

# EM-50/30/20/10

CREATIVE KEYBOARDS

**MIDI** Implementation



## **■** MIDI implementation

## (Arranger)

## Section 1. Receive data

### ■ Channel Voice Messages

Note off

Status 2nd byte 3rd byte kkH

n = MIDI channel number 0H-FH (ch.1-ch.16) kk = note number 00H-7FH (0-127) vv = note off velocity

\* Not received when Rx.NOTE MESSAGE = OFF (Initial value is ON) or when note number is outside limits

\* 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-ch.16) 00H-7FH (0-127) kk = note number vv = note on velocity : 01H-7FH (1-127)

Not received when Rx.NOTE MESSAGE = OFF. (Initial value is ON)
 For Drum Parts, not received when Rx.NOTE ON = OFF for each instrument.

## ● Polyphonic Key Pressure

Status 2nd byte 3rd byte AnH kkH vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16) : 00H-7FH (0-127) kk = note number vv = key pressure

\* 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.

## O Bank Select (Controller number 0, 32)

Status 2nd byte 3rd byte BnH 00H mmH

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

: 00H-7FH (GS Variation number 0 - 127), Initial Value = 00H mm = Bank number MSB

II = Bank number LSB : 00H - 03H (MAP), Initial Value = 00H

\* Not received when Rx.BANK SELECT = OFF. "Rx.BANK SELECT" is set to OFF by "Turn General MIDI System On." and set to ON by "GS RESET." (Pow

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

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

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

## O Modulation (Controller number 1)

Status 2nd byte 3rd byte BnH 01H vvH

n = MIDI channel number : OH-FH (ch.1-ch.16) : 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. Ignored when "Modulation Midi Rx Parameter = OFF".

O Portamento Time (Controller number 5)

Status 2nd byte 3rd byte

n = MIDI channel number

: 0H-FH (ch.1-ch.16) : 00H-7FH (0-127), Initial value = 00H (0) vv = Portamento Time

\* 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.

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O Data Entry (Controller number 6, 38)

Status 2nd byte 3rd byte BnH 06H mmH

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

O Volume (Controller number 7) <u>Status</u>

2nd byte 3rd byte 07H vvH

n = MIDI channel number : OH-FH (ch.1-ch.16)

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

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

Not received when Rx.VOLUME = OFF. (Initial value is ON)
Ignored when "Volume Midi Rx Parameter = OFF".[EM-50/30]

O Pan (Controller number 10)

Status 2nd byte 3rd byte BnH 0AH vvH

n = MIDI channel number

: OH-FH (ch.1-ch.16) : OOH-40H-7FH (Left-Center-Right), Initial Value vv = pan

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)

O Expression (Controller number 11) Status 2nd byte 3rd byte

n = MIDI channel number

: OH-FH (ch.1-ch.16) : OOH-7FH (0-127), Initial Value = 7FH (127) vv = Expression

\* 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)

O Hold 1 (Controller number 64)

Status 2nd byte 3rd byte BnH 40H vvH

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

\* Not received when Rx.HOLD1 = OFF. (Initial value is ON)
\* Ignored when "Sustain Midi Rx Parameter = OFF". [EM-50/30]

O Portamento (Controller number 65)

Status 2nd byte 3rd byte BnH 41H vvH

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

vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

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

O Sostenuto (Controller number 66)

Status 2nd byte 3rd byte BnH 42H vvH

n = MIDI channel number : OH-FH (ch.1-ch.16)

: 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

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

O Soft (Controller number 67)

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

n = MIDI channel number

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

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

O Portamento control (Controller number 84)

2nd byte 3rd byte 54H kkH

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

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

* The rate of the pitch change caused by Portamento Control is determined by	
the Portamento Time value.	

Example 1.		
On MIDI	Description	Result
90 3C 40	Note on C4	C4 on
B0 54 3C	Portamento Control from C4	no change
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.		DW
On MIDI	Description	Result
B0 54 3C	Portamento Control from C4	no change
90 40 40	Note on E4	E4 is played with glide from C4 to E4
80 40 40	Note off E4	E4 off

## O 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) : 00H-7FH (0-127), Initial Value = 28H (40)

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

## O Effect 3 (Chorus Send Level) (Controller number 93)

2nd byte 3rd byte 5DH vvH

n = MIDI channel number

vv = Chorus Send Level

: 0H-FH (ch.1-ch.16) : 00H-7FH (0-127), Initial Value = 00H (0)

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

## O NRPN MSB/LSB (Controller number 99, 98)

Status	2nd byte	3rd byte
3nH	63H	mmH
BnH	62H	IIH

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

\* NRPN can be received when Rx.NRPN = ON. "Rx.NRPN" is set to OFF by power-on reset or by receiving "Turn General MIDI System On," and it is set to ON by "GS

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 this unit, NRPN messages can be used to modify

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 to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7FH) when you have finished setting the value of the desired parameter. Refer to Section 5. Supplementary material "Examples of actual MIDI messages" <Example 4> (page 14). On this unit, 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-50/30/20/10, 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) nr: Drum Instrument note number mm: 00H - 7FH (0 - max)
4FH 10H	mmH	Part 4 On / Off ( Upper 1) <b>[EM-50/30/20]</b> mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)
4FH 11H	mmH	Part 11 On / Off ( Lower) <b>[EM-50/30/20]</b> mm: 00H - 7FH (00-3FH = Off - 40-7FH= On)
4FH 12H	mmH	Part 12 On / Off ( Man Bass) [EM-50/30/20] mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)
4FH 13H	mmH	Part 6 On / Off ( Upper 2) [EM-50/30/20] mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)
4FH 14H	mmH	Part 16 On / Off ( Man Drums) [EM-50/30/20] mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)

[EM-50/30/20] Part 10 On / Off (Acc Drums) 4FH 1AH mmH mm: 00H - 7FH (00-3FH =Off - 40-7FH= On) Part 2 On / Off (Acc Bass) [EM-50/30/20] 4FH 1BH mmH mm: 00H - 7FH (00-3FH = Off - 40-7FH= On)

Part 1 On / Off (Acc 1) [EM-50/30/20] 4FH 1CH mmH mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)

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mm: 00H - 7FH (00-3FH = Off - 40-7FH= On) Part 5 On / Off (Acc3) [EM-50/30/20] 4FH 1FH mmH mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)

Part 3 On / Off (Acc2)

Part 7 On / Off (Acc 4)

4FH 1FH mmH mm: 00H - 7FH (00-3FH = Off - 40-7FH= On) [EM-50/30/20] Part 8 On / Off (Acc 5) 4FH 18H mmH

mm: 00H - 7FH (00-3FH = Off - 40-7FH= On) [EM-50/30/20] 4FH 19H mmH Part 9 On / Off (Acc 6) mm: 00H - 7FH (00-3FH = Off - 40-7FH= On)

Master Accompaniment On / Off [EM-50/30/20] 4FH 20H mmH mm: 00H - 7FH (00-3FH =Off - 40-7FH= On) [EM-50/30/20] Master Upper On / Off 4FH 21H mmH mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)

Master Bass On / Off [EM-50/30/20] 4FH 23H mmH mm: 00H - 7FH (00-3FH =Off - 40-7FH= On)

4FH 24H mmH Master Drum On / Off [EM-50/30/20] mm: 00H - 7FH (00-3FH = Off - 40-7FH= On)

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.
\* lanored when "NRPN Midi Rx Parameter = OFF". [EM-50/30]

\* Parameters marked 'relative change' will change relative to the preset

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

2nd byte 3rd byte 65H mmH <u>Status</u>

Data entry LSB (IIH) is ignored.

4FH 1DH mmH

: OH-FH (ch.1-ch.16) n = MIDI channel number mm = upper byte of parameter number specified by RPN II = lower byte of parameter number specified by RPN

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

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

## \*\*RPN\*\*

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

To use these messages, you must first use RPN (Controller number 100 and 110, 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 Section 5. "Examples of actual MIDI messages" <Example 4> (page 14).

On the EM-50/30/20/10, RPN can be used to modify the following parameters.

RPN	Data entry	
MSB LSB	MSB LSB	Explanation
00H 00H	mmH	Pitch Bend Sensitivity
		mm: 00H-18H (0-24 semitones),
		Initial Value = 02H (2 semitones)
		II: ignored (processed as 00H)
		specify up to 2 octaves in semitone steps
00H 01H	mmH IIH	Master Fine Tuning
		mm, II: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +99.99 cents),
		Initial Value = 40 00H (± 0 cent)
		Refer to 5. Supplementary material, "About tuning" (page 15).
00H 02H	mmH	Master Coarse Tuning
		mm: 28H-40H-58H (-24 - 0 - +24 semitones),
		Initial Value = 40H (±0 semitone)
75 75		II: 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, II: ignored

#### Program Change Status 2nd byte CnH

n = MiDI channel number

: 0H-FH (ch.1-ch.16) : 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)).

\* Ignored when "Program Change Midl Rx Parameter = OFF". [EM-50/30]

## Channel Pressure

Status 2nd byte

n = MIDI channel number vv = Channel Pressure

: 0H-FH (ch.1-ch.16) : 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 IIH mmH

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

mm, II = Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

Not received when Rx.PITCH BEND = OFF. (Initial value is ON)

\* The resulting effect is determined by System Exclusive messages. With the initial settings the effect is Pitch Bend.

\* Ignored when "Pitch Bender Midi Rx Parameter = OFF".

## ■ 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)

 $^{\star}$  When this message is received, the following controllers will be set to their reset

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

## ● Local On/Off (Controller number 122)

Status 2nd byte 3rd byte 7AH 00H

(Local Off)

BnH 7AH 7FH (Local On - Default Value)

n = MIDI channel number : OH-FH (ch.1-ch.16) This parameter affect all the parts

When Local Off message is received, the generation board is disconnected from the keyboard but the messages received via Midi are still recognized and

\*Regardless of the set channel, this message is sent to all parts.

## All Notes Off (Controller number 123)

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

n = MIDI channel number : OH-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

## OMNI OFF (Controller number 124)

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

n = MIDI channel number : OH-FH (ch.1-ch.16)

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

## OMNI ON (Controller number 125)

2nd byte 3rd byte 7DH 00H

n = MIDI channel number : OH-FH (ch.1-ch.16)

\* The same processing will be carried out as when All Note Off is received.OMNI ON will not be turned on

## MONO (Controller number 126)

2nd byte 3rd byte 7EH mmH

: 0H-FH (ch.1-ch.16) n = MIDI channel number : 00H-10H (0-16)

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

## POLY (Controller number 127)

2nd byte 3rd byte 7FH 00H <u>Status</u>

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

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

## ■ System Realtime Message

## Active Sensing

\* 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.

## O Sequencer Start

Status FAH

\* When "Sequencer Start" is received, the internal Recorder and/or the internal Arranger start.

## O Sequencer Stop

 $\mbox{\ensuremath{^{\circ}}}$  When "Sequencer Stop" is received, the internal Recorder and/or the internal arranger stop.

## O Timing Clock

Status

\* When "Timing Clock" is received the internal recorder or the internal arranger is synchronized to an external clock according to the following table

ync RX F	lesponse	System exclusive messages related to mode settings     These messages are used to initialize a device to GS or General MIDI mode, or
nternal T	he Style will neither start/stop nor follow the empo of the external Timing Clock (F8) and	change the operating mode. When creating performance data, a Turn General MIDI
•	Sequencer tart /Stop" (FA / FC ) messages. [EM-50/30]	score, and a "GS Reset" message at the beginning of a GS music data. In the case of data for the EM-50/30/20/10 and for this unit, we recommend that "System Mode
	As long the EM-50/30/20/10 does not receive	Set 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
	Sequencer Start/Stop" (FA/FC) and "Timing	more mode setting messages in a single song.) "Turn Conoral MIDL System On" use Universal Non-realtime Message format. "Sys-
	Clock" (F8) messages it will follow its own tempo and Start/Stop whenever you press the	tem Mode Set" and "GS Reset" use Roland system exclusive format "Data Set 1
•	START/STOP" button to start Style Playback and	(DTI)."
(	Recorder (Rec). Once received a "Sequencer Start" (FA), if also	O Turn General MIDI System On This is a command message that resets the internal settings of the unit to the
•	Timing Clock" (F8) follows this message, the Arranger / Recorder (Rec) start with the external	Canada MIDI initial state (Canada MIDI System-Level 1). After receiving this mes-
†	iming, otherwise it start following its internal empo.	sage this unit, will automatically be set to the proper condition for correctly playing a General MIDI score.
	empo. As long the EM:50/30/20/10 does not receive	Status Data byte Status
	Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages .it will follow its own tempo	FOH 7EH, 7FH, 09H, 01H F7H
	and Recorder Play/Stop whenever you press the	Byte Explanation
	*PLAY/STOP" button to start Song Playback and Recorder (Rec).	FOH Exclusive status 7EH ID number (Universal Non-realtime Message)
	Once received a "Sequencer Start" (FA), if also	7FH Device ID (Broadcast)
	"Timing Clock" (F8) follows this message, the Recorder (Play) / Recorder (Rec) start with the	09H Sub ID#1 (General MIDI Message) 01H Sub ID#2 (General MIDI On)
,	external timing, otherwise it start following its	F7H EOX (End Of Exclusive)
	internal tempo.	* When this message is received, Rx.BANK SELECT will be OFF and Rx.NRPN will be
MIDI A	As long the EM-50/30 does not receive "Sequencer Start/Stop" ( FA/FC ) and "Timing	OFF.  * There must be an interval of at least 50 ms between this message and the next
	Clock" (F8) messages it will follow its own tempo	message.
	and Start/Stop whenever you press the "START/STOP" button to start Style Playback and	
	Recorder (Rec).	<ul> <li>Turn General MIDI System Off         "General MIDI System Off" is a command message that resets the internal set-     </li> </ul>
	Once received a "Sequencer Start" (FA), if also "Timing Clock" (F8) follows this message, the	tings of the unit to the Arranger Mode I initial state .
	Arranger / Recorder (Rec) start with the external timing, otherwise it will wait for external "Timing	Status Data byte Status
	Clock" (F8).	FOH 7EH, 7FH, 09H, 02H F7H
MIDI S	As long the EM-50/30 does not receive	Byte Explanation
	"Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo	FOH Exclusive status 7EH ID number (Universal Non-realtime Message)
	and Recorder Play/Stop whenever you press the	7FH Device ID (Broadcast) 09H Sub ID#1 (General MIDI Message)
	*PLAY/STOP" button to start Song Playback and Recorder (Rec).	02H Sub ID#2 (General MIDI Off)
	Once received a "Sequencer Start" (FA), if also	F7H EOX (End Of Exclusive)
	"Timing Clock" (F8) follows this message, the Recorder (Play) / Recorder (Rec) start with the	* When this message is received, the unit change from "General MIDI" mode to
	external timing, otherwise it will wait for external "Timing Clock" (F8).	EM-50/30/20/10 default mode. (Arranger mode) * There must be an interval of at least 100 ms between this message and the next
Remote A	As long the EM-50/30 does not receive	message.
Remote A	"Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo	○ GS Reset
	and Start/Stop whenever you press the	accompand message that resets the Internal settings of a device
	"START/STOP" button to start Style Playback and Recorder (Rec).	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 prop-
	Once received a "Sequencer Start" (FA), if also	er state to correctly playback GS music data.
	"Timing Clock" (F8) follows this message, the Arranger / Recorder (Rec) start always with the	Status Data byte Status
	internal timing.	FOH 41H, dev, 42H, 12H, 40H, 00H, 7FH, 00H, 41H F7H
		Byte Explanation FOH Exclusive status
Remote \$	As long the EM-50/30 does not receive "Sequencer Start/Stop" (FA/FC) and "Timing	41H ID number (Roland)
	Clock" (F8) messages it will follow its own tempo and Recorder Play/Stop whenever you press the	dev Device ID (dev: 00H - 1FH (1 - 32) Initial value is 10H(17)) 42H Model ID (G\$)
	"PLAY/STOP" button to start Song Playback and	12H Command ID (DT1)
	Recorder (Rec). Once received a "Sequencer Start" (FA), if also	40H Address MSB 00H Address
	"Timing Clock" (F8) follows this message, the	7FH AddressLSB
	Recorder (Play) / Recorder (Rec) start always with the internal timing.	41H Checksum
	·	F7H EOX (End Of Exclusive)
		<ul> <li>When this message is received, Rx.NRPN will be ON.</li> <li>There must be an interval of at least 50 ms between this message and the next</li> </ul>
= 0t Funkaha Masa		
System Exclusive Mess		message.
System Exclusive Mess Status Data byte FOH iiH, ddH,,eeH	<b>age</b> <u>Status</u> F7H	O Evit GS Mode
Status Data byte FOH iiH, ddH,eeH FOH	Status F7H : System Exclusive Message status	O Exit GS Mode "Exit GS Mode" is a command message that resets the internal settings of the
Status Data byte FOH iiH, ddH,eeH	Status F7H  : System Exclusive Message status : an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message	Exit GS Mode     Exit GS Mode' is a command message that resets the internal settings of the unit to the Arranger Mode I initial state.
Status Data byte FOH iiH, ddH,eeH FOH	Status F7H  : System Exclusive Message status : an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H.	O Exit GS Mode "Exit GS Mode" is a command message that resets the internal settings of the
Status Data byte FOH iiH, ddH,,eeH	Status F7H  : System Exclusive Message status : 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	© Exit GS Mode  "Exit GS Mode" is a command message that resets the internal settings of the unit to the Arranger Mode I Initial state .  Status FOH Data byte 41H, dev, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H F7H
Status Data byte FOH iiH, ddH,eeH FOH	Status F7H  : System Exclusive Message status : 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 Mes-	O Exit GS Mode  "Exit GS Mode" is a command message that resets the internal settings of the unit to the Arranger Mode I initial state.  Status FOH  41H, dev, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H  Status F7H  Explanation F0H  Exclusive status
Status Data byte FOH iiH, ddH,eeH FOH ii = ID number	Status F7H  : System Exclusive Message status : 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). : 00H-7FH (0-127)	O Exit GS Mode  "Exit GS Mode" is a command message that resets the internal settings of the unit to the Arranger Mode I initial state.  Status FOH 41H, dev, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H F7H  Byte Explanation FOH Exclusive status 41H ID number (Roland)
Status Data byte FOH iiH, ddH,eeH FOH	Status F7H  : System Exclusive Message status : 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 (7FH) and Universal Realtime Messages (7FH).	O Exit GS Mode  "Exit GS Mode" is a command message that resets the internal settings of the unit to the Arranger Mode I initial state.  Status FOH  41H. dev, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H  FOH  Exclusive status FOH  Model ID  GS  Initial value is 10H(17))
Status Data byte FOH iIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Status F7H  : System Exclusive Message status : 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). : 00H-7FH (0-127)	O Exit GS Mode  "Exit GS Mode' is a command message that resets the internal settings of the unit to the Arranger Mode I initial state .  Status FOH  Data byte 41H, dev, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H  Explanation FOH  Exclusive status 41H  ID number  (Roland)  Device ID  (dev: OH - 1FH (1 - 32) Initial value is 10H(17))

AddressLSB 7FH Data (Exit GS Mode) 42H Checksum EOX (End Of Exclusive)

 $^{\bullet}$  When this message is received, the unit change from "General MIDI" mode to EM-50/30/20/10 default mode. (Style mode)

There must be an interval of at least 100 ms between this message and the next

: middle byte of the starting address of the transmitted data : lower byte of the starting address of the transmitted data : the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address. bbH Address ссн Address LSB ddH Data eeH Data Checksum F7H EOX (End Of Exclusive)

The amount of data that can be transmitted at one time depends on the type of data, and data can be received only from the specified starting address and

size. Refer to the Address and Size given in Section 3.

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

Regarding the checksum please refer to section 4

## ● Universal Realtime System Exclusive Messages

#### O Master volum

**Status** Data byte <u>Status</u> FOH 7FH, 7FH, 04H, 01H, IIH, mmH Explanation Exclusive status Byte ID number (universal realtime message) Device ID (Broadcast) 7FH 7FH 04H

Sub ID#1 (Device Control messages) Sub ID#2 (Master Volume) 01H IIH Master volume lower byte Master volume upper byte FOX (Fnd Of Exclusive)

## Data transmission

The EM-50/30/20/10 can use Exclusive messages to transmit internal settings to other devices. There are two types of Exclusive data transmission; Individual Parameter Transmission (section 3) In which single parameters are transmitted one by one, and Bulk Dump Transmission (section 4) in which a large amount of data is transmitted at once.

The exclusive message used when transmitting GS format data has a model ID of 42H and a device ID of 10H.

## O Data request 1 RQ1 (11H)

O Data request 1 RQ1 (11H)
This message requests the other device to send data. The Address and Size determine the type and amount of data to be sent. There are two types of request: Individual Parameter Request which requests data for an individual parameter, and Bulk Dump Request which requests a large amount of data at once. In either case, the "Data Request" (RQ1)" message format is used, and the Address and Size included in the message determine the type and amount of data that is desired. data that is desired

For Individual Parameter Request, refer to "3. Individual Parameter Transmission",

For Bulk Dump Request, refer to '4. Bulk Dump'.

When a Data Request message is received, if the device is ready to transmit data and if the address and size are appropriate, the requested data will be transmitted as a 'Data Set 1 (DT1)' message. If not, nothing will be transmitted.

Status FOH <u>Data byte</u> 41H, dev, 42H, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum Byte Explanation FOH 41H ID number (Roland) Device ID (dev: 00H - 1FH Initial value is 10H Model ID (GS) 11H Command ID Address MSB: upper byte of the starting address of the requested data
Address : middle byte of the starting address of the requested data bbH ссН Address LSB: lower byte of the starting address of the requested data SSH Size MSB Size LSB uuH Checksum EOX (End Of Exclusive)

## O Data set 1 DT1 (12H)

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

<u>Status</u> FOH	<u>Data byte</u> 41H, dev, 42H, 12H, aaH, bbH, ccH, ddH, eeH, sum F7H	15
<u>Byte</u>	Explanation	
FOH	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: 00H - 1FH Initial value is 10H	
42H	Model ID (GS), 45H	
12H	Command ID (DT1)	
aaH	Address MSB : upper byte of the starting address of the transmitted a	lata

<sup>\*</sup> The lower byte (IIH) of Master Volume will be handled as 00H.

<sup>•</sup> The amount of data that can be transmitted at once time will depend on the type of data, and data must be requested using a specific starting address and size. Refer to the Address and Size listed in Section 3

<sup>\*</sup> Regarding the checksum please refer to Section 4.

## Section 2. Transmit data (Style Section)

## ■ Channel voice messages

Note off

2nd byte 3rd byte Status

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

Note on

2nd byte 3rd byte

: 0H - FH (ch.1 - ch.16) n=MIDI channel number : 00H - 7FH (0 - 127) : 01H - 7FH (1 - 127) kk=note number vv=velocity

## Control Change

(Controller number 0,32) O Bank Select 2nd byte 3rd byte mmH **Status** 

20H IIH

: OH - FH (ch.1 - ch.16) n=MIDI channel number

: 00H - 7FH (GS Variation number 0 - 127) mm=Bank number MSB

II=Bank number LSB :00H - 02H (MAP)

Some other GS devices do not recognize the Bank Select LSB (Controller num-

[EM-50/30/20] (Controller number 1) Modulation <u>Status</u>

2nd byte 3rd byte 01H vvH BnH

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

\* Ignored when "Modulation Midi Tx Parameter" = OFF. [EM-50/30]

O Portamento Time (Controller number 5)

2nd byte 3rd byte 05H vvH <u>Status</u>

: DH - FH (ch.1 - ch.16) n=MIDI channel number

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

 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.

O Data Entry (Controller number 6,38)

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

: 0H - FH (ch.1 - ch.16) n=MIDI channel number mm.II= the value of the parameter specified by RPN/NRPN

(Controller number 7)

2nd byte 3rd byte 07H vvH

: 0H - FH (ch.1 - ch.16) n=MIDI channel number Initial value = 64H (100) : 00H - 7FH (0 - 127) vv=Volume

Ignored when "Volume Midi Tx Parameter" = OFF. TEM-50/301

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

(Controller number 10)

Status 2nd byte 3rd byte

vvH

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

: 00H - 40H - 7FH vv=pan (Left - Center - Right) Initial value = 40H (Center)

\* The stereo position can be adjusted over 127 steps.

(Controller number 11) O Expression

2nd byte 3rd byte
0BH vvH <u>Status</u>

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

initial value = 7FH (127) : 00H - 7FH (0 - 127)

\* 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

(Controller number 64) O Hold 1

2nd byte 3rd byte <u>Status</u>

n=MIDI channel number

\* Ignored when \*Hold Midi Tx Parameter" = OFF.

(Controller number 84) O Portamento control

Status 2nd byte 3rd byte 54H

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

(Controller number 91) O Effect 1 (Reverb Send Level)

2nd byte 3rd byte 5BH

wH

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

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

(Controller number 93) O Effect 3 (Chorus Send Level)

Status 2nd byte 3rd byte BnH 5DH vvH

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

: 00H - 7FH (0 - 127) Initial value = 00H (0) vv=Control value

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

(Controller number 99,98) O NRPN MSB/LSB 2nd byte 3rd byte Status BoH 63H mmH BnH 62H

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

Ignored when "NRPN Midi Tx Parameter" = OFF. IEM-50/301

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

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.

NIDPN Data entry

MSB LSB	MSB	Function and range	
01H 20H	mmH	TVF Cutoff Frequency (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)	[EM-50/30/20]
01H 21H	mmH	TVF Resonance (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)	[EM-50/30/20]
4FH 10H	mmH	Part 4 On / Off ( Upper 1) mm: 00H - 7FH (00-3FH = Off - 40-7FH= 0	[ <b>EM-50/30/20]</b> On)
4FH 11H	mmH	Part 11 On / Off (Lower) mm: 00H - 7FH (00-3FH = Off - 40-7FH= 6	[ <b>EM-50/30/20]</b> On)
4FH 12H	mmH	Part 12 On / Off ( Man Bass) mm: 00H - 7FH (00-3FH = Off - 40-7FH=	
4FH 13H	mmH	Part 6 On / Off ( Upper 2) mm: 00H - 7FH (00-3FH =Off - 40-7FH=	[ <b>EM-50/30/20]</b> On)
4FH 1AH	mmH	Part 10 On / Off ( Acc Drums ) mm: 00H - 7FH (00-3FH = Off - 40-7FH=	<b>[EM-50/30/20]</b> On)
4FH 1BH	mmH	Part 2 On / Off ( Acc Bass) mm: 00H - 7FH (00-3FH = Off - 40-7FH=	[ <b>EM-50/30/20]</b> On)
4FH 20H	mmH	Master Accompaniment On / Off mm: 00H - 7FH (00-3FH = Off - 40-7FH=	[ <b>EM-50/30/20</b> ] On)

Data entry LSB (IIH) is ignored.

\* Parameters marked "absolute change" will be set to the absolute value of the parameter, regardless of the preset value.

It is not possible to simultaneously use both Chorus Send Level and Delay Sendlevel on a single Drum Instrument.

Program Change

Parameters marked 'relative change' will change relative to the preset value. Even among different GS devices, 'relative change' parameters may sometimes differ in the way the sound changes or in the range of change.

<u>Status</u> 2nd byte Hqq

n=MIDI channel number

: 0H - FH (ch.1 - ch.16) : 00H - 7FH (prog.1 - prog.128)

\* Ignored when \*Program Change Midi Tx Parameter"= OFF. [EM-50/30]

● Pitch Bend Change

[EM-50/30/20]

<u>Status</u> 2nd byte 3rd byte FnH

n=MIDI channel number

: 0H - FH (ch.1 - ch.16)

mm,II=Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

' Ignored when "Pitch Bend Midi Tx Parameter" = OFF. [EM-50/30]

## ■ System Realtime Messages

O Active Sensing

Status FEH

Transmitted about every 250ms.

O Sequencer Start

Status

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

O Sequencer Stop

Status FCH

\* This message is transmitted when the internal sequencer is stopped.

## O Timing Clock

Status F8H

There are two options for sending MIDI realtime messages whenever you playback a style

### Sync TX

Start/Stop If you select this option, the EM-50/30/20/10 arranger sends Start, Stop messages (FA - FC).

\* Ignored when "Start/Stp Midi Tx Parameter" = OFF. [EM-50/30]

Clock This option means that the EM-50/30/20/10 arranger sends Timing clock messages (F8).
\* Ignored when "Clock Tx Midi Tx Parameter" = OFF. [EM-50/30]

Data byte Status F7H iiH. ddH.

: System Exclusive Message status : an ID number (manufacturer ID) to indicate the manufacii = ID number

turer whose Exclusive message this is. Roland's manufactur-

er 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) : EOX (End Of Exclusive)

The System Exclusive Messages Transmitted and received by the EM-50/30 are: messages related to Mode Setting, Universal Realtime System Exclusive messages, Data Requests (RQ1), and Data Set (DT1).

## Universal Realtime System Exclusive Messages

#### Data transmission

The EM-50/30/20/10 can use Exclusive messages to transmit internal settings to other devices. There are two types of Exclusive data transmission; Individual Parameter Transmission (section 3) in which single parameters are transmitted one by one, and Bulk Dump Transmission (section 4) in which a large amount of data is transmitted at once.

The exclusive message used when transmitting GS format data has a model ID of 42H and a device ID of 10H.

### O Data request 1 RQ1 (11H)

This message requests the other device to send data. The Address and Size determine the type and amount of data to be sent. There are two types of request; Individual Parameter Request which requests data for an individual parameter, and Bulk Dump Request which requests a large amount of data at once. In either case, the "Data Request 1 (RQ1)" message format is used, and the Address and Size included in the message determine the type and amount of data that is desired.

For Individual Parameter Request, refer to "3. Individual Parameter Transmis-

For Bulk Dump Request, refer to "4. Bulk Dump"

When a Data Request message is received, if the device is ready to transmit data and if the address and size are appropriate, the requested data will be transmitted as a "Data Set 1 (DT1)" message. If not, nothing will be transmitted.

Status FOH	<u>Data byte</u> 41H, dev, 42H, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum  Status F7H
Byte FOH 41H dev 42H 11H aaH bbH ccH ssH ttH uuH sum F7H	Exclusive status  Device ID (Goland)  Device ID (Ges)  Command ID (RQ1)  Address MSB : upper byte of the starting address of the requested data Address  El lower byte of the starting address of the requested data Size MSB  Size Size LSB  Checksum  Exclusive Size (End Of Exclusive)
1711	(End Of Exclusive)

<sup>\*</sup> The amount of data that can be transmitted at once time will depend on the type of data, and data must be requested using a specific starting address and size. Refer to the Address and Size listed in Section 3.

## O Data set 1 DT1 (12H)

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

<u>Status</u> FOH	<u>Data bvte</u> 41H, dev, 42H, 12H, aaH, bbH, ccH, ddH, eeH, sum F7H
<u>Byte</u> FOH 41H dev 42H	Explanation Exclusive status ID number (Roland) Device ID (dev: 00H - 1FH Initial value is 10H Model ID (GS), 45H, 41H
12H	Command ID (DTI)
aaH bbH ccH ddH	Address MSB : upper byte of the starting address of the transmitted data Address LSB : inladdle byte of the starting address of the transmitted data Address LSB : lower byte of the starting address of the transmitted data : lower byte of the starting address of the transmitted data : the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	
eeH sum	Data Checksum
F7H	EOX (End Of Exclusive)

<sup>\*</sup> The amount of data that can be transmitted at one time depends on the type of data, and data can be received only from the specified starting address and

## ■ System Exclusive Messages

Regarding the checksum please refer to Section 4.

size. Refer to the Address and Size given in Section 3.

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

Regarding the checksum please refer to section 4

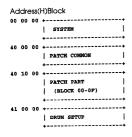
## Section 3 Individual Parameter Transmission

(Model ID= 42H)
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.

## ■ Address Block Map

The address map for Individual Parameter Transmission is as follows.

## <Model ID = 42H>



• System Parameters

Parameters affecting the entire unit, such as how the two MIDI IN connectors will function, are called System Parameters. System parameters will not be reset even if 'GS Reset' or 'General MIDI System On' are received.

## <MODEL ID = 42H>

# Patch parameters Patch common parameters

Address(H)	Size(H)	Data(H)	Parameter			
40 00 00	00 00 04	0018 - 07E8	MASTER TUNE	Description -100.0 - +100.0 (cent)	Default Value (H)	Descrip-tion
40 00 01#			WINDLEK TOTAL	Use nibblized data.	00 04 00 00	0 (cent)
40 00 02#				ose hibblized data.		
40 00 03#						
* Refer to se	ction 5. Supple	ementary material, "Abo	out tuning" (page 15).			
40 00 04	00 00 01	00 - 7F	MASTER VOLUME			
		00 /1	MASIER VOLUME	0 - 127	7F	127
40 00 05	00 00 01	28 - 58	MASTER KEY-SHIFT	(= F0 7F 7F 04 01 00 vv F7 )		
40 00 06	00 00 01	01 - 7F	MASTER PAN	-24 - +24 (semitones) -63 (LEFT) - +63 (RIGHT)	40	O(semitones)
40 00 7F	00 00 01	00	MODE SET	00 = GS Reset	40	0 (CENTER)
				(Rx. only)		
* Refer to *Sy	stem exclusive	messages related to N	1ode settings" (page 6).	(KX. Of ily)		
40 01 00	00 00 10					
40 01 00	00 00 10	20 - 7F	PATCH NAME	16 ASCII Characters		
40 01 0F#						
400101#						
40 01 10	00 00 10	00 - 18	VOICE RESERVE	Part 0	00	
40 01 11#			VOICE RESERVE	Part 1	00	
40 01 12#				Part 2	00	
40 01 13#				Part 3	02 02	
40 01 14#				Part 4	06	
40 01 15#				Part 5	04	
40 01 16#				Part 6	03	
40 01 17#				Part 7	02	
40 01 18#				Part 8	02	
40 01 19#				Part 9	02	
40 01 1A#				Part 11	00	
40 01 1B#				Part 12	00	
40 01 1C#				Part 13	00	
40 01 1D#				Part 14	00	
40 01 1E# 40 01 1F#				Part 15	00	
40 01 1F#				Part 16	01	
The sum total	of voices in the	e voice reserve functio	n must be equal or less than the number of	the maximum poliphony. (24)		
40 01 30	00 00 01	00 - 07	REVERB MACRO	00: Room 1	04	Hall 2
				01: Room 2	•	riuli 2
				02: Room 3		
				03: Hall 1		
				04: Hall 2		
				05: Plate		
				06: Delay		
40 01 31	00 00 01	00 07	DE 1500 OLLINO OLLINO	07: Panning Delay		
40 01 32	00 00 01	00 - 07 00 - 07	REVERB CHARACTER	0 - 7	04	4
40 01 33	00 00 01	00 - 07 00 - 7F	REVERB PRE-LPF	0 - 7	00	0
40 01 34	00 00 01	00 - 7F	REVERB LEVEL	0 - 127	40	64
40 01 35	00 00 01	00 - 7F	REVERB TIME	0 - 127		64
40 01 36	00 00 01	00 - 7F	REVERB DELAY FEEDBACK	0 - 127	00	0
	23 00 01	55 - 71	REVERB SEND LEVEL TO CHORUS	0 - 127	00	0

REVERB MACRO is a macro parameter that allows global setting of reverb parameters. When you select the reverb type with REVERB MACRO, each reverb parameter will be set to the most suitable value.
 REVERB CHARACTER is a parameter that changes the reverb algorithm. The value of REVERB CHARACTER corresponds to the REVERB MACRO of the same number.

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

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

## O Patch Part parameters

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

x=2 : x=9 x=0
x=A

Part 12 (default MIDIch = 12) x=B

: : .
Part16 (default MIDIch =16) x=

## 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
10 1x 00	00 00 02	00 - 7F	TONE NUMBER	CC#00 VALUE 0 - 127	00	Ü
10 1x 00#	00 00 02	00 - 7F		P.C. VALUE 1 - 128	00	1
10 1x 01# 10 1x 02	00 00 01	00 - 10	Rx. CHANNEL	1 - 16, OFF		Same as the Part Number
10 1x 02 10 1x 03	00 00 01	00 - 01	Rx. PITCH BEND	OFF / ON	01	ON
10 1x 03 10 1x 04	00 00 01	00 - 01	Rx. CH PRESSURE(CAf)	OFF / ON	01	ON
10 1x 04 10 1x 05	00 00 01	00 - 01	Rx. PROGRAM CHANGE	OFF / ON	01	ON
	00 00 01	00 - 01	RX. CONTROL CHANGE	OFF / ON	01	ON
10 1x 06	00 00 01	00 - 01	Rx. POLY PRESSURE(PAf)	OFF / ON	01	ON
40 1x 07	00 00 01	00 - 01	Rx. NOTE MESSAGE	OFF / ON	01	ON
40 1x 08		00 - 01	Rx. RPN	OFF / ON	01	ON
40 1x 09 40 1x 0A	00 00 01 00 00 01	00 - 01	Rx. NRPN	OFF / ON	00(01*)	OFF(ON*)
	eral MIDI Syste	em On" is receiv	ed, Rx. NRPN will be set OFF. When	n "GS Reset" is received, it will be	set ON.	
		00 - 01	Rx. MODULATION	OFF / ON	01	ON
40 1x 0B	00 00 01 00 00 01	00 - 01	Rx. VOLUME	OFF / ON	01	ON
40 1x 0C		00 - 01	Rx. PANPOT	OFF / ON	01	ON
40 1x 0D	00 00 01	00 - 01	RX. EXPRESSION	OFF / ON	01	ON
40 1x 0E	00 00 01	00 - 01	Rx. HOLD1	OFF / ON	01	ON
40 1x 0F	00 00 01		RX. PORTAMENTO	OFF / ON	01	ON
40 1x 10	00 00 01	00 - 01	Rx. SOSTENUTO	OFF / ON	01	ON
40 1x 11	00 00 01	00 - 01		OFF / ON	01	ON
40 1x 12	00 00 01	00 - 01	Rx. SOFT	0/1 / 0/1	<del>-</del> ·	
40 lx 13	00 00 01	00 - 01.	MONO/POLY MODE	Mono / Poly (=CC# 126 01 / CC# 127	01 00)	Poly
40 1x 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE 1 = LIMITED-MULTI 2 = FULL-MULTI		
				Z = I OLL-MOLII	00 at x=0	SINGLE (Drum Part)

\* 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 00 at x0 OFF (Normal Part) 1 = MAP1 01 at x=0 MAP1 (Drum Part) 2 = MAP2

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

40 1 x 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) 08 00 0 (Hz) Use nibblized data.

\* PITCH OFFSET FINE allows you to after, 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 afteration (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
			A THE REST OF SECTION	0 - 127	40	64
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		40	0 (CENTER)
40 1x 1C	00 00 01	00 - 7F	PART PANPOT	-64(RANDOM),	40	O(CENTER)
				-63(LEFT) - +63(RIGHT)		
				(=CC# 10, except RANDOM)	00	C-1
40 1x 1D	00 00 01	00 - 7F	KEYBOARD RANGE LOW	(C-1) - (G9)	00	G9
40 1x 1E	00 00 01	00 - 7F	KEYBOARD RANGE HIGH	(C-1) - (G9)	7F	
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	00	0
40 11 21	00 00 01	00 //		(=CC# 93)		
40 1x 22	00 00 01	00 - 7F	REVERB SEND LEVEL	0 - 127	28	40
40 1X ZZ	00 00 01	00-71	NE PERO DE LO DE L	(=CC# 91)		
				•		
	00 00 01	00 - 01	Rx.BANK SELECT	OFF / ON	01(00")	ON(OFF*)
40 1x 23	00 00 01			•		
* When *Gene	eral MIDI System	On" is received, Rx.BANK SI	ELECT will be set OFF. When "GS Reset" o	r "System Mode Set" is received, it	will be set ON.	
40 1x 24	00 00 01	00 - 01	RX BANK SELECT LSB	OFF / ON	01	ON
* When RX BA	NK SELECT LSB =	= OFF, Bank Select LSB (Bn 2)	0 11) will be treated as 00H regardless of	its value.		
***************************************					40.00	•
40 1x 2A	00 00 02	00 00 - 40 00 - 7F 7F	PITCH FINE TUNE	-100 - 0 - +100 (cent)	40 00	0
40 1/2/	•• ••			(= RPN#1)		
40 1x 2B#						
40 17 20						_
40 1x 30	00 00 01	OE - 72	TONE MODIFY1	-50 - +50	40	0
40 17 30	00 00 01	02 72	Vibrato Rate	(=NRPN# 8)		
40 1x 31	00 00 01	OE - 72	TONE MODIFY2	-50 - +50	40	0
40 IX 3 I	00 00 01	OL - 72	Vibrato Depth	(=NRPN# 9)		
40.100	00 00 01	0E - 72	TONE MODIFY3	-50 - +50	40	0
40 1x 32	00 00 01	OE - 72	TVF Cutoff Freq.	(=NRPN# 32)		
	00 00 01	0E - 72	TONE MODIFY4	-50 - +50	40	0
40 1x 33	00 00 01	UE - 72	TVF Resonance	(=NRPN# 33)		
		05 70	TONE MODIFY5	-50 - +50	40	0
40 1x 34	00 00 01	0E - 72	TVF&TVA Env.attack	(=NRPN# 99)	•	
				-50 - +50	40	0
40 1x 35	00 00 01	0E - 72	TONE MODIFY6	(=NRPN# 100)	70	-
			TVF&TVA Env.decay	(-INICIAL 100)		

00 00 01	0E - 72 0E - 72	TONE MODIFY7 TVF&TVA Env.release TONE MODIFY8 Vibrato Delay	-50 - +50 (=NRPN# 102) -50 - +50 (=NPPN# 10)	40 40	0
		Vibrato Delay	(=NRPN# 10)		-
			10/16 MODIFY   10/16	TVF&TVA_Env.release	TVF&TVA_Env.release

ddress(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
) 1x 40 ) 1x 41# ) 1x 42# ) 1x 43# ) 1x 44# ) 1x 45# ) 1x 45# ) 1x 45# ) 1x 49#   1x 49#   1x 44#   1x 48#	00 00 0C	00 - 7F 00 - 7F	SCALE TUNING C SCALE TUNING C# SCALE TUNING D SCALE TUNING D SCALE TUNING F SCALE TUNING F SCALE TUNING F SCALE TUNING F SCALE TUNING G# SCALE TUNING A SCALE TUNING A SCALE TUNING A#	-64 - +63 (ce -64 - +63 (ce	nt) 40	0 (cent) 0 (cent) 0 (cent) 0 (cent) 0 (cent) 0 (cent) 0 (cent)

40 2x 00	00 00 01	00 50				
		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 (cent)		
40 2x 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL		40	0 (cent)
40 2x 03	00 00 01	00 - 7F		-100.0 - +100.0 (%)	40	0 (%)
40 2x 04			MOD LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 (cent)	0A	10 (cent)
40 2x 05	00 00 01	00 - 7F	MOD LFO1 TVF DEPTH	0 - 2400 (cent)	00	
40 2x 06	00 00 01	00 - 7F	MOD LFO1 TVA DEPTH			0 (cent)
40 2x 07	00 00 01	00 - 7F		0 - 100.0 (%)	00	0 (%)
40 2x 08			MOD LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 09	00 00 01	00 - 7F	MOD LFO2 TVF DEPTH	0 - 2400 (cent)	00	
40 2x 0A	00 00 01	00 - 7F	MOD LFO2 TVA DEPTH			0 (cent)
			MOD LI OZ IVA DEFIN	0 - 100.0 (%)	00	0 (%)
40 2x 10	00.00.01	40 50				
	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 (cent)	40	
40 2x 12	00 00 01	00 - 7F	BEND AMPLITUDE CONTROL	100.0 - 100.0 (Ceril)		0 (cent)
40 2x 13	00 00 01	00 - 7F		-100.0 - +100.0 (%)	40	0 (%)
40 2x 14	00 00 01		BEND LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
		00 - 7F	BEND LFO1 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 15	00 00 01	00 - 7F	BEND LFO1 TVF DEPTH	0 - 2400 (cent)	00	
40 2x 16	00 00 01	00 - 7F	BEND LFO1 TVA DEPTH	0 - 100.0 (%)		0 (cent)
40 2x 17	00 00 01	00 - 7F			00	0 (%)
40 2x 18			BEND LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 19	00 00 01	00 - 7F	BEND LFO2 TVF DEPTH	0 - 2400 (cent)	00	
40 2x 1A	00 00 01	00 - 7F	BEND LFO2 TVA DEPTH	0 - 100.0 (%)		0 (cent)
			DEND & OZ IVA DEI III	0 - 100.0 (%)	00	0 (%)
40 2x 20	00 00 01	00 50				
		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 (cent)	40	
40 2x 22	00 00 01	00 - 7F	CAF AMPLITUDE CONTROL	-100.0 - +100.0 (%)		0 (cent)
40 2x 23	00 00 01	00 - 7F			40	0 (%)
40 2x 24			CAF LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40	O (Hz)
	00 00 01	00 - 7F	CAF LFO 1 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 25	00 00 01	00 - 7F	CAf LFO1 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 26	00 00 01	00 - 7F	CAFLEO 1 TVA DEPTH	0 - 100.0 (%)		
40 2x 27	00 00 01	00 - 7F	CAF LFO2 RATE CONTROL		00	. O (%)
40 2x 28	00 00 01	00 - 7F		-10.0 - +10.0 (Hz)	40	0 (Hz)
			CAf LFO2 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 29	00 00 01	00 - 7F	CAf LFO2 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 2A	00 00 01	00 - 7F	CAf LFO2 TVA DEPTH	0 - 100.0 (%)	00	
			5. 11 D 52 1171 DEI 117	0 - 100.0 ( /a)	00	0 (%)
40 2x 30	00 00 01	28 - 58	DA CREATION CONTRACT			
			PAf PITCH CONTROL	-24 - +24 (semitones)	40	0 (semitones)
40 2x 31	00 00 01	00 - 7F	PAF TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40	0 (cent)
40 2x 32	00 00 01	00 - 7F	PAF AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40	
40 2x 33	00 00 01	00 - 7F	PAF LFO1 RATE CONTROL			0 (%)
40 2x 34	00 00 01	00 - 7F		-10.0 - +10.0 (Hz)	40	0 (Hz)
			PAf LFO1 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 35	00 00 01	00 - 7F	PAf LFO1 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 36	00 00 01	00 - 7F	PAf LFO1 TVA DEPTH	0 - 100.0 (%)	00	
40 2x 37	00 00 01	00 - 7F	PAf LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)		0 (%)
40 2x 38	00 00 01	00 - 7F			40	0 (Hz)
			PAf LFO2 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 39	00 00 01	00 - 7F	PAf LFO2 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 3A	00 00 01	00 - 7F	PAf LFO2 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
				0 100.0 (%)	00	U (%)
40 2x 40	00 00 01	28 - 58	CC1 DITOU CONTROL			
40 2x 41	00 00 01		CC1 PITCH CONTROL	-24 - +24 (semitones)	40	0 (semitones)
		00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40	0 (cent)
40 2x 42	00 00 01	00 - 7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40	0 (%)
40 2x 43	00 00 01	00 - 7F	CC1 LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40	
40 2x 44	00 00 01	00 - 7F	CC1 LFO1 PITCH DEPTH			O (Hz)
40 2x 45	00 00 01			0 - 600 (cent)	00	0 (cent)
		00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 46	00 00 01	00 - 7F	CC1 LFO1 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
40 2x 47	00 00 01	00 - 7F	CC1 LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40	
40 2x 48	00 00 01	00 - 7F	CC1 LFO2 PITCH DEPTH			0 (Hz)
40 2x 49	00 00 01	00 - 7F		0 - 600 (cent)	00	0 (cent)
			CC1 LFO2 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 4A	00 00 01	00 - 7F	CC1 LFO2 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
				0 100.0 (70)	00	0 (76)
40 2x 50	00 00 01	28 - 58	CC2 PITCH CONTROL	04 . 04 (1)		
40 2x 51	00 00 01		CC2 PIICH CONIROL	-24 - +24 (semitones)	40	0 (semitones)
		00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40	0 (cent)
40 2x 52	00 00 01	00 - 7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40	0 (%)
40 2x 53	00 00 01	00 - 7F	CC2 LFO1 RATE CONTROL	-10.0 - + 10.0 (Hz)		
40 2x 54	00 00 01	00 - 7F		-10.0 - +10.0 (ΠΔ)	40	0 (Hz)
40 2x 55	00 00 01	00 - 7F	CC2 LFO1 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
			CC2 LFO1 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 56	00 00 01	00 - 7F	CC2 LFO1 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
40 2x 57	00 00 01	*00 - 7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)		
40 2x 58	00 00 01	00 - 7F	CC2 LFO2 PITCH DEPTH	0 400 (nest)	40	0 (Hz)
40 2x 59	00 00 01	00 - 7F		0 - 600 (cent)	00	0 (cent)
			CC2 LFO2 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
						O (10)

## Section 4. Bulk Dump

Bulk Dump allows you to transmit a large amount of data at once, and is convenient for storing settings for the entire unit on a computer or sequencer.

Model ID: 00 19

User Program Dump	[EM-50/30]
F0 41 10 00 19 12 05 08 00 00 CHK F7	(23 System Ex.)
Song Dump	[EM-50/30]
F0 41 10 00 19 12 05 08 28 00 CHK F7	(563 System Ex.)
Custom Style	[EM-50/30]
F0 41 10 00 19 12 00 60 00 00 CHK F7 F0 41 10 00 19 12 00 68 00 00 CHK F7 F0 41 10 00 19 12 00 70 00 00 CHK F7 F0 41 10 00 19 12 00 78 00 00 CHK F7	(586 System Ex.) (586 System Ex.) (586 System Ex.) (586 System Ex.)
Program	[EM-50/30]
F0 41 10 00 19 12 00 01 00 00 CHK F7 F0 41 10 00 19 12 00 01 40 00 CHK F7 F0 41 10 00 19 12 00 42 00 00 CHK F7 F0 41 10 00 19 12 00 48 00 00 CHK F7 F0 41 10 00 19 12 00 50 00 00 CHK F7 F0 41 10 00 19 12 00 50 00 00 CHK F7 F0 41 10 00 19 12 00 58 00 00 CHK F7	( 37 System Ex.) ( 37 System Ex.) ( 439 System Ex.) ( 586 System Ex.) ( 586 System Ex.) ( 586 System Ex.)

## Section 5. 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 1	00н   1	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	23Н	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	09Н	41	29H	73	49H	105	69H
10	0AH	42	2AH	74	4AH	106	бан
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	j 51 j	33Н	83	53H	115	73H
20	14H	52 i	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
1 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

<sup>\*</sup> 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

What is the decimal expression of 5AH? <Example 1>

<Fxample 2>

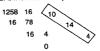
From the preceding table, 5AH = 90 What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits? From the preceding table, since 12H = 18 and 34H = 52

18 x 128+52 = 2356

<Fxample 3>

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

<Example 4> What is the nibbled expression of the decimal value 1258?



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

## Examples of actual MIDI messages

<Fxample 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.

CALL IN THE EVOLUTION CONTROL OF THE MAN AND THE MAN 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 (=  $64~\times~12+80=8192$ ) is 0, so this Pitch

28 00H - 40 00H = 40 x 12+80 - (64 x 12+80) = 5120 - 8192 = -3072

If the Pttch 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.

## <Fxample 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 sta-tus, 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 (MIDI ch.4) upper byte of RPN parameter number (MIDI ch.4) upper byte of parameter value (MIDI ch.4) lower byte of parameter value (MIDI ch.4) lower byte of RPN parameter number	: 00H
(B3)	65 00		: 00H
(B3)	06 0C		: 0CH
(B3)	26 00		: 00H
(B3)	64 7F		: 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  $^{\prime\prime}$ 

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

Once the parameter number has been specified for RPN or NRPN, all Data Entry once the balances hands are 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 (83) 64 7F (83) 65 7F at the

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

It is also necessary that the RPN or NRPN parameter number setting and the It is also flectisely that the proper order. On some sequencers, events occur-ing 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.

precision is required, we must use two or more bytes. For example, two hexadecimal numbers as bbH expressing two 7-bit bytes would indicate a value of as x

In the case of values which have a  $\pm$  sign, 00H = -64, 40H =  $\pm$ 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 =  $\pm 0$ , and 7F 7FH = +8191. For example if an abbl were expressed as decimal, this would be an bbH -40 00H

<sup>=</sup>  $a \times 128$ +bb -  $64 \times 128$ .

\* 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  $\times 16$ +b.

## + 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 an bb ccH and the data or size is dd ee ffH.

aa+bb+cc+dd+ee+ff = sumsum 1 128 = quotient ... remainder 128 - remainder = checksum

## <Example 1> Setting REVERB MACRO to ROOM 3

According to the "Parameter Address Map," the REVERB MACRO Address is 40 01 30H, and ROOM 3 is a value of 02H. Thus,

<u>EQ</u>	<u>41</u>	10	<u>42</u>	<u>12</u>	40 01 30	<u>02</u>	??	<u>F7</u>
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)
		re Status, ID (GS),	,-,	ID (Rok	and), iand ID (DT1).		Device ID (17) End of Exclusiv	

### 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> Requesting transmission of the LEVEL for DRUM MAP 1 NOTE NUMBER 75 (D#5; Claves)

NOTE NUMBER 75 (D#5) is 4BH in hexadecimal.

According to the 'Parameter Address Map,' LEVEL of NOTE NUMBER 75 (D#5; Claves) in DRUM MAP 1 has an Address of 41 02 4BH and a Size of 00 00 01H. Thus,

(1)	(2)	(3)	<u>42</u> (4)	11 (5)	41 02 4B address	00 00 01 size	?? checksum	<u>F7</u> (6)

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17), (4) Model ID (GS), (5) Command ID(RQ1), (6) End of Exclusive

Next we calculate the checksum

41H+02H+4BH+00H+00H+01H = 65+2+75+0+0+1 = 143 (sum)143 (sum) 1 128 = 1 (quotient) ... 15 (remainder) checksum = 128 - 15 (remainder) = 113 = 71H

This means that F0 41 10 42 11 41 02 4B 00 00 01 71 F7 is the message we transmit.

### About tuning

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

appropriate mich crainine.

In MIDI, an entite 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 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   cent	++		+	
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)	Hz at A4	cent	RPN #1	Sys.Ex. 40 00 00
	444.0     443.0     442.0     441.0     440.0     439.0	+15.67 +11.76 + 7.85 + 3.93 0 - 3.94	4A 03 (+1283)   47 44 (+ 964)   45 03 (+ 643)   42 42 (+ 322)   40 00 ( 0 )   3D 3D (- 323)	00 04 09 0D (+157) 00 04 07 05 (+118) 00 04 04 0F (+ 79) 00 04 02 07 (+ 39) 00 04 00 00 ( 0) 00 03 0D 09 (- 39)

Example > Set the tuning of MIDI channel 3 to A4 = 442.0 HzSend 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 funing methods other than equal temperament. As examples, three possible types of scale setting are explained

## O Equal Temperament

This method of tuning divides the octave into 12 equal parts. It is currently the

most widely used form of tuning, especially in occidental music. On this unit, the default settings for the Scale Tune

## O Just Temperament (Keytone C)

The three main chords resound much more beautifully than with equal temperament, but this benefit can only be obtained in one key. If transposed, the chords tend to become ambiguous. The example given involves settings for a key in which C is the keynote.

#### O Arabian Scale

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

## Example Settings

Note name	Equal Temperament	Just Temperament (Keytone C)	Arabian Scale
С	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
Α	0	-16	0
A#	0	+14	-10
В	0	-12	-40

The values in the table are given in cents. Refer to the explanation of Scale Tun-Ing on page 15 to convert these values to hexadecimal, and transmit them as exclusive data.

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

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

## Model: EM-50/30

# MIDI Implementation Charts

Date: NOV 1998 Version: 1.00

Function		Transmitted		Recognized		Remarks
Basic Channel	Default Changed	1-16 1-16, Off		1-16 1-16, Off		1= ACC1, 2=A.BASS, 3=ACC2, 4=Upper1, 5=ACC3, 6=Upper2 7=ACC4, 8=ACC5, 9=ACC6, 10=A Drums/Stl PG, 11=Lower, 12=M.Bass, 13=Basic Ch/RX1 14=NTA1/RX2, 15=NTA2/RX3, 16=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	*1	
Velocity	Note ON Note OFF	O X	*1	O X	*1	
After Touch	Key's Ch's	×		00		
Pitch Bend		0	*]	0	*1	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98, 99	000000000xxx000000	*  *  *	O O O O O O (Reverb) O (Chorus)	*] *] *]	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 ****	*1	O 0-127	*1	Program Number: 1-128
System Exc	clusive	0		0		
System Common	Song Pos Song Sel Tune	× ×		× × ×		
System Real Time	Clock Commands	0	*  *	0	*] *]	MIDI File Record/Play
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	× × × × × × × × × × × × × × × × × × ×		O (120,126,127) O (121) O (123-125) O X		
Notes		*1 O X is selectors: *2 Recognize as	able. s M=1 e	even if M ≠ 1		

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

Model: EM-20

# MIDI Implementation Charts

Date: APR 1999 Version: 1.00

Function		Transmitted		Recognized		Remarks
Basic Channel	Default Changed	1-16 ×		1-16 ×		1= ACC1, 2=A.BASS, 3=ACC2, 4=Upper1, 5=ACC3, 6=Upper2 7=ACC4, 8=ACC5, 9=ACC6, 10=A Drums/Stl PG, 11=Lower, 12=M.Bass, 13=Basic Ch 14=NTA1, 15=NTA2, 16=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	*1	
Velocity	Note ON Note OFF	O X	*]	O X	*]	
After Touch	Key's Ch's	×		0		
Pitch Bend		0	*1	0	*]	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98, 99 100,101	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	*] *] *]	O O O O O O O O O O O O O O O O O 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 ****	*1	O 0-127	*1	Program Number: 1-128
System Exc	lusive	О		0		
System Common	Song Pos Song Sel Tune	× × ×		× × ×		
System Real Time	Clock Commands	0	*1	0	*] *]	MIDI File Record/Play
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	× × × × ×		O (120,126,127) O (121) O (123-125) O X		
Notes		*1 O X is selectable *2 Recognize as M		en if M ≠ 1		

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

Model : EM-10

# MIDI Implementation Charts

Date: APR 1999 Version: 1.00

Function		Transmitted		Recognized		Remarks
200.0	Default Changed	1-16 ×		1-16 ×		1= ACC1, 2=A.BASS, 3=ACC2, 4=Upper, 5=ACC3, 7=ACC4, 8=ACC5, 9=ACC6, 10=A Drums/Stl PG, 11=Lower, 13=Basic Ch, 14=NTA1, 15=NTA2, 16=M.Drums
	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	*1	
Velocity	Note ON Note OFF	O ×	*1	O X	*1	
After Touch	Key's Ch's	×		0		
Pitch Bend		×	*]	0	*1	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98, 99 100,101	0x000000xxx00000	*] *] *]	O O O O O O O (Reverb) O (Chorus)	*  *  *	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 *****	*1	O 0-127	*1	Program Number: 1-128
System Exc	lusive	0		0		
System Common	Song Pos Song Sel Tune	× × ×		× ×		
System Real Time	Clock Commands	0	*] *]	0	*] *]	MIDI File Record/Play
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	X X X O X		O (120,126,127) O (121) O (123-125) O X		
Notes		*1 O X is selecto *2 Recognize as	ible. M=1 e	even if M ≠ 1		•

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

## **■ MIDI implementation**

(Sound Module, Keyboard Section, SMF Player)

## Section 1. Receive data

## ■ Channel Voice Messages

Status 2nd byte 3rd byte kkH

n = MIDI channel number

: 0H-FH (ch.1-ch.16) : 00H-7FH (0-127)

vv = note off velocity

: 00H-7FH (0-127)

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

or when note number is outside limits.
\* For Drum Parts, these messages are received when Rx.NOTE OFF = ON

The velocity values of Note Off messages are ignored.

#### Note on

2nd byte 3rd byte kkH vvH

n = MIDI channel number kk = note number

: 0H-FH (ch.1-ch.16) vv = note on velocity : 01H-7FH (1-127)

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

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

## Polyphonic Key Pressure

Status 2nd byte 3rd byte AnH kkH vvH

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

## O Bank Select (Controller number 0, 32)

Status 2nd byte 3rd byte BnH 00H mmH BnH 20H IIH

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

00H-7FH (GS Variation number 0 - 127), Initial

Value = 00HII = Bank number LSB : 00H - 03H (MAP), Initial Value = 00H

\* Not received when Rx.BANK SELECT = OFF. \*Rx.BANK SELECT\* is set to OFF by "Turn General MIDI System On," and set to ON by "GS RESET." (Power-on default

When Rx.BANK SELECT LSB = OFF, Bank number LSB 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 (IIH, 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 (Controlled

## O Modulation (Controller number 1)

2nd byte 3rd byte 01H vvH

n = MIDI channel number : OH-FH (ch.1-ch.16) : 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.
\* Ignored when "Modulation Midi Rx Parameter = OFF". [EM-50/30]

## O Portamento Time (Controller number 5)

2nd byte 3rd byte 05H vvH

n = MIDI channel number

: OH-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.

## Model EM-50/30/20/10

Version 1.00 '99.03

## O Data Entry (Controller number 6, 38)

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

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

## O Volume (Controller number 7) Status 2nd byte 3rd byte

n = MIDI channel number

: 0H-FH (ch.1-ch.16) : 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)
 Ignored when "Volume Midi Rx Parameter = OFF".

## O Pan (Controller number 10) Status 2nd byte 3rd byte BnH 0AH vvH

n = MIDI channel number

0H-FH (ch.1-ch.16)

: 00H-40H-7FH (Left-Center-Right), Initial Value = vv = pan

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)

## O 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)

 $^{ullet}$  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)

# Status 2nd byte 3rd byte BnH 40H vvH

n = MIDI channel number vv = Control value

: 0H-FH (ch.1-ch.16) : 00H-7FH (0-127)

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

\* Ignored when "Sustain Midi Rx Parameter = OFF" [EM-50/30]

## O Portamento (Controller number 65)

Status 2nd byte 3rd byte
BnH 41H vvH

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

vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

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

## O Sostenuto (Controller number 66)

Status 2nd byte 3rd byte 42H vvH

= MIDI channel number : OH-FH (ch.1-ch.16)

vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

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

## O Soft (Controller number 67)

Status 2nd byte 3rd byte BnH 43H vvH

n = MIDI channel number : OH-FH (ch.1-ch.16)

vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

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

## O Portamento control (Controller number 84)

Status 2nd byte 3rd byte BnH 54H kkH

n = MIDI channel number

: OH-FH (ch.1-ch.16) : 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 glide from C4 to E4
80 40 40	Note off E4	E4 off

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

2nd byte 3rd byte 5BH vvH Status

n = MIDI channel number

: 0H-FH (ch.1-ch.16) : 00H-7FH (0-127), Initial Value = 28H (40) vv = Reverb Send Level

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

## O Effect 3 (Chorus Send Level) (Controller number 93)

2nd byte 3rd byte 5DH vvH

n = MIDI channel number

: 0H-FH (ch.1-ch.16) : 00H-7FH (0-127), Initial Value = 00H (0) vv = Chorus Send Level

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

### O NRPN MSB/LSB (Controller number 99, 98)

<u>Status</u>	2nd byte	3rd byte
BnH	63H	mmH
Doll	4011	III.J

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

- reset or by receiving "Turn General MIDI System On," and it is set to ON by "GS RESET."
- The value set by NRPN will not be reset even if Program Change or Reset All Controllers is received.

## \*\*NDDN\*\*

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used. On this unit, NRPN messages can be used to modify sound parameters etc.

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 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 received on that channel will modify the value of that parameter. 10 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 5. Supplementary material "Examples of actual MIDI messages" <Example 4> (page 29). On this unit, 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-50/30/20/10, 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

\* Data entry LSB (IIH) is ignored.
\* Parameters marked 'relative change' will change relative 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.

Ignored when "NRPN Midi Rx Parameter = OFF" [EM-50/30]

mm: 00H - 7FH (0 - max)

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

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	NH.

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

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

\*\*RPN\*\*
The RPN (Registered Parameter Number) messages are expanded control

changes, and each function of an RPN is described by the MIDI Standard.

To use these messages, you must first use RPN (Controller number 100 and 110, 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 Section 5. 'Examples of actual MIDI messages' <Example 4> (page 29).

On the EM-50/30/20/10, RPN can be used to modify the following parameters.

DDN	Data anta:	
RPN	Data entry	Fundamentary
MSB LSB	MSB LSB	Explanation
00H 00H	mmH	Pitch Bend Sensitivity
		mm: 00H-18H (0-24 semitones),
		Initial Value = 02H (2 semitones)
		II: ignored (processed as 00H)
		specify up to 2 octaves in semitone steps
00H 01H	mmH IIH	Master Fine Tuning
		mm, II: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +99.99 cents),
		Initial Value = 40 00H (± 0 cent)
		Refer to 5. Supplementary material, "About tuning" (page 30).
00H 02H	mmH	Master Coarse Tuning
		mm: 28H-40H-58H (-24 - 0 - +24 semitones),
		Initial Value = 40H (±0 semitone)
		II: 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 diready made will not change. mm, II: ignored

### ● Program Change 2nd byte

Status

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

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 mes-
- sage 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)).

  Ignored when "Program Change Midi Rx Parameter = OFF". [EM-50/30]
- Channel Pressure

Status 2nd byte

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

\* 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

<u>Status</u> 2nd byte 3rd byte

n = MIDI channel number

: OH-FH (ch.1-ch.16)

: 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191) mm, II = Pitch Bend value

\* 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.

Ignored when "Pitch Bender Midi Rx Parameter = OFF".

## ■ Channel Mode Messages

## ● All Sounds Off (Controller number 120)

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

n = MIDI channel number

: 0H-FH (ch.1-ch.16)

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

### Reset All Controllers (Controller number 121)

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

n = MIDI channel number

: 0H-FH (ch.1-ch.16)

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

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

## ■ Local On/Off (Controller number 122)

#### Status 2nd byte 3rd byte BnH

(Local Off) 7FH (Local On - Default Value)

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

This parameter affect all the parts

When Local Off message is received, the generation board is disconnected from the keyboard but the messages received via Midi are still recognized and

\*Regardless of the set channel, this message is sent to all parts.

## All Notes Off (Controller number 123)

2nd byte 3rd byte

n = MIDI channel number : OH-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)

2nd byte 3rd byte 7CH 00H Status

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)

2nd byte 3rd byte 7DH 00H

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

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

ON will not be turned on.

## MONO (Controller number 126)

Status 2nd byte 3rd byte 7EH mmH

n = MIDI channel number

0H-FH (ch.1-ch.16)

: 00H-10H (0-16)

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

POLY (Controller number 127)

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

n = MIDI channel number

: 0H-FH (ch.1-ch.16)

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

## ■ System Realtime Message

## Active Sensing

Status

\* 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

### O Sequencer Start

Status

When "Sequencer Start" is received, the internal Recorder and/or the internal

## O Sequencer Continue

Status

\* When "Sequencer Continue" is received, the internal Player continue to play

from the current position Ignored in Recorder Mode

## O Sequencer Stop

Status FCH

\* When "Sequencer Stop" is received, the internal Recorder and/or the internal

Player stop.

### O Song Position Pointer

2nd byte 3rd byte
XXH YYH

XX = Song Position (Bar) LSB YY = Song Position (Bar) MSB

#### O Timing Clock **Status**

When "Timing Clock" is received the internal recorder or the internal Player is synchronized to an external clock according to the following table.

## Sync RX

Internal The Style will neither start/stop nor follow the tempo of the external Timing Clock (F8) and "Sequencer Start /Stop" (FA / FC) messages. [EM-50/30]

Auto A As long the EM-50/30/20/10 does not receive "Sequencer Start/Stop" (FA/FC) and "Timing Clock"

(F8) messages it will follow its own tempo and Start/Stop whenever you press the "START/STOP" button to start Style Playback and Recorder (Rec). Once received a "Sequencer Start" (FA), if also "Timing Clock" (F8) follows this message, the Arranger / Recorder (Rec) start with the external timing, otherwise it start following its internal tempo.

Auto S As long the EM-50/30/20/10 does not receive

"Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo and corder Play/Stop whenever you press the "PLAY/STOP" button to start Song Playback and Recorder (Rec). Once received a "Sequencer Start" (FA), if also

"Timing Clock" (F8) follows this message, the Recorder (Play) / Recorder (Rec) start with the external timing, otherwise it start following its internal

As long the EM-50/30 does not receive "Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo and Start/Stop whenever you press the "START/STOP"

button to start Style Playback and Recorder (Rec). Once received a "Sequencer Start" (FA), if also "Timing Clock" (F8) follows this message, the Arranger / Recorder (Rec) start with the external timing, otherwise it will wait for external "Timing

Clock" (F8).

MIDI A

MIDI S

As long the EM-50/30 does not receive "Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo and

Recorder Play/Stop whenever you press the "PLAY/STOP" button to start Song Playback and

Recorder (Rec).

Once received a "Sequencer Start" (FA), if also "Timing Clock" (F8) follows this message, the Recorder (Play) / Recorder (Rec) start with the external timing, otherwise it will wait for external "Timing Clock" (F8).

Remote A

As long the EM-50/30 does not receive "Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo and Start/Stop whenever you press the "START/STOP" button to start Style Playback and Recorder (Rec). Once received a "Sequencer Start" (FA), if also "Timing Clock" (F8) follows this message, the Arranger / Recorder (Rec) start always with the

Remote S

As long the EM-50/30 does not receive "Sequencer Start/Stop" (FA/FC) and "Timing Clock" (F8) messages it will follow its own tempo and Recorder Play/Stop whenever you press the "PLAY/STOP" button to start Song Playback and Recorder (Rec).

Once received a "Sequencer Start" (FA), if also "Timing Clock" (F8) follows this message, the Recorder (Play) / Recorder (Rec) start always with

the internal timing.

## ■ System Exclusive Message

Status F7H Data byte iiH, ddH, ....,eeH

dd,...,ee = data

System Exclusive Message status an ID number (manufacturer ID) to indicate ii = ID number 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 Mes-

sages (7FH). 00H-7FH (0-127) : EOX (End Of Exclusive)

The System Exclusive Messages received by this unit 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 mode," anding the operating filed. When cleaning periodining of a 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 a GS music data. In the case of data for the EM-50/30/20/10 and for this unit, we recommend that 'System Mode Set' be placed at the beginning of the song data. Each song should rem mode set to b picked at the beginning of the angladate. Learning states are 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" use Universal Non-realtime Message format. "System Mode Set" and "GS Reset" use Roland system exclusive format "Data Set 1

O **Turn General MIDI 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 unit, will automatically be set to the proper condition for correctly playing a General MIDI score.

Status F7H Data byte 7EH, 7FH, 09H, 01H FOH Explanation Byte Exclusive status ID number (Universal Non-realtime Message) 7EH

7FH Device ID (Broadcast) 09H

Sub ID#1 (General MIDI Message)
Sub ID#2 (General MIDI On) 01H

EOX (End Of Exclusive)

 Turn General MIDI System Off
 'General MIDI System Off' is a command message that resets the internal settings of the unit to the Arranger Mode I initial state

Data byte 7EH, 7FH, 09H, 02H <u>Status</u> F7H Status FOH

Explanation Byte FOH Exclusive status

7EH ID number (Universal Non-realtime Message)

7FH Device ID (Broadcast) (General MIDI Message) (General MIDI Off) 09H Sub ID#1 02H Sub ID#2 (End Of Exclusive)

 $^{\bullet}$  When this message is received, the unit change from "General MIDI" mode to EM-50/30/20/10 default mode. (Arranger mode)

\* There must be an interval of at least 100 ms between this message and the next

O **GS Reset**S 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 playback GS music data.

Status FOH	Data byte 41H, dev, 42H,	12H, 40H, 00H, 7FH, 00H,	<u>Status</u> 41H F7H	
Byte FOH 41H dev 42H 12H 40H 00H 7FH	Explanation Exclusive statu ID number Device ID Model ID Command ID Address MSB Address AddressLSB	s (Roland) (dev: 00H - 1FH (1 - 32) (GS) (DT1)	Initial value is 10H(17))	
00H	Data	(GS reset)		
41H	Checksum			
F7H	EOX	(End Of Exclusive)		

When this message is received, Rx.NRPN will be ON.

#### O Exit GS Mode

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

FOH	41H, dev, 42H,	12H, 40H, 00H, 7FH, 7FH,	42H F7H	
Byte FOH 41H dev 42H 12H 40H 00H	Explanation Exclusive statu ID number Device ID Model ID Command ID Address MSB Address	s (Roland) (dev: 00H - 1FH (1 - 32) (GS) (DT1)	Initial value is 10H(17))	
7FH 7FH	AddressLSB Data	(Exit GS Mode)		
42H F7H	Checksum EOX	(End Of Exclusive)		

## Universal Realtime System Exclusive Messages

### O Master volume Data byte 7FH, 7FH, 04H, 01H, IIH, mmH Status

Explanation <u>Byte</u> Exclusive status
ID number (universal realtime message) FOH 7FH 7FH Device ID (Broadcast) Sub ID#1 (Device Control messages) 01H Sub ID#2 (Master Volume) IIН Master volume lower byte mmH Master volume upper byte EOX (End Of Exclusive)

■ **uata transmission**The EM-50/30/20/10 can use Exclusive messages to transmit internal settings to other devices. There are two types of Exclusive data transmission: Individual Parameter Transmission (section 3) in which single parameters are transmitted one by one, and Bulk Dump Transmission (section 4) in which a large amount of data is transmitted to the contraction of the contraction data is transmitted at once.

The exclusive message used when transmitting GS format data has a model ID of 42H and a device ID of 10H.

<sup>\*</sup> When this message is received, Rx.BANK SELECT will be OFF and Rx.NRPN will be

There must be an interval of at least 50 ms between this message and the next message

<sup>\*</sup> There must be an interval of at least 50 ms between this message and the next message.

When this message is received, the unit change from "General MIDI" mode to

EM-50/30/20/10 default mode. (Style mode)
\* There must be an interval of at least 100 ms between this message and the next

<sup>\*</sup> The lower byte (IIH) of Master Volume will be handled as 00H.

## O Data request 1 RQ1 (11H)

This message requests the other device to send data. The Address and Size determine the type and amount of data to be sent. There are two types of request; Individual Parameter Request which requests data for an individual parameter, and Bulk Dump Request which requests a large amount of data at once. In either case, the 'Data Request 1 (RQ1)' message format is used, and the Address and Size included in the message determine the type and amount of data that is desired. data that is desired.

For Individual Parameter Request, refer to '3. Individual Parameter Transmis-

son .

For Bulk Dump Request, refer to "4. Bulk Dump" .

When a Data Request message is received, if the device is ready to transmit data and if the address and size are appropriate, the requested data will be transmitted as a "Data Set 1 (DT1)" message. If not, nothing will be transmitted.

<u>Status</u>	<u>Data byte</u> Status
FOH	41H, dev, 42H, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum F7H
<u>Byte</u> F0H 41H	Explanation Exclusive status
	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H
42H	Model ID (GS)
11H	Command ID (RQ1)
aaH	Address MSB: upper byte of the starting address of the requested data
bbH	Address : middle byte of the starting address of the requested data
ccH	Address LSB: lower byte of the starting address of the requested data
ssH	Size MSB
#H	Size
uuH	Size LSB
sum	Checksum
F7H	EOX (End Of Exclusive)

<sup>\*</sup> The amount of data that can be transmitted at once time will depend on the type of data, and data must be requested using a specific starting address and size. Refer to the Address and Size listed in Section 3.

\* Regarding the checksum please refer to Section 4.

### O Data set 1

Oata set 1 DT1 (12H)
This is the message that actually performs data transmission, and is used when you wish to transmit the data.

<u>Status</u> FOH	<u>Data byte</u> 41H, dev, 42H, 12H, aaH, bbH, ccH, ddH, eeH, sum F7H
Byte FOH 41H dev 42H 12H aaH bbH ccH ddH	Exclanation Exclusive status ID number (Roland) Device ID (dev: 100H - 1FH Initial value is 10H Model ID (GS), 45H Command ID (DT1) Address MSB : upper byte of the starting address of the transmitted data Address LSB : lower byte of the starting address of the transmitted data Address LSB : lower byte of the starting address of the transmitted data it the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	
eeH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

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

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

## Section 2. Transmit data (Sound Module, Keyboard Section, SMF Player)

## ■ Channel voice messages

## ● Note off

Status 2nd byte 3rd byte 9nH kkH 00H

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

#### Note on

Status 2nd byte 3rd byte kkH

n=MIDI channel number : OH - FH (ch.1 - ch.16) kk=note number : 00H - 7FH (0 - 127) vv=velocity : 01H - 7FH (1 - 127)

### ● Polyphonic Key Pressure

2nd byte 3rd byte kkH vvH

n = MIDI channel number : OH-FH (ch.1-ch.16) kk = note number vv = key pressure : 00H-7FH (0-127)

## Control Change

O 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 - ch.16) : 00H - 7FH (GS Variation number 0 - 127) mm=Bank number MSB

II=Bank number LSB :00H - 02H (MAP)

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

O Modu	lation	(Controller number 1)	[EM-50/30/201	
<u>Status</u> BnH	2nd byte 01H	3rd byte vvH	[ 00.00,20]	
	channel num ulation deptl			

\* Ignored when "Modulation Midi Tx Parameter" = OFF. [EM-50/30]

## (Controller number 5)

2nd byte 3rd byte 05H vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16) vv=Portamento Time : 00H - 7FH (0 - 127) Initial value = 00H (0)

 $^{\bullet}$  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.

## (Controller number 6,38)

n=MIDI channel number : 0H - FH (ch.1 - ch.16) mm.ll= the value of the parameter specified by RPN/NRPN

#### O Volume (Controller number 7) Status 2nd byte 3rd byte

07H vvH

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

: 00H - 7FH (0 - 127) Initial value = 64H (100)

Ignored when "Volume Midi Tx Parameter" = OFF. [EM-50/30] Volume messages are used to adjust the volume balance of each Part

### (Controller number 10) <u>Status</u>

2nd byte 0AH 3rd byte ₩

n=MIDI channel number : 0H - FH (ch.1 - ch.16) w=pan

: 00H - 40H - 7FH (Left - Center - Right) Initial value = 40H (Center)

Regarding the checksum please refer to section 4.

<sup>\*</sup> The stereo position can be adjusted over 127 steps.

(Controller number 11) Expression 2nd byte 3rd byte Status OBH

n=MIDI channel number

: 0H - FH (ch.1 - ch.16)

: 00H - 7FH (0 - 127)

Initial value = 7FH (127)

\* 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

(Controller number 64) O Hold 1

2nd byte 3rd byte <u>Status</u>

n=MIDI channel number

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

\* Ignored when "Hold Midi Tx Parameter" = OFF.

O Portamento (Controller number 65)

2nd byte 3rd byte Status 41H

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

vv=Control value

O Sostenuto (Controller number 66) Status 2nd byte 3rd byte BnH 42H vvH

n=MIDI channel number

vv=Control value

(Controller number 67) O Soft

2nd byte 3rd byte <u>Status</u>

BnH

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

: 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

O Portamento control (Controller number 84)

2nd byte 3rd byte Status

: 0H - FH (ch.1 - ch.16) n=MIDI channel number kk=source note number

(Controller number 91) O Effect 1 (Reverb Send Level)

2nd byte 3rd byte 5BH

n=MIDI channel number vv=Control value

: OH - FH (ch.1 - ch.16) : 00H - 7FH (0 - 127) Initial value = 28H (40)

• This message adjusts the Reverb Send Level of each Part.

O Effect 3 (Chorus Send Level)

2nd byte 3rd byte 5DH vvH Status

n=MiDI channel number

: 0H - FH (ch.1 - ch.16)

Initial value = 00H (0) : 00H - 7FH (0 - 127)

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

O NRPN MSB/LSB (Controller number 99,98)

Status BnH 2nd byte 63H 3rd byte mmH IIН BnH 62H

: OH - FH (ch.1 - ch.16) n=MIDI channel number mm=upper byte of the parameter number specified by NRPN II=lower byte of the parameter number specified by NRPN

\* Ignored when "NRPN Midi Tx Parameter" = OFF.

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

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

MSB LSB MSB Function and range

01H 08H mmH

Vibrato Rate (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)

Vibrato Depth (relative change) 01H 09H mmH mm: 00H - 40H - 7FH (-64 - 0 - +63)

01H 0AH mmH Vibrato Delay (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)

TVF Cutoff Frequency (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63) 01H 20H mmH

TVF Resonance (relative change) 01H 21H mmH

mm: 00H - 40H - 7FH (-64 - 0 - +63) TVF&TVA Envelope Attack Time (relative change) 01H 63H mmH mm: 00H - 40H - 7FH (-64 - 0 - +63)

TVF&TVA Envelope Decay Time (relative change) 01H 64H mmH mm: 00H - 40H - 7FH (-64 - 0 - +63)

TVF&TVA Envelope Release Time (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63) 01H 66H mmH

Drum Instrument Pitch Coarse (relative change) 18H rrH mmH

rr: Drum Instrument note number mm: 00H - 40H - 7FH (-64 - 0 - +63 semitone)

Drum Instrument TVA Level (absolute change) 1AH rrH mmH

rr: Drum Instrument note number mm: 00H - 7FH (0 - max)

Drum Instrument Panpot (absolute change) 1CH rrH mmH

rr: Drum Instrument note number mm: 00H, 01H - 40H - 7FH (random, left-center-right)

Drum Instrument Reverb Send Level (absolute change)

rr: Drum Instrument note number

mm: 00H - 7FH (0 - max)

Drum instrument Chorus Send Level (absolute change) 1EH rrH mmH

rr: Drum Instrument note number mm: 00H - 7FH (0 - max)

1DH rrH mmH

\* Data entry LSB (III+) is ignored.

\* Parameters marked 'relative change' will change relative to the preset value.

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 reparalises of the preset value.

parameter, regardless of the preset value.

(Controller number 101,100) O RPN MSB/LSB 3rd byte 2nd byte Status mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16) mm=upper byte of parameter number specified by RPN n=MIDI channel number II=lower byte of parameter number specified by 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-50/30/20/10, RPN can be used to modify the following parameters.

RPN Data entry MSB LSB MSB LSB Explanation

Pitch Bend Sensitivity 00H 00H mmH ---

mm: 00H - 18H (0 - 24 semitones) Initial value = 02H (2 semitones) II: ignored (processed as 00H) specify up to 2 octaves in semitone steps

00H 01H mmH IIH

Master Fine Tuning mm.ll: 00 00H - 40 00H - 7F 7FH

(-100-0-+99.99 cents)

Refer to 5. Supplementary material, "About tuning" (page 28)

00H 02H mmH ---

Master Coarse Tuning mm: 28H - 40H - 58H (-24 - 0 - +24 semitones)

II: ignored (processed as 00H)

7FH 7FH --- --RPN null

set condition where RPN and NRPN are unspecified Settings already made will not change.

mm,II: ignored

 Program Change 2nd byte Status

n=MIDI channel number pp=Program number

: 0H - FH (ch.1 - ch.16) : 00H - 7FH (prog.1 - prog.128)

\* Ignored when "Program Change Midi Tx Parameter" = OFF. [EM-50/30]

#### Pitch Bend Change

[EM-50/30/20]

<u>Status</u> 2nd byte 3rd byte mmH

n=MIDI channel number

: 0H - FH (ch.1 - ch.16) : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191) mm,ll=Pitch Bend value

\* Ignored when "Pitch Bend Midi Tx Parameter"= OFF. [EM-50/30]

## ■ System Realtime Messages

## O Active Sensing

Status

Transmitted about every 250ms.

#### O Sequencer Start

This message is transmitted when the internal sequencer is started.

#### O Sequencer Stop

\* This message is transmitted when the internal sequencer is stopped.

### O Song Position Pointer

[EM-50/30]

Status 2nd byte F2H XXH 3rd byte YYH

XX = Song Position ( Bar ) LSB YY = Song Position ( Bar ) MSB

## O Timing Clock

Status F8H

There are two options for sending MIDI realtime messages whenever you playback a style.

### Sync TX

Start/Stop If you select this option, the EM-50/30/20/10 player sends Start, Stop messages (FA - FC).

Ty Parameter" = OFF. [EM-50/30] \* Ignored when "Start/Stp Midi Tx Parameter" = OFF.

Clock This option means that the EM-50/30/20/10

arranger sends Timing clock messages (F8).
\* Ignored when "Clock Tx Midi Tx Parameter" = OFF. [EM-50/30]

## ■ System Exclusive Messages

Status Data byte Status iiH. ddH.

: System Exclusive Message status : an ID number (manufacturer ID) to indicate the manufacii = ID number turer whose Exclusive message this is. Roland's manufactur-

ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal

Reaffime Messages (7FH). : 00H - 7FH (0 - 127) : EOX (End Of Exclusive) dd,...,ee = data F7H

The System Exclusive Messages Transmitted and received by the EM-50/30/20/10 are: messages related to Mode Setting, Universal Realtime System Exclusive messages, Data Requests (RQ1), and Data Set (DT1).

## Universal Realtime System Exclusive Messages

## Data transmission

The EM-50/30/20/10 can use Exclusive messages to transmit internal settings to other devices. There are two types of Exclusive data transmission; Individual Parameter Transmission (section 3) in which single parameters are transmitted one by one, and Bulk Dump Transmission (section 4) in which a large amount of data is transmitted at once

The exclusive message used when transmitting GS format data has a model ID of 42H and a device ID of 10H.

## O Data request 1 RQ1 (11H)

This message requests the other device to send data. The Address and Size determine the type and amount of data to be sent. There are two types of request; Individual Parameter Request which requests data for an individual parameter, and Bulk Dump Request which requests a large amount of data at once. In either case, the "Data Request 1 (RQ1)" message format is used, and the Address and Size included in the message determine the type and amount of

For Individual Parameter Request, refer to \*3. Individual Parameter Transmission'

For Bulk Dump Request, refer to "4. Bulk Dump"

When a Data Request message is received, if the device is ready to transmit data and if the address and size are appropriate, the requested data will be transmitted as a "Data Set 1 (DT1)" message. If not, nothing will be transmitted.

Status FOH	Data byte         Stat           41H, dev, 42H, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum         F7H	
Byte FOH 41H dev 42H 11H aaH bbH ccH ssH ttH uuH sum F7H	Explanation Exclusive status ID number (Roland) Device ID (dev: 00H - 1FH Initial value is 10H Model ID (GS) Command ID (RQ1) Address MSB : upper byte of the starting address of the requested address LSB : lower byte of the starting address of the requested deddress LSB : lower byte of the starting address of the requested Size MSB Size MSB Size Size LSB Checksum EOX (End Of Exclusive)	ata

\* The amount of data that can be transmitted at once time will depend on the type of data, and data must be requested using a specific starting address and size. Refer to the Address and Size listed in Section 3.

O Data set 1 DT1 (12H)
This is the message that actually performs data transmission, and is used when you wish to transmit the data.

Status FOH	<u>Data byte</u> 41H, dev, 42H, 12H, aaH, bbH, ccH, ddH, eeH, sum F7H
Byte FOH 41H dev 42H 12H aaH bbH ccH	Explanation Exclusive status  ID number (Roland) Device ID (dev: 00H - 1FH Initial value is 10H Model ID (GS), 45H, 41H Command ID (DT1) Address MSB : upper byte of the starting address of the transmitted data Address LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data Caddress LSB : lower byte of the starting address of the transmitted data
:	are transmitted starting from the address.
eeH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

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

Regarding the checksum please refer to Section 4.

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

Regarding the checksum please refer to section 4.

• System Parameters

Parameters affecting the entire unit, such as how the two MIDI IN connectors will function, are called System Parameters. System parameters will not be reset even if 'GS Reset' or 'General MIDI System On' are received.

## <MODEL ID = 42H>

# Patch parameters Patch common parameters

J ratell colli	mon paramete	15				
Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Descrip-tion
40 00 00 40 00 01# 40 00 02#	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 - +100.0 (cent) Use nibblized data.	00 04 00 00	0 (cent)
10 00 03#						
Refer to sec	tion 5. Supple	mentary material, *Abo	out tuning" (page 30).			
40 00 04	00 00 01	00 - 7F	MASTER VOLUME	0 - 127 (= F0 7F 7F 04 01 00 vv F7 )	7F	127
10 00 05	00 00 01	28 - 58	MASTER KEY-SHIFT	-24 - +24 (semitones)	40	0(semitones)
10 00 06	00 00 01	01 - 7F	MASTER PAN	-63 (LEFT) - +63 (RIGHT)	40	0 (CENTER)
10 00 7F	00 00 01	00	MODE SET	00 = GS Reset (Rx. only)		
' Refer to "Sys	stem exclusive	messages related to M	Mode settings" (page 22).			
40 01 00	00 00 10	20 - 7F	PATCH NAME	16 ASCII Characters		
40 01 : #						
40 01 0F#						
10 01 10	00 00 10	00 - 18	VOICE RESERVE	Part 0	02	
00111#	** ***			Part 1	06	
0 01 12#				Part 2	02	
0 01 13#				Part 3	02	
0 01 14#				Part 4	02	
0 01 15#				Part 5	02	
00116#				Part 6	02	
0 01 17#				Part 7	02	
0 01 18#				Part 8	02	
0 01 19#				Part 9	02	
				Part 11	00	
0 01 1A#				Part 12	00	
0 01 1B#				Part 13	00	
0 01 1C#				Part 14	00	
0 01 1D#				Part 15	00	
10 01 1E# 10 01 1F#				Part 16	00	
	I of voices in t	ne voice reserve function	on must be equal or less than the number of	the maximum poliphony. (24)		
40 01 30	00 00 01	00 - 07	REVERB MACRO	00: Room 1	04	Hall 2
10 01 30	00 00 01	00 07	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	01: Room 2		
				02: Room 3		
				03: Hall 1		
				04: Hall 2		
				05: Plate		
				06: Delay		
		00 07	DEVIEDD CHADACTED	07: Panning Delay 0 - 7	04	4
40 01 31	00 00 01	00 - 07	REVERB CHARACTER		00	0
10 01 32	00 00 01	00 - 07	REVERB PRE-LPF	0 - 7	40	64
10 01 33	00 00 01	00 - 7F	REVERB LEVEL	0 - 127		64
10 01 34	00 00 01	00 - 7F	REVERB TIME	0 - 127	40	
40 01 35	00 00 01	00 - 7F	REVERB DELAY FEEDBACK	0 - 127	00 00	0 0
	00 00 01	00 - 7F	REVERB SEND LEVEL TO CHORUS	0 - 127		

<sup>•</sup> REVERB MACRO is a macro parameter that allows global setting of reverb parameters. When you select the reverb type with REVERB MACRO, each reverb parameter

will be set to the most suitable value.

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

40 01 38	00 00 01	00 - 07	CHORUS MACRO	00: Chorus 1	02	Chorus 3
				01: Chorus 2 02: Chorus 3		
				03; Chorus 4		
				04: Feedback Chorus		
				05: Flanger		
				06: Short Delay		
				07: Short Delay(FB)		
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

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

## O Patch Part parameters

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

xBLOCK NUMBER (0 - F),	Part 1 Part 2	(default MIDIch = 1) (default MIDIch = 2)	x=1 x=2
	;	:	:
	Part 9	(default MIDIch = 9)	x=9
	Part 10	(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
10 1x 00	00 00 02	00 - 7F	TONE NUMBER	CC#00 VALUE 0 - 127	00	0
10 1x 01#		00 - 7F		P.C. VALUE 1 - 128	00	i
10 1x 02	00 00 01	00 - 10	Rx. CHANNEL	1 - 16, OFF	••	Same as the Part Number
10 1x 03	00 00 01	00 - 01	Rx. PITCH BEND	OFF / ON	01	ON
10 1x 04	00 00 01	00 - 01	Rx. CH PRESSURE(CAf)	OFF / ON	01	ON
10 1x 05	00 00 01	00 - 01	Rx. PROGRAM CHANGE	OFF / ON	01	ON
10 1x 06	00 00 01	00 - 01	Rx. CONTROL CHANGE	OFF / ON	01	ON
IO 1x 07	00 00 01	00 - 01	Rx. POLY PRESSURE(PAf)	OFF / ON	01	ON
10 1x 08	00 00 01	00 - 01	Rx. NOTE MESSAGE	OFF / ON	01	ON
0 1x 09	00 00 01	00 - 01	Rx. RPN	OFF / ON	01	ON
0 1x 0A	00 00 01	00 - 01	Rx. NRPN	OFF / ON	00(01*)	OFF(ON*)
When "Gene	eral MIDI Syste	m On" is receive	ed, Rx. NRPN will be set OFF. When	"GS Reset" is received, it will be set	ON.	, , ,
0 1x 0B	00 00 01	00 - 01	Rx. MODULATION	OFF / ON		
0 1x 0C	00 00 01	00 - 01	Rx. VOLUME	OFF / ON	01	ON
0 1x 0D	00 00 01	00 - 01	Rx. PANPOT		01	ON
0 1x 0E	00 00 01	00 - 01	Rx. EXPRESSION	OFF / ON	01	ON
0 1x 0F	00 00 01	00 - 01	Rx. HOLD1	OFF / ON	01	ON
0 1x 10	00 00 01	00 - 01	Rx. PORTAMENTO	OFF / ON	01	ON
0 1x 11	00 00 01	00 - 01	Rx. SOSTENUTO	OFF / ON	01	ON
0 1x 12	00 00 01	00 - 01	Rx. SOSTENOTO Rx. SOFT	OFF / ON	01	ON
		00-01	RX. SOFI	OFF / ON	01	ON
0 1x 13	00 00 01	00 - 01	MONO/POLY MODE	Mono / Poly	01	Poly
				(=CC# 126 01 / CC# 127 00)	•	, or
				( === ===== , === , == , == , == , == ,		
0 1x 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE		
				1 = LIMITED-MULTI		
				2 = FULL-MULTI		
					00 at x=0	SINGLE (Drum Part)
					01 at x-0	LIMITED-MULTI (Normal Part
ASSIGN MOI peatedly str	DE is the para uck notes). Thi	ameter that det is is initialized to	ermines how voice assignment v a mode suitable for each Part, so	vill be handled when sounds overlo for general purposes there is no ne	up on identical note i ed to change this.	numbers in the same channe
0 1x 15	00 00 01	00 - 02	USE FOR RHYTHM PART	0 = OFF		055.41
· ··· · <del>-</del>		00 JZ	OSE I OR RETURNING PART	1 = MAP1	00 at x-0	OFF (Normal Part)
				2 = MAP2	01 at x=0	MAP1 (Drum Part)

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

40 1x 16 40 1x 17 40 1x 18#	00 00 01 00 00 02	28 - 58 08 - F8	PITCH KEY SHIFT PITCH OFFSET FINE	-24 - +24 (semitones) -12.0 - +12.0 (Hz) Use pibblized data	40 08 00	0 (semitones) 0 (Hz)
40 1X 10#				Use nibblized data		

<sup>\*</sup> PITCH OFFSET FINE allows you to after, 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 atteration (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	64	100
40 1x 1A	00 00 01	00 - 7F	VELOCITY CENICE DEDT	(=CC# 7)		
40 1x 1B	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40	64
			VELOCITY SENSE OFFSET	0 - 127	40	64
40 lx 1C	00 00 01	00 - 7F	PART PANPOT	-64(RANDOM),	40	0 (CENTER)
				-63(LEFT) - +63(RIGHT)		
				(=CC# 10, except RANDOM)		
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		
40 1x 21	00 00 01	00 - 7F	CHORUS SEND LEVEL		11	17
-0 1X Z I	00 00 01	00-71	CHOKO2 SEIND LEVEL	0 - 127	00	0
40 1x 22	00 00 01	00 75		(=CC# 93)		
40 IX 22	00 00 01	00 - 7F	REVERB SEND LEVEL	0 - 127	28	40
				(=CC# 91)		
40 1x 23	00 00 01	00 - 01	Rx.BANK SELECT	OFF / ON	01(00")	ON(OFF*)
				·		ON(OIL)
* When *Gene	ral MIDi System	On" is received, Rx.BANK SE	ELECT will be set OFF. When "GS Reset" or	"System Mode Set" is received it a	will be set ON	
	•			system mode out is received, if t	Will De 3el Oly.	
40 1x 24	00 00 01	00 - 01	RX BANK SELECT LSB	OFF / ON	01	ON
			TO STATE OF LOS	OIT / OIN	O1	ON
* When RX BAI	VK SELECT LSB =	OFF Bank Select LSB (Bn 20	11) will be treated as 00H regardless of	lta vedue		
	022207 200	CIT, Dark Ocicer Lob (BIT 20	in will be fredred as our regardless of	iis value.		
40 1x 2A	00 00 02	00 00 - 40 00 - 7F 7F	PITCH FINE TUNE	100 0 100 (	** **	_
-10 IX E/ (	00 00 02	00 00 - 40 00 - 71 71	FIICH FINE TONE	-100 - 0 - +100 (cent)	40 00	0
40 1x 2B#				(= RPN#1)		
40 IX 20#						
40 1x 30	00 00 01	05 70				
40 IX 30	00 00 01	0E - 72	TONE MODIFY1	-50 - +50	40	0
			Vibrato Rate	(=NRPN# 8)		
40 1x 31	00 00 01	0E - 72	TONE MODIFY2	-50 - +50	40	0
			Vibrato Depth	(=NRPN# 9)		•
40 1x 32	00 00 01	0E - 72	TONE MODIFY3	-50 - +50	40	0
			TVF Cutoff Freq.	(=NRPN# 32)	40	U
40 1x 33	00 00 01	OE - 72	TONE MODIFY4	-50 - +50	40	•
·- ··· - <del>-</del>			TVF Resonance		40	0
40 1x 34	00 00 01		TONE MODIFY5	(=NRPN# 33)		
IN U-4	55 55 51			-50 - +50	40	0
			TVF&TVA Env.attack	(=NRPN# 99)		

40 1x 35	00 00 01	0E - 72	TONE MODIFY6	-50 - +50 (=NRPN# 100)	40	0
40 1x 36	00 00 01	0E - 72	TVF&TVA Env.decay TONE MODIFY7 TVF&TVA Env.release	-50 - +50 (=NRPN# 102)	40	0
40 1x 37	00 00 01	0E - 72	TONE MODIFY8 Vibrato Delay	-50 - +50 (=NRPN# 10)	40	0

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description	
Address(H)  40 1x 40  40 1x 41#  40 1x 42#  40 1x 43#  40 1x 44#  40 1x 46#  40 1x 46#  40 1x 48#  40 1x 49#  40 1x 49#  40 1x 40#	Size(H) 00 00 0C	00 - 7F 00 - 7F	SCALE TUNING C SCALE TUNING C# SCALE TUNING C# SCALE TUNING D# SCALE TUNING D# SCALE TUNING F SCALE TUNING F SCALE TUNING F SCALE TUNING F SCALE TUNING G SCALE TUNING G# SCALE TUNING G# SCALE TUNING A#	-64 - +63 (cent)	40 40 40 40 40 40 40 40 40 40 40 40 40 4	0( 0) 0( 0) 0( 0) 0( 0) 0( 0)	(cent) (cent) (cent) (cent) (cent) (cent) (cent) (cent) (cent) (cent)

\* SCALE TUNING is a function that allows fine adjustment to the pitch of each note in the octave. The pitch of each identically-named note in all octaves will change simultaneously. A setting of ± 0 cent (40H) is equal temperament (page 29).

40 2x 00 40 2x 01 40 2x 02 40 2x 03 40 2x 04 40 2x 05 40 2x 06 40 2x 07 40 2x 08 40 2x 09 40 2x 09 40 2x 09	00 00 01 00 00 01	28 - 58 00 - 7F 00 - 7F	MOD PITCH CONTROL MOD TVF CUTOFF CONTROL MOD AMPLITUDE CONTROL MOD LFO1 PRITC CONTROL MOD LFO1 PITCH DEPTH MOD LFO1 TVF DEPTH MOD LFO1 TVA DEPTH MOD LFO2 RATE CONTROL MOD LFO2 PITCH DEPTH MOD LFO2 PITCH DEPTH MOD LFO2 TVF DEPTH MOD LFO2 TVF DEPTH	-24 - +24 (semitones) -9600 - +9600 (cent) -100.0 - +100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%)	40 40 40 40 0A 00 00 40 00 00	0 (semitones) 0 (cent) 0 (%) 0 (Hz) 10 (cent) 0 (cent) 0 (%) 0 (Hz) 0 (Hz) 0 (cent) 0 (cent) 0 (cent)
40 2x 10 40 2x 11 40 2x 12 40 2x 13 40 2x 14 40 2x 15 40 2x 16 40 2x 17 40 2x 18 40 2x 19 40 2x 19	00 00 01 00 00 01	40 - 58 00 - 7F 00 - 7F	BEND PITCH CONTROL BEND TVF CUTOFF CONTROL BEND AMPLITUDE CONTROL BEND LFO1 PARTE CONTROL BEND LFO1 PITCH DEPTH BEND LFO1 TVF DEPTH BEND LFO1 TVA DEPTH BEND LFO2 RATE CONTROL BEND LFO2 TVF DEPTH	0 - 24 (semitones) -9600 - +9600 (cent) -100.0 - +100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%)	42 40 40 40 00 00 00 40 00 00	2 (semitones) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (%) 0 (Hz) 0 (Hz) 0 (cent) 0 (cent) 0 (%)
40 2x 20 40 2x 21 40 2x 22 40 2x 23 40 2x 24 40 2x 25 40 2x 26 40 2x 27 40 2x 28 40 2x 29 40 2x 29	00 00 01 00 00 01	28 - 58 00 - 7F 00 - 7F	CAF PITCH CONTROL CAF TVF CUTOFF CONTROL CAF AMPLITUDE CONTROL CAF LFO1 RATE CONTROL CAF LFO1 PITCH DEPTH CAF LFO1 TVA DEPTH CAF LFO2 RATE CONTROL CAF LFO2 PITCH DEPTH CAF LFO2 PITCH DEPTH CAF LFO2 TVF DEPTH CAF LFO2 TVA DEPTH CAF LFO2 TVA DEPTH	-24 - +24 (semitones) -9600 - +9600 (cent) -10.0 - +100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%)	40 40 40 40 00 00 00 40 00 00	0 (semitones) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (cent) 0 (cent) 0 (cent)
40 2x 30 40 2x 31 40 2x 32 40 2x 33 40 2x 34 40 2x 35 40 2x 36 40 2x 37 40 2x 38 40 2x 39 40 2x 39	00 00 01 00 00 01	28 - 58 00 - 7F 00 - 7F	PAF PITCH CONTROL PAF TVF CUTOFF CONTROL PAF AMPLITUDE CONTROL PAF LFO1 RATE CONTROL PAF LFO1 PITCH DEPTH PAF LFO1 TVA DEPTH PAF LFO2 RATE CONTROL PAF LFO2 PITCH DEPTH PAF LFO2 TVF DEPTH PAF LFO2 TVF DEPTH PAF LFO2 TVF DEPTH PAF LFO2 TVA DEPTH	-24 - +24 (semitones) -9600 - +9600 (cent) -100.0 - +100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 2400 (cent) 0 - 100.0 (%)	40 40 40 40 00 00 00 40 00 00	0 (semitones) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (%)
40 2x 40 40 2x 41 40 2x 42 40 2x 43 40 2x 44 40 2x 45 40 2x 46 40 2x 47 40 2x 48 40 2x 49 40 2x 4A	00 00 01 00 00 01	28 - 58 00 - 7F 00 - 7F	CC1 PITCH CONTROL CC1 TVF CUTOFF CONTROL CC1 AMPLITUDE CONTROL CC1 LFO1 PITCH DEPTH CC1 LFO1 TVF DEPTH CC1 LFO1 TVA DEPTH CC1 LFO2 RATE CONTROL CC1 LFO2 PITCH DEPTH CC1 LFO2 TVF DEPTH CC1 LFO2 TVF DEPTH	-24 - +24 (semitones) -9600 - +9600 (cent) -100.0 - +100.0 (%) -10.0 - +100.0 (Hz) 0 - 600 (cent) 0 - 100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 2400 (cent) 0 - 100.0 (%)	40 40 40 40 00 00 00 40 00 00	0 (semitones) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (cent) 0 (cent)
40 2x 50 40 2x 51 40 2x 52 40 2x 53 40 2x 54 40 2x 55 40 2x 56 40 2x 57 40 2x 58 40 2x 59 40 2x 59	00 00 01 00 00 01	28 - 58 00 - 7F 00 - 7F	CC2 PITCH CONTROL CC2 TVF CUTOFF CONTROL CC2 AMPLITUDE CONTROL CC2 LFO1 RATE CONTROL CC2 LFO1 PITCH DEPTH CC2 LFO1 TVF DEPTH CC2 LFO1 TVA DEPTH CC2 LFO2 PATCH CONTROL CC2 LFO2 PTCH DEPTH CC2 LFO2 PTCH DEPTH CC2 LFO2 TVA DEPTH CC2 LFO2 TVA DEPTH	-24 - +24 (semitones) -9600 - +9600 (cent) -100.0 - +100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 100.0 (%) -10.0 - +10.0 (Hz) 0 - 600 (cent) 0 - 2400 (cent) 0 - 2400 (cent) 0 - 100.0 (%)	40 40 40 40 00 00 00 00 00 00 00	0 (semitones) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (%) 0 (Hz) 0 (cent) 0 (cent) 0 (cent) 0 (cent)

### Section 4. Bulk Dump

Bulk Dump allows you to transmit a large amount of data at once, and is convenient for storing settings for the entire unit on a computer or sequencer.

Model ID: 00 19

User Program Dump	[EM-50/30]
F0 41 10 00 19 12 05 08 00 00 CHK F7	(23 System Ex.)
Song Dump	[EM-50/30]
F0 41 10 00 19 12 05 08 28 00 CHK F7	(563 System Ex.)
Custom Style	[EM-50/30]
F0 41 10 00 19 12 00 60 00 00 CHK F7 F0 41 10 00 19 12 00 68 00 00 CHK F7 F0 41 10 00 19 12 00 70 00 00 CHK F7 F0 41 10 00 19 12 00 78 00 00 CHK F7	(586 System Ex.) (586 System Ex.) (586 System Ex.) (586 System Ex.)
Program	[EM-50/30]
F0 41 10 00 19 12 00 01 00 00 CHK F7 F0 41 10 00 19 12 00 01 40 00 CHK F7 F0 41 10 00 19 12 00 42 00 00 CHK F7 F0 41 10 00 19 12 00 48 00 00 CHK F7 F0 41 10 00 19 12 00 50 00 00 CHK F7 F0 41 10 00 19 12 00 58 00 00 CHK F7	( 37 System Ex.) ( 37 System Ex.) ( 439 System Ex.) ( 586 System Ex.) ( 586 System Ex.) ( 586 System Ex.)

## Section 5. 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.		+-		
+	nex.   +++-		nex.	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 j	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	29н	73	49H	105	69H
10	HA0	42	2AH	74	4AH	106	6AH
11	OBH	43	2BH	75	4BH	107	6BH
12	0CH	44	2CH	76	4CH	108	6CH
13	ODH	45	2DH	77	4DH	109	6DH
14	OEH	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	19н	57	39H	89	59н	121	79н
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

<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 hexa-decimal for each 7 bits?

From the preceding table, since 12H = 18 and 34H = 52  $18 \times 128 + 52 = 2356$ 

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 = 10

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

<Example 4> What is the nibbled expression of the decimal value 1258?



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).

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 (=  $64 \times 12+80 = 8192$ ) is 0, so this Pitch

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

В3	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

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

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

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

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

\* TPQN: Ticks Per Quarter Note

● Example of an Exclusive message and calculating a Checksum Roland Exclusive messages (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.

precision is required, we must use two or more bytes. For example, two hexadecimal numbers and bbH expressing two 7-bit bytes would indicate a value of an x 128+bb.

In the case of values which have a  $\pm$  sign, 00H = -64, 40H =  $\pm$ 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 =  $\pm$ 8192, 40 00H =  $\pm$ 0, and 7F 7FH =  $\pm$ 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.

## ♦ 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," the REVERB MACRO Address is 40 01 30H, and ROOM 3 is a value of 02H. Thus,

(6)

<u>FQ</u>	<u>41</u>	<u>10</u>	<u>42</u>	<u>12</u>	40 01 30	<u>02</u>	??
(1)	(2)	(3)	(4)	(5)	address	data	checksum
		re Status, ID (GS).		ID (Rol	and), nand ID (DT1),	,-,	Device ID (17), 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> Requesting transmission of the LEVEL for DRUM MAP 1 NOTE NUMBER

example 2- Requesting Intensions of the ELYEL of District Annual Type 75 (D#5; Cloves)
NOTE NUMBER 75 (D#5) is 48H in hexadecimal.
According to the "Parameter Address Map," LEVEL of NOTE NUMBER 75 (D#5; Cloves) in DRUM MAP 1 has an Address of 41 02 48H and a Size of 00 00 01H. Thus, 11 41 02 4B 00 00 01

(1)	(2)	(3)	(4)	(5)	address	size	checksum	((
		e Status,		ID (Rol	and), nand ID(RQ1)	·	Device ID (17) and of Exclusiv	

Next we calculate the checksum.

41H+02H+4BH+00H+00H+01H = 65+2+75+0+0+1 = 143 (sum) 143 (sum) | 128 = 1 (quotient) ... 15 (remainder) checksum = 128 - 15 (remainder) = 113 = 71H

This means that F0 41 10 42 11 41 02 4B 00 00 01 71 F7 is the message we transmit.

## About tuning

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

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 Rine 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	cent	RPN #1	Sys.Ex. 40 00 00			
444.0   443.0   442.0   441.0   440.0   439.0	+15.67 +11.76 + 7.85 + 3.93 0 - 3.94	4A 03 (+1283) 47 44 (+ 964) 45 03 (+ 643) 42 42 (+ 322) 40 00 ( 0 ) 3D 3D (- 323)	00 04 0C 04 (+196) 00 04 09 0D (+157) 00 04 07 06 (+118) 00 04 04 0F (+ 79) 00 04 02 07 (+ 39) 00 04 00 00 ( 0) 00 03 0D 09 (- 39) 00 03 0B 01 (- 79)			

<Example> Set the tuning of MIDI channel 3 to A4 = 442.0 HzSend 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 (MIDI ch.3) upper byte of RPN parameter number (MIDI ch.3) upper byte of parameter value (MIDI ch.3) lower byte of parameter value (MIDI ch.3) lower byte of RPN parameter number (MIDI ch.3) upper byte of RPN parameter number (MIDI ch.3) upper byte of RPN parameter number	: 00H
(B2)	65 01		: 01H
(B2)	06 45		: 45H
(B2)	26 03		: 03H
(B2)	64 7F		: 7FH
(B2)	65 7F		: 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

### O Equal Temperament

This method of tuning divides the octave into 12 equal parts. It is currently the

most widely used form of funing, especially in occidental music. On this unit, the default settings for the Scale Tune feature produce equal temperament.

### O Just Temperament (Keytone C)

The three main chords resound much more beautifully than with equal temperament, but this benefit can only be obtained in one key. If transposed, the chords tend to become ambiguous. The example given involves settlings for a key in which C is the keynote

#### O Arabian Scale

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

## Example Settings

Note name	Faual Temperament	Just Temperament (Keytone C)	Arabian Scale
C	0	0	-6
C#	Ô	-8	+45
D,	Õ	+4	-2
D#	Õ	+16	-12
F.	Õ	-14	-51
Ē	ñ	-2	-8
F#	Õ	-10	+43
Ġ	Õ	+2	-4
G#	Ô	+14	+47
Ä	Ö	-16	0
Á#	ō	+14	-10
R	Õ	-12	-49

The values in the table are given in cents. Refer to the explanation of Scale Tuning on page 30 to convert these values to hexadecimal, and transmit them as exclusive data.

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

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

Model: EM-50/30

# MIDI Implementation Charts

Date: NOV 1998 Version: 1.00

Function		Transmitted	<del></del>	Recognized		Remarks
				Recognized		Nemuks
Basic Channel	Default Changed	1-16 1-16, Off		1-16 1-16, Off		4=Upper1, 6=Upper2 10=ManDrum 11=Lower,
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	*1	
Velocity	Note ON Note OFF	O X	*1	O ×	*1	
After Touch	Key's Ch's	×		00		
Pitch Bend		0	*1	0	*1	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98, 99 100,101	0000000000000000	*] *] *]	O O O O O O O O (Reverb) O (Chorus)	*] *] *]	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 *****	*1	O 0-127	*1	Program Number: 1-128
System Excl	lusive	0		0		
System Common	Song Pos Song Sel Tune	O X X	*1	O X X	*1	
System Real Time	Clock Commands	0	*] *]	0	*] *]	MIDI File Record/Play
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	0 0 X 0 0 X		O (120,126,127) O (121) O (123-125) O (123-125)		·
Notes		*1 O X is selectab *2 Recognize as N	ole. M=1 ev	/en if M ≠ 1		

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

# **MIDI Implementation Charts**

Date: APR 1999 Version: 1.00

Function		Transmitted		Recognized		Remarks
Basic Channel	Default Changed	1-16 ×		1-16 ×		4=Upper1, 6=Upper2 10=ManDrum 11=Lower,
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	*1	
Velocity	Note ON Note OFF	O X	*1	O X	*1	
After Touch	Key's Ch's	×		0		
Pitch Bend		0	*1	0	*1	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98,99 100,101	0000000000000000	*] *] *]	O O O (Reverb) O (Chorus)	*] *] *]	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 ****	*1	O 0-127	*1	Program Number: 1-128
System Exc	lusive	0		0		
System Common	Song Pos Song Sel Tune	0 × ×	*1	O × ×	*1	,
System Real Time	Clock Commands	0	*] *]	0	*] *]	MIDI File Record/Play
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	0 0 x 0 0 x		O (120,126,127) O (121) O (123-125) O X		
Notes		*1 O X is selectable. *2 Recognize as M=1 even if M ≠ 1				

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

Model: EM-10

# **MIDI Implementation Charts**

Date : APR 1999

Version: 1.00

Function		Transmitted		Recognized		Remarks
Basic Channel	Default Changed	1-16 ×		1-16 ×		4=Upper, 10=ManDrum
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	*1	
Velocity	Note ON Note OFF	O X	*1	O X	*]	
After Touch	Key's Ch's	×		0		
Pitch Bend		×	*]	0	*]	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98, 99 100,101	0×000000000000000	*  *  *	O O O O O O (Reverb) O (Chorus) 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 ****	*1	O 0-127	*]	Program Number: 1-128
System Exc	lusive	0		0		
System Common	Song Pos Song Sel Tune	O X X	*]	O × ×	*1	
System Real Time	Clock Commands	0	*] *]	0	*] *]	MIDI File Record/Play
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	0 0 × 0 0 ×		O (120,126,127) O (121) O (123-125) O X		
Notes		*1 ○ X is selectable. *2 Recognize as M=1 even if M ≠ 1				

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

# **Roland K6018345**

UPC K6018345



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