00 00 01	00 – 7F	MOD TVF CUTOFF CONTROL	-9600 – +9600 [cents]	40	0 [cents]
40 2x 02	00 00 01	00 – 7F	MOD AMPLITUDE CONTROL	-100.0 – +100.0 [%]	40	0 [%]

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
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 [cents]	0A	10 [cents]
40 2x 05	00 00 01	00 - 7F	MOD LFO1 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
40 2x 06	00 00 01	00 - 7F	MOD LFO1 TVA DEPTH	0 - 100.0 [%]	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 [cents]	00	0 [cents]
40 2x 09	00 00 01	00 - 7F	MOD LFO2 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
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 [semitones]	42	2 [semitones]
40 2x 11	00 00 01	00 - 7F	BEND TVF CUTOFF CONTROL	-9600 - +9600 [cents]	40	0 [cents]
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 [cents]	00	0 [cents]
40 2x 15	00 00 01	00 - 7F	BEND LFO1 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
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 [cents]	00	0 [cents]
40 2x 19	00 00 01	00 - 7F	BEND LFO2 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
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	CAf PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 21	00 00 01	00 - 7F	CAf TVF CUTOFF CONTROL	-9600 - +9600 [cents]	40	0 [cents]
40 2x 22	00 00 01	00 - 7F	CAf AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 23	00 00 01	00 - 7F	CAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 24	00 00 01	00 - 7F	CAf LFO1 PITCH DEPTH	0 - 600 [cents]	00	0 [cents]
40 2x 25	00 00 01	00 - 7F	CAf LFO1 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
40 2x 26	00 00 01	00 - 7F	CAf LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 27	00 00 01	00 - 7F	CAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 28	00 00 01	00 - 7F	CAf LFO2 PITCH DEPTH	0 - 600 [cents]	00	0 [cents]
40 2x 29	00 00 01	00 - 7F	CAf LFO2 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
40 2x 2A	00 00 01	00 - 7F	CAf LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 30	00 00 01	28 - 58	PAf PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 31	00 00 01	00 - 7F	PAf TVF CUTOFF CONTROL	-9600 - +9600 [cents]	40	0 [cents]
40 2x 32	00 00 01	00 - 7F	PAf AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 33	00 00 01	00 - 7F	PAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 34	00 00 01	00 - 7F	PAf LFO1 PITCH DEPTH	0 - 600 [cents]	00	0 [cents]
40 2x 35	00 00 01	00 - 7F	PAf LFO1 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
40 2x 36	00 00 01	00 - 7F	PAf LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 37	00 00 01	00 - 7F	PAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 38	00 00 01	00 - 7F	PAf LFO2 PITCH DEPTH	0 - 600 [cents]	00	0 [cents]
40 2x 39	00 00 01	00 - 7F	PAf LFO2 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
40 2x 3A	00 00 01	00 - 7F	PAf LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 40	00 00 01	28 - 58	CC1 PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 41	00 00 01	00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cents]	40	0 [cents]
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 [cents]	00	0 [cents]
40 2x 45	00 00 01	00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
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 [cents]	00	0 [cents]
40 2x 49	00 00 01	00 - 7F	CC1 LFO2 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
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 [semitones]	40	0 [semitones]
40 2x 51	00 00 01	00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cents]	40	0 [cents]
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 [cents]	00	0 [cents]
40 2x 55	00 00 01	00 - 7F	CC2 LFO1 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
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 [cents]	00	0 [cents]
40 2x 59	00 00 01	00 - 7F	CC2 LFO2 TVF DEPTH	0 - 2400 [cents]	00	0 [cents]
40 2x 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]

• You may not always be able to obtain the desired effect by modifying the LFO 1 and LFO 2 parameters.

#### ○ Drum Setup Parameters

Address(H)	Size(H)	Data(H)	Parameter	Description
41 m5 rr	00 00 01	00 - 7F	REVERB SEND LEVEL	0.0 - 1.0 Multiplicand of the part Reverb level
41 m6 rr	00 00 01	00 - 7F	CHORUS SEND LEVEL	0.0 - 1.0 Multiplicand of the part chorus level (=NRP# 30)
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

## 4. Supplementary material

### ■ Decimal and Hexadecimal table

(An "H" is appended to the end of numbers in hexadecimal notation.)

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.

Dec.	Hex.	Dec.	Hex.	Dec.	Hex.	Dec.	Hex.
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

- Decimal values such as MIDI channel, bank select, and program change are listed as one greater than the values given in the above table.
- A 7-bit 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-bit 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 "Use nibbled data" is expressed in hexadecimal in 4-bit 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 = 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 result 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 12+80 = 8192) is 0, so this Pitch Bend Value is  
28 00H - 40 00H = 40 x 12+80 - (64 x 12+80) = 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 control 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 generators 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 generator 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 (RQ1, DT1) 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

**[Example 1]** Setting REVERB MACRO to ROOM 3  
According to the "Parameter Address Map (p.247)," 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.

**[Example 2]** Setting REVERB LEVEL to 12  
According to the "Parameter Address Map (p.248)," the REVERB LEVEL Address is 40 01 33H, and the parameter value is 0CH. Thus,  
F0 41 10 42 12 40 01 33 0C ?? 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 + 33H + 0CH = 64 + 1 + 51 + 12 = 128 (sum)  
128 (sum) ÷ 128 = 0 (quotient) ... 0 (remainder)  
checksum = 128 - 0 (remainder) = 128 = 80H

In this case, however, the checksum value should be 00H, not 80H. You should use 00H if the remainder is 0.  
This means that F0 41 10 42 12 40 01 33 0C 00 F7 is the message we transmit.

## ■ About the 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 at A4	Cents	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	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]** Setting the tuning of MIDI channel 3 to A4 = 442.0 Hz

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

B2 64 00 MIDI ch.3, lower byte of RPN parameter number: 00H

(B2) 65 01 (MIDI ch.3) upper byte of RPN parameter number: 01H

(B2) 06 45 (MIDI ch.3) upper byte of parameter value: 45H

(B2) 26 03 (MIDI ch.3) lower byte of parameter value: 03H

(B2) 64 7F (MIDI ch.3) lower byte of RPN parameter number: 7FH

(B2) 65 7F (MIDI ch.3) upper byte of RPN parameter number: 7FH

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

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

#### ○ Equal Temperament

This method of tuning divides the octave into 12 equal parts. It is currently the most widely used form of tuning, especially in occidental music. On the VA-76, the default settings for the Scale Tune feature produce equal temperament.

#### ○ Just Temperament (Tonic of C)

The principal triads 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.

#### ○ Arabic 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 Arabic Scale.

#### Example Settings

Note name	Equal Temperament	Just Temperament (Keytone C)	Arabic 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 on page 11 to convert these values to hexadecimal, and transmit them as Exclusive data. For example, to set the tune (C-B) of the Part1 Arabic Scale, send the following data:

F0 41 10 42 12 40 11 40 3A 6D 3E 34 0D 38 6B 3C 6F 40 36 0F 76 F70



[Creative Keyboard] Song mode

Date: March 2001

Model: EM-25/15

Version: 1.00

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1~16 X	1~16 X	3=Lower, 4=Upper, 6=Layer 10=M.Drums
Mode	Default Message Altered	Mode 3 Mode 3, 4 (M=1) *****	Mode 3 Mode 3, 4 (M=1)	*2
Note Number	True Voice	0~127 *****	0~127 0~127	
Velocity	Note ON Note OFF	O X	O X	
After Touch	Key's Ch's	O *3 O *3	O O	
Pitch Bend		O *3	O	
Control Change		0,32 O 1 O *3 5 O *3 6, 38 O 7 O 10 O 11 O 64 O 65 O 66 O 67 O 84 O *3 91 O 93 O 98, 99 O *3 100, 101 O *3	O O O O O O O O O O O (Reverb) O (Chorus) O O	Bank Select Modulation Portamento Time Data Entry Volume Panpot Expression Hold 1 Portamento Sostenuto Soft Portamento Control Effect 1 Depth Effect 3 Depth NRPN LSB, MSB RPN LSB, MSB
Program Change	True #	O *****	O 0~127	Program Number 1~128
System Exclusive		O	O	
System Common	Song Position Pointer Song Sel Tune	O *1 X X	O *1 X X	
System Real Time	Clock Commands	O *1 O *1	O O	
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	O O X O O X	O (120, 126, 127) O (121) O O (123-125) O X	
Notes		*1 O X is selectable *2 Recognized as M=1 even if M≠1 *3 Only for Song parts		

Mode 1: OMNI ON, POLY  
Mode 3: OMNI OFF, POLYMode 2: OMNI ON, MONO  
Mode 4: OMNI OFF, MONOO: Yes  
X: No