GENERAL MIDI GS

E-56

INTELLIGENT SYNTHESIZER

MIDI Implementation

Roland

E-56 INTELLIGENT SYNTHESIZER

MIDI IMPLEMENTATION **Version 1.00** **Date: February 1993**

ARRANGER SECTION

1 Receive data (Arranger Section)

- Channel Voice Message -

■ Note off

Status	Second	Third
8nH	kkH	vvH
9nH	kkH	00H

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

*Ignored when "Rx.Note message = OFF".
*In the drum part, recognized when "Rx.Note off = ON" for each instrument.
*Velocity is ignored.

■ Note on

Status	Second	Third
9nH	kkH	vvH

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

*Ignored when "Rx.Note message = OFF".
*In the drum part, ignored when "Rx.Note on = OFF" for each instrument.

■ Polyphonic key pressure

Status	Second	Third
AnH	kkH	vvH

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

*Ignored when "Rx.Polyphonic key pressure = OFF".
*Effect to the parameter set on "PAf controller function".
The default setting has no effect.

■ Control change

*Ignored all control change messages other than channel mode messages when "Rx.Control change = OFF".
*The values set by Control change messages won't reset by receiving new Program change messages.

Bank select

Status	Second	Third
BnH	00H	mmH
BnH	20H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, ll=Bank number : 00H,00H - 7FH,7FH (bank1 - bank16384)
Default Value = 00 00H (bank.1)

*Ignored when "Rx.Bank Select = OFF".
"Rx.Bank Select" is set to ON by "GS RESET".(Power-on default value is ON.)
*The LSB 7-bits are ignored (always regards as llH=00H).
However, when sending Bank Select messages, you have to send both of the MSB(mm) and LSB(ll) together.
*"Bank select" is suspended until receiving "Program change".
To select a Tone of another bank, you have to send Bank select(mm,ll) before sending the Program change.
*The "Variation number" of GS Format is defined as the decimal expression of the MSB value (Control change number 00H) of the Bank select.

Modulation

Status	Second	Third
BnH	01H	vvH

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

*Ignored when "Rx.Modulation = OFF".
*Effect to the parameter set on "MOD controller function".
The default setting is pitch modulation depth.

Portamento time

Status	Second	Third
BnH	05H	vvH

n=MIDI channel number : 0H - FH (ch.1- ch.16)
vv=Portamento time : 00H - 7FH (0 - 127)
Default Value = 00H (0)

*The Portamento time value changes the rate of pitch change when Portamento is ON or when using portamento control messages.
Value 0 is the fastest.

Data entry

Status	Second	Third
BnH	06H	mmH
BnH	26H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll=Value of the parameter specified with RPN and/or NRPN

Volume

Status	Second	Third
BnH	07H	vvH

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

*Volume messages control the volume level of the specified channel (part).
Use Volume messages to control volume balance of each part.
*Ignored when "Rx.Volume = OFF".

Panpot

Status	Second	Third
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Panpot : 00H - 40H 7FH (Left - Center - Right)

*127 steps from Left to Center to Right.
*Within the Drum Part, the panpot provides overall control of a stereophonic image.
*Ignored when "Rx.Panpot = OFF".

Expression

Status	Second	Third
BnH	0BH	vvH

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

*Expression and Volume messages are cumulative, and the result will control the overall volume.
Use Expression messages for expression pedal, or creating expressive effects, such as crescendo, decrescendo, while playing.
*Ignored when "Rx.Expression = OFF".

Hold1

Status	Second	Third
BnH	40H	vvH

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

*Ignored when "Rx.Hold1 = OFF".

Portamento

Status	Second	Third
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

*Ignored when "Rx.Portamento = OFF".

Sostenuto

Status	Second	Third
BnH	42H	vvH

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

*Ignored when "Rx.Sostenuto = OFF".

Soft

Status	Second	Third
BnH	43H	vvH

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

*Ignored when "Rx.Soft = OFF".

Portamento Control

Status	Second	Third
BnH	54H	kkH

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

*When a Note On message is received after a Portamento Control message, the voice's pitch will glide from the pitch specified by the source note number of the Portamento Control message at the rate set by the portamento time controller (regardless portamento on/off.)
If there is a currently sounding voice whose note number is coincident with the source note number, the voice's pitch will glide to the new Note On's pitch according to the portamento time without re-triggering (played in legato). Then no new voice should be assigned.

Example 1.

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

Example 2.

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

Effect1 depth(Reverb send level)

Status	Second	Third
BnH	5BH	vvH

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

*Effect1 depth messages control the Send Level of the specified channel (part) to the internal Reverb unit.

Effect3 depth(Chorus send level)

Status	Second	Third
BnH	5DH	vvH

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

*Effect3 depth messages control the Send Level of the specified channel (part) to the internal Chorus unit.

NRPN MSB/LSB

Status	Second	Third
BnH	63H	mmH
BnH	62H	llH

n =MIDI channel number :0H - FH (ch.1 - ch.16)
mm =MSB of the NRPN
ll =LSB of the NRPN

*Recognized when "Rx.NRPN = ON". "Rx.NRPN" is set ON by "GS RESET".
*The values set by NRPN won't reset by receiving new Program Change messages or Reset All Controllers.

NRPN

An NRPN (Non Registered Parameter Number) is an expanded control change message.
Each function of an NRPN is described by the individual manufacturer.
To use NRPN, set NRPN number (MSB/LSB) before sending data. Then send data by Data entry message(Control Change # 6/38).
And then, it is recommended to send RPN null (RPN number = 7FH/7FH) to prevent the data from being unexpectedly change. For more explanation, refer to Chapter 4. Useful Information, Example of actual MIDI messages <EXAMPLE 4>.

You can change the following parameters by using NRPN.

NRPN MSB	NRPN LSB	Data entry MSB	Description
01H	08H	mmH	Vibrato rate relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	09H	mmH	Vibrato depth relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	0AH	mmH	Vibrato delay relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	20H	mmH	TVF cutoff frequency relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	21H	mmH	TVF resonance relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	63H	mmH	TVF&TVA Env. Attack time relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)

01H	64H	mmH	TVF&TVA Env. Decay time relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	66H	mmH	TVF&TVA Env. Release time relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
18H	r r H	mmH	Pitch coarse of drum instrument relative change on specified drum instrument rr: key number of drum instrument mm: 00H-40H-7FH (-64 - 0 - +63 semitone)
1AH	r r H	mmH	TVA level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)
1CH	r r H	mmH	Panpot of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H,01H-40H-7FH (Random, Left-Center-Right)
1DH	r r H	mmH	Reverb send level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)
1EH	r r H	mmH	Chorus send level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)

*Data entry LSB is ignored.
*The relative change means that the parameter value(e.g.-50 - 0 - +50) will be added to the preset value.
*The absolute change means that the parameter value will be replaced by the received value.

RPN MSB/LSB

Status	Second	Third
BnH	65H	mmH
BnH	64H	l l H

n =MIDI channel number :0H -FH (ch.1 - ch.16)
mm =MSB of the RPN
l l =MSB of the RPN

*Ignored when "Rx.RPN = OFF".
*The values set by an RPN won't be reset by receiving new Program Change messages or Reset All Controllers.

RPN
An RPN (Registered Parameter Number) is an expanded control change message.
Each function of an RPN is described by the MIDI Standard.
To use RPN, set RPN number (MSB/LSB) before sending data. Then send data by Data entry message(Control Change # 6/38). And then, it is recommended to send RPN null (RPN number = 7FH/7FH) to prevent the data from being unexpectedly change. For more explanation, refer to Chapter 4. Useful Information, Example of actual MIDI messages <EXAMPLE 4>.

You can change the following parameters by using RPN.

RPN MSB	RPN LSB	Data entry MSB	Data entry LSB	Description
00H	00H	mmH	----	Pitch bend sensitivity mm: 00H-18H (0 - 24 semitone) Default value=02H (two semitones) l l: ignored (value=00H) (Up to 2 octaves)
00H	01H	mmH	l l H	Master fine tuning mm, l l: 00 00H-40 00H-7F 7FH (-8192x100/8192 - 0 - +8191x100/8192 cents)
00H	02H	mmH	----	Master coarse tuning mm: 28H-40H-58H (-24 - 0 - +24 semitones) l l: ignored (value=00H)
7FH	7FH	----	----	RPN null Return to disable condition. The parameter already set retains its value. mm,l l: ignored.

■ **Program change**

Status	Second
CnH	ppH

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

*The Tone of the voices already ON before receiving a program change message isn't affected.
The Tone will be changed by a new Not-on message after the program change is received.
*Ignored when "Rx.Program change = OFF".
*In the drum part, Program change messages are ignored when the Bank is set at 129 - 16384 (ie. the value of the control change number 0 is not 00H).

■ **Channel pressure**

Status	Second
DnH	vvH

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

*Effect to the parameter set on "MOD controller function".
The default setting has no effect.
*Ignored when "Rx.Channel pressure = OFF".

■ **Pitch bend change**

Status	Second	Third
EnH	l l H	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, l l=Value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

*Effect to the parameter set on "MOD controller function".
The default setting is pitch bend.
*Ignored when "Rx.Pitch bend change = OFF"

Channel Mode Messages

■ **All sounds off**

Status	Second	Third
BnH	78H	00H

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

*When "All sounds off" is received, all sounds on a specified channel turn off immediately.
However, the state of channel messages does not change. You must not use "All sound off" message for "Note off".

■ **Reset all controllers**

Status	Second	Third
BnH	79H	00H

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

*When "reset all controllers" is received, the controller value of specified channel returns to the default at values as follows.

Controller	Default Value
Pitch bend change	0(Center)
Polyphonic key pressure	0(off)
Channel pressure	0(off)
Modulation	0(off)
Expression	127(maximum)
Hold1	0(off)
Portamento	0(off)
Sostenuto	0(off)
Soft	0(off)
RPN	disabled. The parameter already set retains its old value.
NRPN	disabled. The parameter already set retains its old value.

■ **All notes off**

Status	Second	Third
BnH	7BH	00H

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

*When "All notes off" is received, all notes are turned off in the specified channel.
However, sound continues while hold1 and/or sostenuto is on.

■ **OMNI OFF**

Status	Second	Third
BnH	7CH	00H

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

*OMNI OFF is only recognized as "all notes off". Mode doesn't change.

■ **OMNI ON**

Status	Second	Third
BnH	7DH	00H

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

*OMNI ON is only recognized as "all notes off". Mode doesn't change (OMNI OFF remains).

■ **MONO**

Status	Second	Third
BnH	7EH	mmH

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

**MONO is recognized as "all sounds off". The specified channel turns to Mode4 (M=1), even if mm is not equal to 1 (mm is ignored).

■ **POLY**

Status	Second	Third
BnH	7FH	00H

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

*POLY is recognized as "all sounds off". The specified channel turns to Mode3.

System Real Time Message

■ **Active sensing**

Status
FEH

*Having received an "active sensing" message, GS expects to receive additional active sensing messages at 300ms intervals.
If the interval is greater than 420ms, GS executes "All sounds off", "All notes off" and "Reset all controllers" and returns to normal operation. (Monitoring of active sensing messages will terminate.)

■ **Sequencer start**

Status
FAH

When "Sequencer start" is received the internal sequencer and/or the internal arranger start.

■ **Sequencer stop**

Status
FCH

When "Sequencer stop" is received the internal sequencer and/or the internal arranger stop

■ **Timing clock**

Status
F8H

When "Timing clock" is received the internal sequencer or the internal arranger are syncronized with an external clock.

note: if the parameter "Real time RX" is "Internal" this message is not received.

System Exclusive Message

Status	Data	Status
F0H	iiH,ddH,.....,eeH	F7H

F0H : System exclusive
ii=ID number : The ID number identifies the manufacturer of a MIDI device that triggers an exclusive message. Value 7EH and 7FH are reserved to use as universal messages which are used for extension of the MIDI Standard.
41H : Roland's Manufacturer-ID.
7EH : Universal Non-Realtime Message
7FH :Universal Realtime Message
dd,...,ee=data: 00H-7FH (0-127)
F7H: EOX (End of Exclusive/System common)

■ **Data Transfer**

E-56 can transmit and receive the various parameters using System Exclusive messages of the following data format.
E-56 Common Exclusive messages use Model ID = 5BH and Device ID = 17(10H).
E-56 has a unique Exclusive communication function which has it's own Model IDs in addition to the GS Common Exclusive messages.

■ **Request data 1RQ1**

This message is sent out to request the remote device to send back the required data.
It contains data for the address and size that specify designation and length, respectively.
On receiving a proper RQ1 message for the device, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will not send anything.

Status	Data Byte	Status
F0H41H,	10H, 5BH, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum	F7H

Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID	(Roland)
10H	Device ID	(dev => 10H)
5BH	Model ID	(E-56)
11H	Command ID	(RQ1)
aaH	Address MSB	
bbH	:	
ccH	Address LSB	
ssH	Size MSB	
ttH	:	
uuH	Size LSB	
sum	Checksum	
F7H	EOX	(End of exclusive)

*E-56 only recognizes the RQ1 messages whose address and size match the Parameter Address Map (Section 3).
*The error checking process uses a Checksum. Refer to Section 4 to calculate a Checksum.

■ **Data set 1 DT1**

This message corresponds to the actual data transfer process.
On receiving a DT1 message, the device writes the data to internal memory according to the address.

Status	Data Byte	Status
F0H	41H, 10H, 5BH, 12H, aaH, bbH, ccH, ddH, ... eeH, sum	F7H

Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID	(Roland)
10H	Device ID	(dev => 10H)
5BH	Model ID	(E-56)
12H	Command ID	(DT1)
aaH	Address MSB	
bbH	:	
ccH	Address LSB	
ddH	Data	
:	:	
eeH	Data	
sum	Checksum	
F7H	EOX	(End of exclusive)

*E-56 only recognizes the DT1 messages whose address and size match the Parameter Address Map (Section 3).
*To send large DT1 messages at a time, insert 40ms - intervals at least in between each packet.
*The error checking process uses a Checksum. Refer to Section 4 to calculate a Checksum.

2 Transmit data (Arranger Section)

- Channel Voice Message -

■ **Note off**

Status	Second	Third
9nH	kkH	00H

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

* The E-56 does not send this message if Upper Tx channel = Off

■ **Note on**

Status	Second	Third
9nH	kkH	vvH

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

* The E-56 does not send this message if Upper Tx channel = Off

■ **Control change**

Bank select

Status	Second	Third
BnH	00H	mmH
BnH	20H	l l H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, l l =Bank number : 00H,00H - 7FH,7FH (bank1 - bank16384)

* The E-56 does not send this message if channel = Off

Modulation

Status	Second	Third
BnH	01H	vvH

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

* The E-56 does not send this message if channel = Off

Volume

Status	Second	Third
BnH	07H	vvH

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

* The E-56 does not send this message if channel = Off

Data entry

Status	Second	Third
BnH	06H	mmH
BnH	26H	l l H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll=Value of the specified parameter with RPN and/or NRPN

* The E-56 does not send this message if channel = Off

Hold1

Status	Second	Third
BnH	40H	vvH

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

* The E-56 does not send this message if channel = Off

■ **Effect1 depth (Reverb send level)**

Status	Second	Third
BnH	5BH	vvH

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

*Effect1 depth messages control the Send Level of the specified channel (part) to the internal Reverb unit.
* The E-56 does not send this message if channel = Off

■ **Effect3 depth (Chorus send level)**

Status	Second	Third
BnH	5DH	vvH

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

*Effect3 depth messages control the Send Level of the specified channel (part) to the internal Chorus unit.
* The E-56 does not send this message if channel = Off

■ **Program change**

Status	Second
CnH	ppH

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

* The E-56 does not send this message if channel = Off

■ **Pitch bend change**

Status	Second	Third
EnH	l l H	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, l l=Value : 00H,00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

* The E-56 does not send this message if channel = Off

System Realtime Message

Active sensing

Status
FEH

*Transmits at about 250ms intervals.

Sequencer start

Status
FAH

"Sequencer start" is transmitted if START/STOP button is pressed and the internal sequencer/arranger is in STOP mode. (see note)

Sequencer stop

Status
FCH

"Sequencer stop" is transmitted if START/STOP button is pressed and the internal sequencer/arranger is in START mode. (see note)

Timing clock

Status
F8H

"Timing clock" is always transmitted. (see note)

note: If the parameter "TxSy" is "Off" the message is not transmitted

System Exclusive Message

■ **Data Transfer**
E-56 transmits "Data set 1 (DT1)" message when receiving a proper "Request Data 1(RQ1)" message. Refer to section 1(System Exclusive Message)

■ **Data set 1** **DT1** **(12H)**

Status	Data Byte	Status
F0H	41H, 10H, (5BH e/o 42H), 12H, aaH, bbH, ccH, ddH, ... eeH, sum	F7H

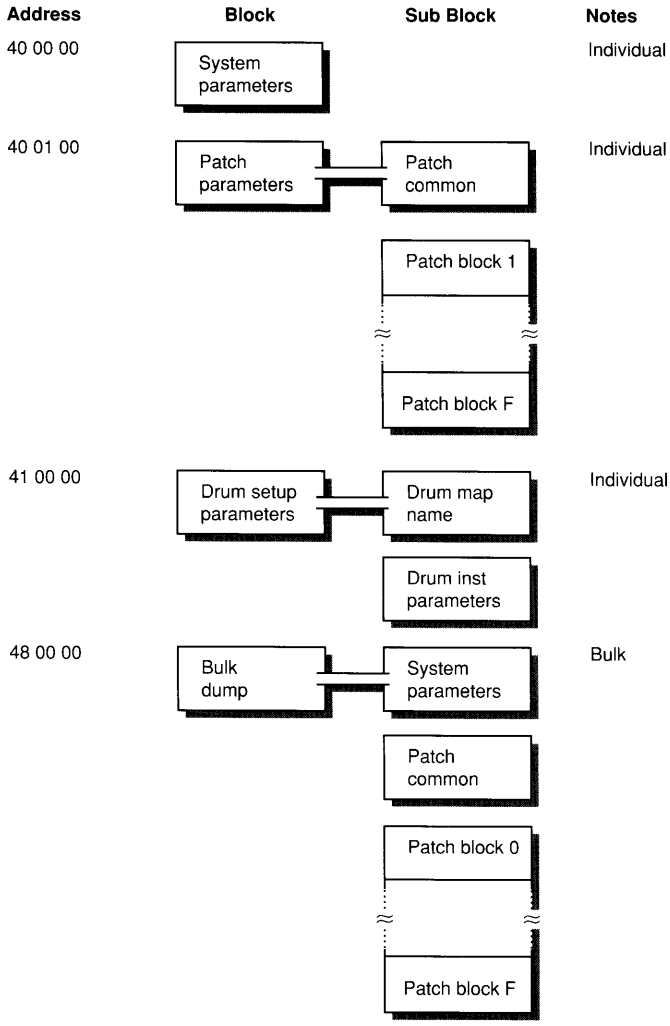
Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID	(Roland)
10H	Device ID	(dev => 10H
5BH 42H	Model ID	(E-56 or GS)
12H	Command ID	(DT1)
aaH	Address MSB	
bbH	Address	
ccH	Address LSB	
ddH	Data	
:	:	
eeH	Data	
sum	Checksum	
F7H	EOX	(End of exclusive)

*E-56 only sends the DT1 messages whose address and size match the Parameter Address Map (Section 3).
*If the data to send is a large data (more than 128 bytes), then the data will be sent out in separate packets.
*Refer to Section 4 to calculate a Checksum.

3.1 Parameter address map (Model ID=42H)

This map indicates address, size, Data (range), Parameter, Description, and Default Value of parameters which can be transferred using "Request data 1 (RQ1)" and "Data set 1 (DT1)".
All the numbers of address, size, Data, and Default Value are indicated in 7-bit Hexadecimal-form.

■ **Address Block map**
An outlined address map of the Exclusive Communication is shown below;



Individual parameter

You can use individual parameter communication to send or request an individual parameter value.
One packet of System Exclusive messages "F0 ..... F7" can only have one parameter (which may contain several bytes).
You cannot use any address having "#" for the top address in a System Exclusive message.

[SYSTEM PARAMETERS]

Address(H)	SIZE(H)	Data(H)	Parameter	Description	Default value (H)
40 00 00 40 00 01# 40 00 02# 40 00 03#	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 - +100.0 [cent] Use nibblized data.	00 04 00 00
40 00 04	00 00 01	00 - 7F	MASTER VOLUME	0 - 127	7F
40 00 05	00 00 01	28-58	MASTER KEY SHIFT	- 24 - +24 semitones	40
40 00 06	00 00 01	01 - 7F	MASTER PAN		40
40 00 7F	00 00 01	00, 7F	MODE SET (Rx Only)	00 = GS Reset 127 = Exit GS	

Refer to "System Exclusive Messages of Mode Change" Page ...

[PATCH PARAMETERS]

E-56 has 16 parts. The parameters of each part are called PATCH PARAMETERS. To send or request a PATCH PARAMETER, use not the part number (which is usually same as the MIDI channel number) but the BLOCK NUMBER in the message.

*x...BLOCK NUMBER (0 - F),

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

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

Address(H)	SIZE(H)	Data(H)	Parameter	Description	Default value (H)
40 01 00 40 01 :# 40 01 0F#	00 00 10	20-7F	PATCH NAME	16 ASCII Characters	
40 01 10	00 00 10	00 - 18	VOICE RESERVE	PART 10 (Drum Part)	04
40 01 11#				PART 1	06
40 01 12#				PART 2	04
40 01 13#				PART 3	00
40 01 14#				PART 4	00
40 01 15#				PART 5	00
40 01 16#				PART 6	00
40 01 17#				PART 7	00
40 01 18#				PART 8	00
40 01 19#				PART 9	00
40 01 1A#				PART 11	02
40 01 1B#				PART 12	04
40 01 1C#				PART 13	04
40 01 1D#				PART 14	04
40 01 :#				:	
40 01 1F#				PART 16	00

The sum total of voices in the voice reserve function must be equal or less than the number of the maximum polyphony. The number of the maximum polyphony of E-56 is 28.
For the compatibility to other GS models, it is recommended to be equal or less than 24.

40 01 30	00 00 01	00 - 07	REVERB MACRO	00:Room 1 01: Room 2 02: Room 3 03: Hall 1 04: Hall 2 05: Plate 06: Delay 07: Panning Delay	04
40 01 31	00 00 01	00 - 07	REVERB CHARACTER		04
40 01 32	00 00 01	00 - 07	REVERB PRE-LPF		00
40 01 33	00 00 01	00 - 7F	REVERB LEVEL		40
40 01 34	00 00 01	00 - 7F	REVERB TIME		40
40 01 35	00 00 01	00 - 7F	REVERB DELAY FEEDBACK		00
40 01 36	00 00 01	00 - 7F	REVERB SEND LEVEL TO CHORUS		00

REVERB MACRO is a parameter used to select the preset type of the effect. When set to another REVERB MACRO, all other reverb parameters will reset to the values set for each type of REVERB MACRO.

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
40 01 39	00 00 01	00 - 07	CHORUS PRE-LPF		00
40 01 3A	00 00 01	00 - 7F	CHORUS LEVEL		40
40 01 3B	00 00 01	00 - 7F	CHORUS FEEDBACK		08
40 01 3C	00 00 01	00 - 7F	CHORUS DELAY		50
40 01 3D	00 00 01	00 - 7F	CHORUS RATE		03
40 01 3E	00 00 01	00 - 7F	CHORUS DEPTH		13
40 01 3F	00 00 01	00 - 7F	CHORUS SEND LEVEL TO REVERB		00

CHORUS MACRO is a parameter used to select the preset type of effect. When set to another CHORUS MACRO, then all other chorus parameters will reset to the values set for each type of CHORUS MACRO.

40 1x 00	00 00 02	00 - 7F	TONE NUMBER	CC#00 VALUE	00
40 1x 01#		00 - 7F	P.C. VALUE		00
40 1x 02	00 00 01	00 - 10	Rx. CHANNEL	1 - 16,OFF	same as the Part#
40 1x 03	00 00 01	00 - 01	Rx. PITCH BEND	OFF / ON	01
40 1x 04	00 00 01	00 - 01	Rx. CH PRESSURE(CAf)	OFF / ON	01
40 1x 05	00 00 01	00 - 01	Rx. PROGRAM CHANGE	OFF / ON	01
40 1x 06	00 00 01	00 - 01	Rx. CONTROL CHANGE	OFF / ON	01
40 1x 07	00 00 01	00 - 01	Rx. POLY PRESSURE(PAf)	OFF / ON	01
40 1x 08	00 00 01	00 - 01	Rx. NOTE MESSAGE	OFF / ON	01
40 1x 09	00 00 01	00 - 01	Rx. RPN	OFF / ON	01
40 1x 0A	00 00 01	00 - 01	Rx. NRPN	OFF / ON	00(01*)

* Rx. NRPN is set to ON by "GS RESET" .

40 1x 0B	00 00 01	00 - 01	Rx. MODULATION	OFF / ON	01
40 1x 0C	00 00 01	00 - 01	Rx. VOLUME	OFF / ON	01
40 1x 0D	00 00 01	00 - 01	Rx. PANPOT	OFF / ON	01
40 1x 0E	00 00 01	00 - 01	Rx. EXPRESSION	OFF / ON	01
40 1x 0F	00 00 01	00 - 01	Rx. HOLD1	OFF / ON	01
40 1x 10	00 00 01	00 - 01	Rx. PORTAMENTO	OFF / ON	01
40 1x 11	00 00 01	00 - 01	Rx. SOSTENUTO	OFF / ON	01
40 1x 12	00 00 01	00 - 01	Rx. SOFT	OFF / ON	01
40 1x 13	00 00 01	00 - 01	MONO/POLY MODE	Mono / Poly (=Bn 7E 01 / Bn 7F 00)	01
40 1x 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE 1 =LIMITED-MULTI 2 = FULL-MULTI	00 at x=0 01 at x%0

ASSIGN MODE is a parameter used to select the voice assign manner when "multiple Note Ons" occur(the same note number on the same channel at the same time).
The best assign modes (SINGLE(0) for Drum part and LIMITED-MULTI(1) for the other parts) are selected automatically, so you don't need reset this parameter.

40 1x 15	00 00 01	00 - 02	USE FOR RHYTHM PART	0 = OFF 1 = MAP1 2 = MAP2	00 at x%0 01 at x=0

USE FOR RHYTHM PART is a parameter to define the part to be used as an ordinary part (0), as a drum part using DRUM MAP1(1),
or a drum part using DRUM MAP2(2). The default is MAP1(1) for Part10 (MIDI CH-10,x=0), and all other parts are set to ordinary parts(OFF(0)).

40 1x 16	00 00 01	28 - 58	PITCH KEY SHIFT	-24 - +24 [semitone]	40
40 1x 17 40 1x 18#	00 00 02	08 - F8	PITCH OFFSET FINE	-12.0 - +12.0 [Hz]08 Use nibblized data.	00
40 1x 19	00 00 01	00 - 7F	PART LEVEL	0 - 127 (=Bn 07 vv)	64
40 1x 1A	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40
40 1x 1B	00 00 01	00 - 7F	VELOCITY SENSE OFFSET	0 - 127	40
40 1x 1C	00 00 01	00 - 7F	PART PANPOT	Random, -63(LEFT) - +63(RIGHT) (=Bn 0A vv, except random)	40
40 1x 1D	00 00 01	00 - 7F	KEY RANGE LOW	C-1 - G9	00
40 1x 1E	00 00 01	00 - 7F	KEY RANGE HIGH	C-1 - G9	7F
40 1x 1F	00 00 01	00 - 5F	CC1 CONTROLLER NUMBER	0 - 95	10
40 1x 20	00 00 01	00 - 5F	CC2 CONTROLLER NUMBER	0 - 95	11
40 1x 21	00 00 01	00 - 7F	CHORUS SEND LEVEL	0 - 127 (=Bn 5D vv)	00
40 1x 22	00 00 01	00 - 7F	REVERB SEND LEVEL	0 - 127 (=Bn 5B vv)	28
40 1x 23	00 00 01	00 - 01	Rx. Bank Select	OFF / ON	01

Rx. Bank Select is set to ON by power-on reset or by "GS RESET".

40 1x 30	00 00 01	0E - 72	TONE MODIFY 1 Vibrato rate	-50 - +50 (=Bn 63 01 62 08 06 vv)	40
40 1x 31	00 00 01	0E - 72	TONE MODIFY 2 Vibrato depth	-50 - +50 (=Bn 63 01 62 09 06 vv)	40
40 1x 32	00 00 01	0E - 72	TONE MODIFY 3 TVF cutoff freq.	-50 - +50 (=Bn 63 01 62 20 06 vv)	40
40 1x 33	00 00 01	0E - 72	TONE MODIFY 4 TVF resonance	-50 - +50 (=Bn 63 01 62 21 06 vv)	40
40 1x 34	00 00 01	0E - 72	TONE MODIFY 5 TVF&TVA Env.attack	-50 - +50 (=Bn 63 01 62 63 06 vv)	40
40 1x 35	00 00 01	0E - 72	TONE MODIFY 6 TVF&TVA Env.decay	-50 - +50 (=Bn 63 01 62 64 06 vv)	40
40 1x 36	00 00 01	0E - 72	TONE MODIFY 7 TVF&TVA Env.release	-50 - +50 (=Bn 63 01 62 66 06 vv)	40
40 1x 37	00 00 01	0E - 72	TONE MODIFY 8 Vibrato delay	-50 - +50 (=Bn 63 01 62 0A 06 vv)	40

40 1x 40	00 00 0C	00 - 7F	SCALE TUNING C	-64 - +63 [cent]	40
40 1x 41#		00 - 7F	SCALE TUNING C#	-64 - +63 [cent]	40
40 1x 42#		00 - 7F	SCALE TUNING D	-64 - +63 [cent]	40
40 1x 43#		00 - 7F	SCALE TUNING D#	-64 - +63 [cent]	40
40 1x 44#		00 - 7F	SCALE TUNING E	-64 - +63 [cent]	40
40 1x 45#		00 - 7F	SCALE TUNING F	-64 - +63 [cent]	40
40 1x 46#		00 - 7F	SCALE TUNING F#	-64 - +63 [cent]	40
40 1x 47#		00 - 7F	SCALE TUNING G	-64 - +63 [cent]	40
40 1x 48#		00 - 7F	SCALE TUNING G#	-64 - +63 [cent]	40
40 1x 49#		00 - 7F	SCALE TUNING A	-64 - +63 [cent]	40
40 1x 4A#		00 - 7F	SCALE TUNING A#	-64 - +63 [cent]	40
40 1x 4B#		00 - 7F	SCALE TUNING B	-64 - +63 [cent]	40

40 2x 00	00 00 01	28 - 58	MOD PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 01	00 00 01	00 - 7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
40 2x 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40
40 2x 03	00 00 01	00 - 7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 04	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 [cent]	0A
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 - 100.0 [%]	00
40 2x 07	00 00 01	00 - 7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 08	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 [cent]	00
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 - 100.0 [%]	00
40 2x 10	00 00 01	40 - 58	BEND PITCH CONTROL	0 - 24 [semitone]	42
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 [%]	40
40 2x 13	00 00 01	00 - 7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 14	00 00 01	00 - 7F	BEND LFO1 PITCH DEPTH	0 - 600 [cent]	00
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 [%]	00
40 2x 17	00 00 01	00 - 7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 18	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 [cent]	00
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 [%]	00
40 2x 20	00 00 01	28 - 58	CAf PITCH CONTROL	-24 - +24 [semitone]	40
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 [%]	40
40 2x 23	00 00 01	00 - 7F	CAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 24	00 00 01	00 - 7F	CAf LFO1 PITCH DEPTH	0 - 600 [cent]	00
40 2x 25	00 00 01	00 - 7F	CAf LFO1 TVF DEPTH	0 - 2400 [cent]	00
40 2x 26	00 00 01	00 - 7F	CAf LFO1 TVA DEPTH	0 - 100.0 [%]	00
40 2x 27	00 00 01	00 - 7F	CAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 28	00 00 01	00 - 7F	CAf LFO2 PITCH DEPTH	0 - 600 [cent]	00
40 2x 29	00 00 01	00 - 7F	CAf LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 2A	00 00 01	00 - 7F	CAf LFO2 TVA DEPTH	0 - 100.0 [%]	00
40 2x 30	00 00 01	28 - 58	PAf PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 31	00 00 01	00 - 7F	PAf TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
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	-10.0 - +10.0 [Hz]	40
40 2x 34	00 00 01	00 - 7F	PAf LFO1 PITCH DEPTH	0 - 600 [cent]	00
40 2x 35	00 00 01	00 - 7F	PAf LFO1 TVF DEPTH	0 - 2400 [cent]	00
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]	40
40 2x 38	00 00 01	00 - 7F	PAf LFO2 PITCH DEPTH	0 - 600 [cent]	00
40 2x 39	00 00 01	00 - 7F	PAf LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 3A	00 00 01	00 - 7F	PAf LFO2 TVA DEPTH	0 - 100.0 [%]	00
40 2x 40	00 00 01	28 - 58	CC1 PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 41	00 00 01	00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
40 2x 42	00 00 01	00 - 7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40
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	0 - 600 [cent]	00
40 2x 45	00 00 01	00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 [cent]	00
40 2x 46	00 00 01	00 - 7F	CC1 LFO1 TVA DEPTH	0 - 100.0 [%]	00
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 - 600 [cent]	00
40 2x 49	00 00 01	00 - 7F	CC1 LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 4A	00 00 01	00 - 7F	CC1 LFO2 TVA DEPTH	0 - 100.0 [%]	00
40 2x 50	00 00 01	28 - 58	CC2 PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 51	00 00 01	00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
40 2x 52	00 00 01	00 - 7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40
40 2x 53	00 00 01	00 - 7F	CC2 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 54	00 00 01	00 - 7F	CC2 LFO1 PITCH DEPTH	0 - 600 [cent]	00
40 2x 55	00 00 01	00 - 7F	CC2 LFO1 TVF DEPTH	0 - 2400 [cent]	00
40 2x 56	00 00 01	00 - 7F	CC2 LFO1 TVA DEPTH	0 - 100.0 [%]	00
40 2x 57	00 00 01	00 - 7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 58	00 00 01	00 - 7F	CC2 LFO2 PITCH DEPTH	0 - 600 [cent]	00
40 2x 59	00 00 01	00 - 7F	CC2 LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 [%]	00

DRUM SETUP PARAMETERS

*m:Map number (0 = MAP1, 1 = MAP2)
*rr:drum part note number (00H - 7FH)

Address(H)	*SIZE(H)*	*Data(H)*	*Parameter*	*Description*
41 m0 00 : 41 m0 0B#	00 00 0C	20 - 7F	DRUM MAP NAME	ASCII Character
41 m1 rr	00 00 01	00 - 7F	PLAY NOTE NUMBER	Pitch coarse
41 m2 rr	00 00 01	00 - 7F	LEVEL	TVA level (=Bn 63 1A 62 rr 06 vv)
41 m3 rr	00 00 01	00 - 7F	ASSIGN GROUP NUMBER	Non, 1 - 127
41 m4 rr	00 00 01	00 - 7F	PANPOT	Random, -63(LEFT) - +63(RIGHT) (=Bn 63 1C 62 rr 06 vv)
41 m5 rr	00 00 01	00 - 7F	REVERB SEND LEVEL	0.0 - 1.0 Multiplicand of the part reverb depth (=Bn 63 1D 62 rr 06 vv)
41 m6 rr	00 00 01	00 - 7F	CHORUS SEND LEVEL	0.0 - 1.0 Multiplicand of the part chorus depth (=Bn 63 1E 62 rr 06 vv)
41 m7 rr	00 00 01	00 - 01	Rx. NOTE OFF	OFF / ON
41 m8 rr	00 00 01	00 - 01	Rx. NOTE ON	OFF / ON

When you change Drum Sets, all values of the DRUM SETUP PARAMETERS will be initialized.

Bulk Dump

You can send or request bulk data which contains a large amount of parameter data by using Bulk Dump communication.
It is used for storing bulk data in a sequencer or a computer. To send or request bulk data, use the Address and Size indicated in the following map.
You cannot use any address having "#" for the top address in a System Exclusive message except the following case.
Messages which include large data (more than 128 bytes) are sent out in separate packets, then, the top address of the following messages may be the address marked "#".
To send several packets of large DT1 messages at a time, insert intervals of at least 40ms in between those packets.

All Parameters (System Parameters and all Patch Parameters)

Address(H)	*SIZE(H)*	*Description*	*Number of packets*
48 00 00 : 48 1D 0F#	00 1D 10	ALL	30 packets

System Parameters

Address(H)	SIZE(H)	Description	Number of packets
48 00 00 : # 48 00 0F#	00 00 10	SYSTEM PARAMETERS	1 packet

Patch Parameters

Address(H)	SIZE(H)	Description	Number of packets
48 00 10 : # 48 01 0F#	00 01 00	PATCH COMMON	1 packet
48 01 10 : # 48 02 6F#	00 01 60	BLOCK 0	2 packets
48 02 70 : # 48 04 4F#	00 01 60	BLOCK 1	2 packets
48 04 50 : # 48 06 2F#	00 01 60	BLOCK 2	2 packets
48 06 30 : # 48 08 0F#	00 01 60	BLOCK 3	2 packets
48 08 10 : # 48 09 6F#	00 01 60	BLOCK 4	2 packets
48 09 70 : # 48 0B 4F#	00 01 60	BLOCK 5	2 packets
48 0B 50 : # 48 0D 2F#	00 01 60	BLOCK 6	2 packets
48 0D 30 : # 48 0F 0F#	00 01 60	BLOCK 7	2 packets
48 0F 10 : # 48 10 6F#	00 01 60	BLOCK 8	2 packets
48 10 70 : # 48 12 4F#	00 01 60	BLOCK 9	2 packets
48 12 50 : # 48 14 2F#	00 01 60	BLOCK A	2 packets
48 14 30 : # 48 16 0F#	00 01 60	BLOCK B	2 packets
48 16 10 : # 48 17 6F#	00 01 60	BLOCK C	2 packets
48 17 70 : # 48 19 4F#	00 01 60	BLOCK D	2 packets
48 19 50 : # 48 1B 2F#	00 01 60	BLOCK E	2 packets
48 1B 30 : # 48 1D 0F#	00 01 60	BLOCK F	2 packets

DRUM SETUP PARAMETERS

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

Address(H)	SIZE(H)	Description	Number of packets
49 m0 00 : 49 m1 7F	00 02 00	PLAY NOTE NUMBER	2 packets
49 m2 00 : 49 m3 7F	00 02 00	LEVEL	2 packets
49 m4 00 : 49 m5 7F	00 02 00	ASSIGN GROUP NUMBER	2 packets
49 m6 00 : 49 m7 7F	00 02 00	PANPOT	2 packets
49 m8 00 : 49 m9 7F	00 02 00	REVERB SEND LEVEL	2 packets
49 mA 00 : 49 mB 7F	00 02 00	CHORUS SEND LEVEL	2 packets
49 mC 00 : 49 mD 7F	00 02 00	Rx. NOTE ON/OFF	2 packets
49 mE 00 : 49 mE 17	00 00 18	DRUM MAP NAME	1 packet

3.2 Parameter address map (Model ID=5BH)

The address and size are described whith 7-bit hexadecimal.

Address	MSB		LSB
Binary	0aaa aaaa	0bbb bbbb	0ccc cccc@
Hexadecimal	AA	BB	CC

Size	MSB		LSB
Binary	0sss ssss	0ttt tttt	0uuu uuuu@
Hexadecimal	SS	TT	UU

Address	Description	
00 7E 00	Global parameters	see table 3
00 60 3A	User program #11	see table 2
00 60 74	User program #12	see table 2
00 61 2E	User program #13	see table 2
00 61 68	User program #14	see table 2
00 62 22	User program #15	see table 2
00 62 5C	User program #16	see table 2
00 63 16	User program #17	see table 2
00 63 50	User program #18	see table 2
00 64 0A	User program #21	see table 2
00 64 44	User program #22	see table 2
00 64 7E	User program #23	see table 2
00 65 38	User program #24	see table 2
00 65 72	User program #25	see table 2
00 66 2C	User program #26	see table 2
00 66 66	User program #27	see table 2
00 67 20	User program #28	see table 2
00 67 5A	User program #31	see table 2
00 68 14	User program #32	see table 2
00 68 4E	User program #33	see table 2
00 69 08	User program #34	see table 2
00 69 42	User program #35	see table 2
00 69 7C	User program #36	see table 2
00 6A 36	User program #37	see table 2
00 6A 70	User program #38	see table 2
00 6B 2A	User program #41	see table 2
00 6B 64	User program #42	see table 2
00 6C 1E	User program #43	see table 2

00 6C 58	User program #44	see table 2
00 6D 12	User program #45	see table 2
00 6D 4C	User program #46	see table 2
00 6E 06	User program #47	see table 2
00 6E 40	User program #48	see table 2
00 6E 7A	User program #51	see table 2
00 6F 34	User program #52	see table 2
00 6F 6E	User program #53	see table 2
00 70 28	User program #54	see table 2
00 70 62	User program #55	see table 2
00 71 1C	User program #56	see table 2
00 71 56	User program #57	see table 2
00 72 10	User program #58	see table 2
00 72 4A	User program #61	see table 2
00 73 04	User program #62	see table 2
00 73 3E	User program #63	see table 2
00 73 78	User program #64	see table 2
00 74 32	User program #65	see table 2
00 74 6C	User program #66	see table 2
00 75 26	User program #67	see table 2
00 75 60	User program #68	see table 2
00 76 1A	User program #71	see table 2
00 76 54	User program #72	see table 2
00 77 0E	User program #73	see table 2
00 77 48	User program #74	see table 2
00 78 02	User program #75	see table 2
00 78 3C	User program #76	see table 2
00 78 76	User program #77	see table 2
00 79 30	User program #78	see table 2
00 79 6A	User program #81	see table 2
00 7A 24	User program #82	see table 2
00 7A 5E	User program #83	see table 2
00 7B 18	User program #84	see table 2
00 7B 52	User program #85	see table 2
00 7C 0C	User program #86	see table 2
00 7C 46	User program #87	see table 2
00 7D 00	User program #88	see table 2

01 40 00	Song1
02 40 00	Song2
03 40 00	Song3

21 40 00	Card page 1
22 00 00	Card page 2
22 40 00	Card page 3

21 3E 00 Global Parameters area + 'GM/GS' Global Parameter area (card)

00 7F 60 Chord Rx Data

40 00 7F Exit from 'GM/GS'mode and return to E-56 mode

NOTE: System exclusive data bytes must be sent/received as TWO NIBBLES:
Bit 7:0
Bit 6:0
Bit 5:0
Bit 4:0
Bit 3:data
Bit 2:data
Bit 1:data
Bit 0:data
LSB NIBBLE must be sent/received first

Global parameters area +'GM/GS' parameters internal area

System exclusive 'Data set' : F0 41 10 5B 12 00 7E 00 CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 00 7E 00 00 00 72 1C F7

User program area (Internal)

System exclusive 'Data set' : F0 41 10 5B 12 00 60 3A .... CHKSUM F7 User program #11
System exclusive 'Data request' : F0 41 10 5B 11 00 60 3A 00 00 3A 2C F7

System exclusive 'Data set' : F0 41 10 5B 12 00 60 74 .... CHKSUM F7 User program #12
System exclusive 'Data request' : F0 41 10 5B 11 00 60 74 00 00 3A 72 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 61 2E .... CHKSUM F7 User program #13
System exclusive 'Data request' : F0 41 10 5B 11 00 61 2E 00 00 3A 37 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 61 68 .... CHKSUM F7 User program #14
System exclusive 'Data request' : F0 41 10 5B 11 00 61 68 00 00 3A 7D F7

System exclusive 'Data set' : F0 41 10 5B 12 00 62 22 .... CHKSUM F7 User program #15
System exclusive 'Data request' : F0 41 10 5B 11 00 62 22 00 00 3A 42 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 62 5C .... CHKSUM F7 User program #16
System exclusive 'Data request' : F0 41 10 5B 11 00 62 5C 00 00 3A 08 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 63 16 .... CHKSUM F7 User program #17
System exclusive 'Data request' : F0 41 10 5B 11 00 63 16 00 00 3A 4D F7

System exclusive 'Data set' : F0 41 10 5B 12 00 63 50 .... CHKSUM F7 User program #18
System exclusive 'Data request' : F0 41 10 5B 11 00 63 50 00 00 3A 13 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 64 0A .... CHKSUM F7 User program #21
System exclusive 'Data request' : F0 41 10 5B 11 00 64 0A 00 00 3A 58 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 64 44 .... CHKSUM F7 User program #22
System exclusive 'Data request' : F0 41 10 5B 11 00 64 44 00 00 3A 1E F7

System exclusive 'Data set' : F0 41 10 5B 12 00 64 7E .... CHKSUM F7 User program #23
System exclusive 'Data request' : F0 41 10 5B 11 00 64 7E 00 00 3A 64 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 65 38 .... CHKSUM F7 User program #24
System exclusive 'Data request' : F0 41 10 5B 11 00 65 38 00 00 3A 29 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 65 72 .... CHKSUM F7 User program #25
System exclusive 'Data request' : F0 41 10 5B 11 00 65 72 00 00 3A 6F F7

System exclusive 'Data set' : F0 41 10 5B 12 00 66 2C .... CHKSUM F7 User program #26
System exclusive 'Data request' : F0 41 10 5B 11 00 66 2C 00 00 3A 34 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 66 66 .... CHKSUM F7 User program #27
System exclusive 'Data request' : F0 41 10 5B 11 00 66 66 00 00 3A 7A F7

System exclusive 'Data set' : F0 41 10 5B 12 00 67 20 .... CHKSUM F7 User program #28
System exclusive 'Data request' : F0 41 10 5B 11 00 67 20 00 00 3A 3F F7

System exclusive 'Data set' : F0 41 10 5B 12 00 67 5A .... CHKSUM F7 User program #31
System exclusive 'Data request' : F0 41 10 5B 11 00 67 5A 00 00 3A 05 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 68 14 .... CHKSUM F7 User program #32
System exclusive 'Data request' : F0 41 10 5B 11 00 68 14 00 00 3A 4A F7

System exclusive 'Data set' : F0 41 10 5B 12 00 68 4E .... CHKSUM F7 User program #33
System exclusive 'Data request' : F0 41 10 5B 11 00 68 4E 00 00 3A 10 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 69 08 .... CHKSUM F7 User program #34
System exclusive 'Data request' : F0 41 10 5B 11 00 69 08 00 00 3A 55 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 69 42 .... CHKSUM F7 User program #35
System exclusive 'Data request' : F0 41 10 5B 11 00 69 42 00 00 3A 1B F7

System exclusive 'Data set' : F0 41 10 5B 12 00 69 7C .... CHKSUM F7 User program #36
System exclusive 'Data request' : F0 41 10 5B 11 00 69 7C 00 00 3A 61 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6A 36 .... CHKSUM F7 User program #37
System exclusive 'Data request' : F0 41 10 5B 11 00 6A 36 00 00 3A 26 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6A 70 .... CHKSUM F7 User program #38
System exclusive 'Data request' : F0 41 10 5B 11 00 6A 70 00 00 3A 6C F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6B 2A .... CHKSUM F7 User program #41
System exclusive 'Data request' : F0 41 10 5B 11 00 6B 2A 00 00 3A 31 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6B 64 .... CHKSUM F7 User program #42
System exclusive 'Data request' : F0 41 10 5B 11 00 6B 64 00 00 3A 77 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6C 1E .... CHKSUM F7 User program #43
System exclusive 'Data request' : F0 41 10 5B 11 00 6C 1E 00 00 3A 3C F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6C 58 .... CHKSUM F7 User program #44
System exclusive 'Data request' : F0 41 10 5B 11 00 6C 58 00 00 3A 02 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6D 12 .... CHKSUM F7 User program #45
System exclusive 'Data request' : F0 41 10 5B 11 00 6D 12 00 00 3A 47 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6D 4C .... CHKSUM F7 User program #46
System exclusive 'Data request' : F0 41 10 5B 11 00 6D 4C 00 00 3A 0D F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6E 06 .... CHKSUM F7 User program #47
System exclusive 'Data request' : F0 41 10 5B 11 00 6E 06 00 00 3A 52 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6E 40 .... CHKSUM F7 User program #48
System exclusive 'Data request' : F0 41 10 5B 11 00 6E 40 00 00 3A 18 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6E 7A .... CHKSUM F7 User program #51
System exclusive 'Data request' : F0 41 10 5B 11 00 6E 7A 00 00 3A 5E F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6F 34 .... CHKSUM F7 User program #52
System exclusive 'Data request' : F0 41 10 5B 11 00 6F 34 00 00 3A 23 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 6F 6E .... CHKSUM F7 User program #53
System exclusive 'Data request' : F0 41 10 5B 11 00 6F 6E 00 00 3A 69 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 70 28 .... CHKSUM F7 User program #54
System exclusive 'Data request' : F0 41 10 5B 11 00 70 28 00 00 3A 2E F7

System exclusive 'Data set' : F0 41 10 5B 12 00 70 62 .... CHKSUM F7 User program #55
System exclusive 'Data request' : F0 41 10 5B 11 00 70 62 00 00 3A 74 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 71 1C .... CHKSUM F7 User program #56
System exclusive 'Data request' : F0 41 10 5B 11 00 71 1C 00 00 3A 39 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 71 56 .... CHKSUM F7 User program #57
System exclusive 'Data request' : F0 41 10 5B 11 00 71 56 00 00 3A 7F F7

System exclusive 'Data set' : F0 41 10 5B 12 00 72 10 .... CHKSUM F7 User program #58
System exclusive 'Data request' : F0 41 10 5B 11 00 72 10 00 00 3A 44 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 72 4A .... CHKSUM F7 User program #61
System exclusive 'Data request' : F0 41 10 5B 11 00 72 4A 00 00 3A 0A F7

System exclusive 'Data set' : F0 41 10 5B 12 00 73 04 .... CHKSUM F7 User program #62
System exclusive 'Data request' : F0 41 10 5B 11 00 73 04 00 00 3A 4F F7

System exclusive 'Data set' : F0 41 10 5B 12 00 73 3E .... CHKSUM F7 User program #63
System exclusive 'Data request' : F0 41 10 5B 11 00 73 3E 00 00 3A 15 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 73 78 .... CHKSUM F7 User program #64
System exclusive 'Data request' : F0 41 10 5B 11 00 73 78 00 00 3A 5B F7

System exclusive 'Data set' : F0 41 10 5B 12 00 74 32 .... CHKSUM F7 User program #65
System exclusive 'Data request' : F0 41 10 5B 11 00 74 32 00 00 3A 20 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 74 6C .... CHKSUM F7 User program #66
System exclusive 'Data request' : F0 41 10 5B 11 00 74 6C 00 00 3A 66 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 75 26 .... CHKSUM F7 User program #67
System exclusive 'Data request' : F0 41 10 5B 11 00 75 26 00 00 3A 2B F7

System exclusive 'Data set' : F0 41 10 5B 12 00 75 60 .... CHKSUM F7 User program #68
System exclusive 'Data request' : F0 41 10 5B 11 00 75 60 00 00 3A 71 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 76 1A .... CHKSUM F7 User program #71
System exclusive 'Data request' : F0 41 10 5B 11 00 76 1A 00 00 3A 36 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 76 54 .... CHKSUM F7 User program #72
System exclusive 'Data request' : F0 41 10 5B 11 00 76 54 00 00 3A 7C F7

System exclusive 'Data set' : F0 41 10 5B 12 00 77 0E .... CHKSUM F7 User program #73
System exclusive 'Data request' : F0 41 10 5B 11 00 77 0E 00 00 3A 41 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 77 48 .... CHKSUM F7 User program #74
System exclusive 'Data request' : F0 41 10 5B 11 00 77 48 00 00 3A 07 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 78 02 .... CHKSUM F7 User program #75
System exclusive 'Data request' : F0 41 10 5B 11 00 78 02 00 00 3A 4C F7

System exclusive 'Data set' : F0 41 10 5B 12 00 78 3C .... CHKSUM F7 User program #76
System exclusive 'Data request' : F0 41 10 5B 11 00 78 3C 00 00 3A 12 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 78 76 .... CHKSUM F7 User program #77
System exclusive 'Data request' : F0 41 10 5B 11 00 78 76 00 00 3A 58 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 79 30 .... CHKSUM F7 User program #78
System exclusive 'Data request' : F0 41 10 5B 11 00 79 30 00 00 3A 1D F7

System exclusive 'Data set' : F0 41 10 5B 12 00 79 6A .... CHKSUM F7 User program #81
System exclusive 'Data request' : F0 41 10 5B 11 00 79 6A 00 00 3A 63 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7A 24 .... CHKSUM F7 User program #82
System exclusive 'Data request' : F0 41 10 5B 11 00 7A 24 00 00 3A 28 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7A 5E .... CHKSUM F7 User program #83
System exclusive 'Data request' : F0 41 10 5B 11 00 7A 5E 00 00 3A 6E F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7B 18 .... CHKSUM F7 User program #84
System exclusive 'Data request' : F0 41 10 5B 11 00 7B 18 00 00 3A 33 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7B 52 .... CHKSUM F7 User program #85
System exclusive 'Data request' : F0 41 10 5B 11 00 7B 52 00 00 3A 79 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7C 0C .... CHKSUM F7 User program #86
System exclusive 'Data request' : F0 41 10 5B 11 00 7C 0C 00 00 3A 3E F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7C 46 .... CHKSUM F7 User program #87
System exclusive 'Data request' : F0 41 10 5B 11 00 7C 46 00 00 3A 04 F7

System exclusive 'Data set' : F0 41 10 5B 12 00 7D 00 .... CHKSUM F7 User program #88
System exclusive 'Data request' : F0 41 10 5B 11 00 7D 00 00 00 3A 49 F7

Composer area (Internal)

System exclusive 'Data set' : F0 41 10 5B 12 01 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 01 40 00 00 3F 78 08 F7

System exclusive 'Data set' : F0 41 10 5B 12 02 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 02 40 00 00 3F 78 07 F7

System exclusive 'Data set' : F0 41 10 5B 12 03 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 03 40 00 00 3F 78 06 F7

Card page 1

System exclusive 'Data set' : F0 41 10 5B 12 21 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 21 40 00 01 00 00 1E F7

Card page 2

System exclusive 'Data set' : F0 41 10 5B 12 22 00 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 22 00 00 01 00 00 5D F7

Card page 3

System exclusive 'Data set' : F0 41 10 5B 12 22 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 22 40 00 01 00 00 1D F7

Global parameter area + Global parameter GM (Card)

System exclusive 'Data set' : F0 41 10 5B 12 21 3E 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 21 3E 00 00 00 73 2E F7

User program area (Card)

System exclusive 'Data set' : F0 41 10 5B 12 21 20 00 .... CHKSUM F7 User program #11
System exclusive 'Data request' : F0 41 10 5B 11 21 20 00 00 00 3A 05 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 20 3A .... CHKSUM F7 User program #12
System exclusive 'Data request' : F0 41 10 5B 11 21 20 3A 00 00 3A 4B F7

System exclusive 'Data set' : F0 41 10 5B 12 21 20 74 .... CHKSUM F7 User program #13
System exclusive 'Data request' : F0 41 10 5B 11 21 20 74 00 00 3A 11 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 21 2E .... CHKSUM F7 User program #14
System exclusive 'Data request' : F0 41 10 5B 11 21 21 2E 00 00 3A 56 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 21 68 .... CHKSUM F7 User program #15
System exclusive 'Data request' : F0 41 10 5B 11 21 21 68 00 00 3A 1C F7

System exclusive 'Data set' : F0 41 10 5B 12 21 22 22 .... CHKSUM F7 User program #16
System exclusive 'Data request' : F0 41 10 5B 11 21 22 22 00 00 3A 61 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 22 5C .... CHKSUM F7 User program #17
System exclusive 'Data request' : F0 41 10 5B 11 21 22 5C 00 00 3A 27 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 23 16 .... CHKSUM F7 User program #18
System exclusive 'Data request' : F0 41 10 5B 11 21 23 16 00 00 3A 6C F7

System exclusive 'Data set' : F0 41 10 5B 12 21 23 50 .... CHKSUM F7 User program #21
System exclusive 'Data request' : F0 41 10 5B 11 21 23 50 00 00 3A 32 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 24 0A .... CHKSUM F7 User program #22
System exclusive 'Data request' : F0 41 10 5B 11 21 24 0A 00 00 3A 77 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 24 44 .... CHKSUM F7 User program #23
System exclusive 'Data request' : F0 41 10 5B 11 21 24 44 00 00 3A 3D F7

System exclusive 'Data set' : F0 41 10 5B 12 21 24 7E .... CHKSUM F7 User program #24
System exclusive 'Data request' : F0 41 10 5B 11 21 24 7E 00 00 3A 03 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 25 38 .... CHKSUM F7 User program #25
System exclusive 'Data request' : F0 41 10 5B 11 21 25 38 00 00 3A 48 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 25 72 .... CHKSUM F7 User program #26
System exclusive 'Data request' : F0 41 10 5B 11 21 25 72 00 00 3A 0E F7

System exclusive 'Data set' : F0 41 10 5B 12 21 26 2C .... CHKSUM F7 User program #27
System exclusive 'Data request' : F0 41 10 5B 11 21 26 2C 00 00 3A 53 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 26 66 .... CHKSUM F7 User program #28
System exclusive 'Data request' : F0 41 10 5B 11 21 26 66 00 00 3A 19 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 27 20 .... CHKSUM F7 User program #31
System exclusive 'Data request' : F0 41 10 5B 11 21 27 20 00 00 3A 5E F7

System exclusive 'Data set' : F0 41 10 5B 12 21 27 5A .... CHKSUM F7 User program #32
System exclusive 'Data request' : F0 41 10 5B 11 21 27 5A 00 00 3A 24 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 28 14 .... CHKSUM F7 User program #33
System exclusive 'Data request' : F0 41 10 5B 11 21 28 14 00 00 3A 69 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 28 4E .... CHKSUM F7 User program #34
System exclusive 'Data request' : F0 41 10 5B 11 21 28 4E 00 00 3A 2F F7

System exclusive 'Data set' : F0 41 10 5B 12 21 29 08 .... CHKSUM F7 User program #35
System exclusive 'Data request' : F0 41 10 5B 11 21 29 08 00 00 3A 74 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 29 42 .... CHKSUM F7 User program #36
System exclusive 'Data request' : F0 41 10 5B 11 21 29 42 00 00 3A 3A F7

System exclusive 'Data set' : F0 41 10 5B 12 21 29 7C .... CHKSUM F7 User program #37
System exclusive 'Data request' : F0 41 10 5B 11 21 29 7C 00 00 3A 00 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2A 36 .... CHKSUM F7 User program #38
System exclusive 'Data request' : F0 41 10 5B 11 21 2A 36 00 00 3A 45 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2A 70 .... CHKSUM F7 User program #41
System exclusive 'Data request' : F0 41 10 5B 11 21 2A 70 00 00 3A 0B F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2B 2A .... CHKSUM F7 User program #42
System exclusive 'Data request' : F0 41 10 5B 11 21 2B 2A 00 00 3A 50 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2B 64 .... CHKSUM F7 User program #43
System exclusive 'Data request' : F0 41 10 5B 11 21 2B 64 00 00 3A 16 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2C 1E .... CHKSUM F7 User program #44
System exclusive 'Data request' : F0 41 10 5B 11 21 2C 1E 00 00 3A 5B F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2C 58 .... CHKSUM F7 User program #45
System exclusive 'Data request' : F0 41 10 5B 11 21 2C 58 00 00 3A 21 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2D 12 .... CHKSUM F7 User program #46
System exclusive 'Data request' : F0 41 10 5B 11 21 2D 12 00 00 3A 66 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2D 4C .... CHKSUM F7 User program #47
System exclusive 'Data request' : F0 41 10 5B 11 21 2D 4C 00 00 3A 2C F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2E 06 .... CHKSUM F7 User program #48
System exclusive 'Data request' : F0 41 10 5B 11 21 2E 06 00 00 3A 71 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2E 40 .... CHKSUM F7 User program #51
System exclusive 'Data request' : F0 41 10 5B 11 21 2E 40 00 00 3A 37 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2E 7A .... CHKSUM F7 User program #52
System exclusive 'Data request' : F0 41 10 5B 11 21 2E 7A 00 00 3A 7D F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2F 34 .... CHKSUM F7 User program #53
System exclusive 'Data request' : F0 41 10 5B 11 21 2F 34 00 00 3A 42 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 2F 6E .... CHKSUM F7 User program #54
System exclusive 'Data request' : F0 41 10 5B 11 21 2F 6E 00 00 3A 08 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 30 28 .... CHKSUM F7 User program #55
System exclusive 'Data request' : F0 41 10 5B 11 21 30 28 00 00 3A 4D F7

System exclusive 'Data set' : F0 41 10 5B 12 21 30 62 .... CHKSUM F7 User program #56
System exclusive 'Data request' : F0 41 10 5B 11 21 30 62 00 00 3A 13 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 31 1C .... CHKSUM F7 User program #57
System exclusive 'Data request' : F0 41 10 5B 11 21 31 1C 00 00 3A 58 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 31 56 .... CHKSUM F7 User program #58
System exclusive 'Data request' : F0 41 10 5B 11 21 31 56 00 00 3A 1E F7

System exclusive 'Data set' : F0 41 10 5B 12 21 32 10 .... CHKSUM F7 User program #61
System exclusive 'Data request' : F0 41 10 5B 11 21 32 10 00 00 3A 63 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 32 4A .... CHKSUM F7 User program #62
System exclusive 'Data request' : F0 41 10 5B 11 21 32 4A 00 00 3A 29 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 33 04 .... CHKSUM F7 User program #63
System exclusive 'Data request' : F0 41 10 5B 11 21 33 04 00 00 3A 6E F7

System exclusive 'Data set' : F0 41 10 5B 12 21 33 3E .... CHKSUM F7 User program #64
System exclusive 'Data request' : F0 41 10 5B 11 21 33 3E 00 00 3A 34 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 33 78 .... CHKSUM F7 User program #65
System exclusive 'Data request' : F0 41 10 5B 11 21 33 78 00 00 3A 7A F7

System exclusive 'Data set' : F0 41 10 5B 12 21 34 32 .... CHKSUM F7 User program #66
System exclusive 'Data request' : F0 41 10 5B 11 21 34 32 00 00 3A 3F F7

System exclusive 'Data set' : F0 41 10 5B 12 21 34 6C .... CHKSUM F7 User program #67
System exclusive 'Data request' : F0 41 10 5B 11 21 34 6C 00 00 3A 05 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 35 26 .... CHKSUM F7 User program #68
System exclusive 'Data request' : F0 41 10 5B 11 21 35 26 00 00 3A 4A F7

System exclusive 'Data set' : F0 41 10 5B 12 21 35 60 .... CHKSUM F7 User program #71
System exclusive 'Data request' : F0 41 10 5B 11 21 35 60 00 00 3A 10 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 36 1A .... CHKSUM F7 User program #72
System exclusive 'Data request' : F0 41 10 5B 11 21 36 1A 00 00 3A 55 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 36 54 .... CHKSUM F7 User program #73
System exclusive 'Data request' : F0 41 10 5B 11 21 36 54 00 00 3A 1B F7

System exclusive 'Data set' : F0 41 10 5B 12 21 37 0E .... CHKSUM F7 User program #74
System exclusive 'Data request' : F0 41 10 5B 11 21 37 0E 00 00 3A 60 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 37 48 .... CHKSUM F7 User program #75
System exclusive 'Data request' : F0 41 10 5B 11 21 37 48 00 00 3A 26 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 38 02 .... CHKSUM F7 User program #76
System exclusive 'Data request' : F0 41 10 5B 11 21 38 02 00 00 3A 6B F7

System exclusive 'Data set' : F0 41 10 5B 12 21 38 3C .... CHKSUM F7 User program #77
System exclusive 'Data request' : F0 41 10 5B 11 21 38 3C 00 00 3A 31 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 38 76 .... CHKSUM F7 User program #78
System exclusive 'Data request' : F0 41 10 5B 11 21 38 76 00 00 3A 77 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 39 30 .... CHKSUM F7 User program #81
System exclusive 'Data request' : F0 41 10 5B 11 21 39 30 00 00 3A 3C F7

System exclusive 'Data set' : F0 41 10 5B 12 21 39 6A .... CHKSUM F7 User program #82
System exclusive 'Data request' : F0 41 10 5B 11 21 39 6A 00 00 3A 02 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 3A 24 .... CHKSUM F7 User program #83
System exclusive 'Data request' : F0 41 10 5B 11 21 3A 24 00 00 3A 47 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 3A 5E .... CHKSUM F7 User program #84
System exclusive 'Data request' : F0 41 10 5B 11 21 3A 5E 00 00 3A 0D F7

System exclusive 'Data set' : F0 41 10 5B 12 21 3B 18 .... CHKSUM F7 User program #85
System exclusive 'Data request' : F0 41 10 5B 11 21 3B 18 00 00 3A 52 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 3B 52 .... CHKSUM F7 User program #86
System exclusive 'Data request' : F0 41 10 5B 11 21 3B 52 00 00 3A 18 F7

System exclusive 'Data set' : F0 41 10 5B 12 21 3C 0C .... CHKSUM F7 User program #87
System exclusive 'Data request' : F0 41 10 5B 11 21 3C 0C 00 00 3A 5D F7

System exclusive 'Data set' : F0 41 10 5B 12 21 3C 46 .... CHKSUM F7 User program #88
System exclusive 'Data request' : F0 41 10 5B 11 21 3C 46 00 00 3A 23 F7

Composer1 data area (Card)

System exclusive 'Data set' : F0 41 10 5B 12 21 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 21 40 00 00 3F 78 68 F7

Composer2 data area (Card)

System exclusive 'Data set' : F0 41 10 5B 12 22 00 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 22 00 00 00 3F 78 27 F7

Composer3 data area (Card)

System exclusive 'Data set' : F0 41 10 5B 12 22 40 00 .... CHKSUM F7
System exclusive 'Data request' : F0 41 10 5B 11 22 40 00 00 3F 78 67 F7

Chord Rx data

System exclusive 'Data request' : F0 41 10 5B 11 00 7F 60 00 00 20 01 F7

System Exclusive chord information

F0 41 10 5B 12 00 7F 60 aa aa bb bb cc dd c1 c2 c3...cn CHKSUM F7

00 7F 60	Address
aa aa bb bb	Chord number in 'C' tonality
cc	First note to left
dd	Chord root
c1,c2,...cn	ASCII chord name

Exit from 'GM/GS' MODE and return to E-56 MODE
F0 41 10 5B 12 40 00 7F 00 41 F7

Table 1

*** Tone program change ***

A GM/GS tone is selected by the message: BnH 00H mmH BnH 20H iiH
CnH ppH

n=MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16

mmH	iiH	ppH	Sound Name
00H	00H	00H	Piano 1
00H	08H	00H	Piano 1w
00H	10H	00H	Piano 1d
*			
00H	00H	01H	Piano 2
00H	08H	00H	Piano 2w
*			
00H	00H	02H	Piano 3
00H	08H	00H	Piano 3w
*			
00H	00H	03H	Honky-tonk
00H	08H	00H	Honky-tonk w
*			
00H	00H	04H	E.Piano 1
00H	08H	00H	Detuned EP 1
00H	10H	00H	E.Piano 1 v
00H	18H	00H	60's E.Piano
*			
00H	00H	05H	E.Piano 2
00H	08H	00H	Detuned EP 2
00H	10H	00H	E.Piano 2v
*			
00H	00H	06H	Harpsichord
00H	08H	00H	Coupled Hps.
00H	10H	00H	Harpsi.w
00H	18H	00H	Harpsi.o
*			
00H	00H	07H	Clav.
*			
*			
00H	00H	08H	Celesta
*			
00H	00H	09H	Glockenspiel
*			
00H	00H	0AH	Music Box
*			
00H	00H	0BH	Vibraphone
00H	08H	00H	Vib.w
*			
00H	00H	0CH	Marimba
00H	08H	00H	Marimba w
*			
00H	00H	0DH	Xylophone
*			
00H	00H	0EH	Tubular-bell
00H	08H	00H	Church Bell
00H	09H	00H	Carillon
*			
00H	00H	0FH	Santur
*			
*			
00H	00H	10H	Organ 1
00H	08H	00H	Detuned Or.1
00H	10H	00H	60's Organ 1
00H	20H	00H	Organ 4
*			
00H	00H	11H	Organ 2
00H	08H	00H	Detuned Or.2
00H	20H	00H	Organ 5
*			
00H	00H	12H	Organ 3
*			
00H	00H	13H	Church Org.1
00H	08H	00H	Church Org.2
00H	10H	00H	Church Org.3
*			
00H	00H	14H	Reed Organ
*			
00H	00H	15H	Accordion Fr
00H	08H	00H	Accordion It
*			
00H	00H	16H	Harmonica
*			
00H	00H	17H	Bandoneon
*			
*			
00H	00H	18H	Nylon-str.Gt
00H	08H	00H	Ukulele
00H	10H	00H	Nylon Gt.o
00H	20H	00H	Nylon Gt.2
*			
00H	00H	19H	Steel-str.Gt
00H	08H	00H	12-str.Gt
00H	10H	00H	Mandolin
*			
00H	00H	1AH	Jazz Gt
00H	08H	00H	Hawaiian Gt
*			
00H	00H	1BH	Clean Gt.
00H	08H	00H	Chorus Gt.
*			
00H	00H	1CH	Muted Gt.
00H	08H	00H	Funk Gt.
00H	10H	00H	Funk Gt.2
*			
00H	00H	1DH	Overdrive Gt
*			
00H	00H	1EH	DistortionGt
00H	08H	00H	Feedback Gt.
*			
00H	00H	1FH	Gt.Harmonics
00H	08H	00H	Gt. Feedback
*			
*			
00H	00H	20H	Acoustic Bs.
*			
00H	00H	21H	Fingered Bs.
*			
00H	00H	22H	Picked Bs.
*			
00H	00H	23H	Fretless Bs.
*			
00H	00H	24H	Slap Bass 1
*			
00H	00H	25H	Slap Bass 2
*			
00H	00H	26H	Synth Bass 1
00H	01H	00H	SynthBass101
00H	08H	00H	Synth Bass 3
*			
00H	00H	27H	Synth Bass 2
00H	08H	00H	Synth Bass 4
00H	10H	00H	Rubber Bass
*			
*			
00H	00H	28H	Violin
00H	08H	00H	Slow Violin
*			
00H	00H	29H	Viola
*			
00H	00H	2AH	Cello
*			
00H	00H	2BH	Contrabass
*			
00H	00H	2CH	Tremolo Str

00H	00H	2DH	PizzicatoStr
00H	00H	2EH	Harp
00H	00H	2FH	Timpani
00H	00H	30H	Strings
00H	08H	00H	Orchestra
00H	00H	31H	Slow Strings
00H	00H	32H	Syn.Strings1
00H	08H	00H	Syn.Strings3
00H	00H	33H	Syn.Strings2
00H	00H	34H	Choir Aahs
00H	20H	00H	Choir Aahs 2
00H	00H	35H	Voice Oohs
00H	00H	36H	SynVox
00H	00H	37H	OrchestraHit
00H	00H	38H	Trumpet
00H	00H	39H	Trombone
00H	01H	00H	Trombone 2
00H	00H	3AH	Tuba
00H	00H	3BH	MutedTrumpet
00H	00H	3CH	French Horn
00H	01H	00H	French Horn2
00H	00H	3DH	Brass 1
00H	08H	00H	Brass 2
00H	00H	3EH	Synth Brass1
00H	08H	00H	Synth Brass3
00H	10H	00H	AnalogBrass1
00H	00H	3FH	Synth Brass2
00H	08H	00H	Synth Brass4
00H	10H	00H	AnalogBrass2
00H	00H	40H	Soprano Sax
00H	00H	41H	Alto Sax
00H	00H	42H	Tenor Sax
00H	00H	43H	Baritone Sax
00H	00H	44H	Oboe
00H	00H	45H	English Horn
00H	00H	46H	Bassoon
00H	00H	47H	Clarinet
00H	00H	48H	Piccolo
00H	00H	49H	Flute
00H	00H	4AH	Recorder
00H	00H	4BH	Pan Flute
00H	00H	4CH	Bottle Blow
00H	00H	4DH	Shakuhachi
00H	00H	4EH	Whistle
00H	00H	4FH	Ocarina
00H	00H	50H	Square Wave
00H	01H	00H	Square
00H	08H	00H	Sine Wave
00H	00H	51H	Saw Wave
00H	01H	00H	Saw
00H	08H	00H	Doctor Solo
00H	00H	52H	Syn.Calliope
00H	00H	53H	Chiffer Lead
00H	00H	54H	Charang
00H	00H	55H	Solo Vox
00H	00H	56H	5th Saw Wave
00H	00H	57H	Bass & Lead
00H	00H	58H	Fantasia
00H	00H	59H	Warm Pad
00H	00H	5AH	Polysynth
00H	00H	5BH	Space Voice
00H	00H	5CH	Bowed Glass
00H	00H	5DH	Metal Pad
00H	00H	5EH	Halo Pad
00H	00H	5FH	Sweep Pad
00H	00H	60H	Ice Rain
00H	00H	61H	Soundtrack
00H	00H	62H	Crystal
00H	01H	00H	Syn Mallet
00H	00H	63H	Atmosphere
00H	00H	64H	Brightness
00H	00H	65H	Goblin
00H	00H	66H	Echo Drops
00H	01H	00H	Echo Bell
00H	02H	00H	Echo Pan
00H	00H	67H	Star Theme
00H	00H	68H	Sitar
00H	01H	00H	Sitar 2
00H	00H	69H	Banjo
00H	00H	6AH	Shamisen
00H	00H	6BH	Koto
00H	08H	00H	Taisho Koto
00H	00H	6CH	Kalimba
00H	00H	6DH	Bag Pipe
00H	00H	6EH	Fiddle
00H	00H	6FH	Shanai
00H	00H	70H	Tinkle Bell
00H	00H	71H	Agogo
00H	00H	72H	Steel Drums
00H	00H	73H	Woodblock

00H	08H	00H	Castanets
*			
00H	00H	74H	Taiko
00H	08H	00H	Concert BD
*			
00H	00H	75H	Melo. Tom 1
00H	08H	00H	Melo. Tom 2
*			
00H	00H	76H	Synth Drum
00H	08H	00H	808 Tom
00H	09H	00H	Elec Perc
*			
00H	00H	77H	Reverse Cym.
*			
*			
00H	00H	78H	Gt.FretNoise
00H	01H	00H	Gt.Cut Noise
00H	02H	00H	String Slap
*			
00H	00H	79H	Breath Noise
00H	01H	00H	Fl.Key Click
*			
00H	00H	7AH	Seashore
00H	01H	00H	Rain
00H	02H	00H	Thunder
00H	03H	00H	Wind
00H	04H	00H	Stream
00H	05H	00H	Bubble
*			
00H	00H	7BH	Bird
00H	01H	00H	Dog
00H	02H	00H	Horse-Gallop
00H	08H	00H	Bird 2
*			
00H	00H	7CH	Telephone 1
00H	01H	00H	Telephone 2
00H	02H	00H	DoorCreaking
00H	03H	00H	Door
00H	04H	00H	Scratch
00H	05H	00H	Windchime
*			
00H	00H	7DH	Helicopter
00H	01H	00H	Car-Engine
00H	02H	00H	Car-Stop
00H	03H	00H	Car-Pass
00H	04H	00H	Car-Crash
00H	05H	00H	Siren
00H	06H	00H	Train
00H	07H	00H	Jetplane
00H	08H	00H	Starship
00H	09H	00H	Burst Noise
*			
00H	00H	7EH	Applause
00H	01H	00H	Laughing
00H	02H	00H	Screaming
00H	03H	00H	Punch
00H	04H	00H	Heart Beat
00H	05H	00H	Footsteps
*			
00H	00H	7FH	Gun Shot
00H	01H	00H	Machine Gun
00H	02H	00H	Lasergun
00H	03H	00H	Explosion

*** Drum set program change ***

A Drum set is selected by the message : BnH 00H mmH BnH 20H iiH CnH ppH

n=MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16

mmH	iiH	ppH	Set name
00H	00H	00H	Dry Set
00H	00H	08H	Room Set
00H	00H	10H	Power Set
00H	00H	18H	Elec Set
00H	00H	19H	808 Set
00H	00H	20H	Jazz Set
00H	00H	28H	Brush Set
00H	00H	30H	Orch. Set
00H	00H	38H	Sfx

*** User program change ***

An User Program is selected by the message : BnH 00H mmH BnH 20H iiH CnH ppH

n=MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16

mmH	iiH	ppH	Description	
00H	00H	00H	User program	#11
00H	00H	01H	User program	#12
00H	00H	02H	User program	#13
00H	00H	03H	User program	#14
00H	00H	04H	User program	#15
00H	00H	05H	User program	#16
00H	00H	06H	User program	#17
00H	00H	07H	User program	#18
00H	00H	08H	User program	#21
00H	00H	09H	User program	#22
00H	00H	0AH	User program	#23
00H	00H	0BH	User program	#24
00H	00H	0CH	User program	#25
00H	00H	0DH	User program	#26
00H	00H	0EH	User program	#27
00H	00H	0FH	User program	#28
00H	00H	10H	User program	#31
00H	00H	11H	User program	#32
00H	00H	12H	User program	#33
00H	00H	13H	User program	#34
00H	00H	14H	User program	#35
00H	00H	15H	User program	#36
00H	00H	16H	User program	#37
00H	00H	17H	User program	#38
00H	00H	18H	User program	#41
00H	00H	19H	User program	#42
00H	00H	1AH	User program	#43
00H	00H	1BH	User program	#44
00H	00H	1CH	User program	#45
00H	00H	1DH	User program	#46
00H	00H	1EH	User program	#47
00H	00H	1FH	User program	#48
00H	00H	20H	User program	#51
00H	00H	21H	User program	#52
00H	00H	22H	User program	#53
00H	00H	23H	User program	#54
00H	00H	24H	User program	#55
00H	00H	25H	User program	#56
00H	00H	26H	User program	#57
00H	00H	27H	User program	#58
00H	00H	28H	User program	#61
00H	00H	29H	User program	#62
00H	00H	2AH	User program	#63
00H	00H	2BH	User program	#64
00H	00H	2CH	User program	#65
00H	00H	2DH	User program	#66
00H	00H	2EH	User program	#67
00H	00H	2FH	User program	#68
00H	00H	30H	User program	#71
00H	00H	31H	User program	#72
00H	00H	32H	User program	#73
00H	00H	33H	User program	#74
00H	00H	34H	User program	#75
00H	00H	35H	User program	#76
00H	00H	36H	User program	#77
00H	00H	37H	User program	#78
00H	00H	38H	User program	#81
00H	00H	39H	User program	#82
00H	00H	3AH	User program	#83
00H	00H	3BH	User program	#84
00H	00H	3CH	User program	#85
00H	00H	3DH	User program	#86
00H	00H	3EH	User program	#87
00H	00H	3FH	User program	#88
00H	00H	40H	User Program	#00

*** Style Program Change ***

A Style is selected by the message: BnH 00H mmH BnH 20H iiH CnH ppH

n=MIDI channel number: 0H-FH (0-15) 0=ch. 1 15=ch.16

mmH	iiH	ppH	Description	
01H	05H	ppH	Style #11	Rock1
01H	06H	ppH	Style #12	Rock2
21H	01H	ppH	Style #13	Rap
02H	03H	ppH	Style #14	House
02H	04H	ppH	Style #15	Dance
03H	03H	ppH	Style #16	Funk1
03H	04H	ppH	Style #17	Funk2
1CH	01H	ppH	Style #18	Fusion
06H	03H	ppH	Style #21	8beat1
06H	04H	ppH	Style #22	8beat2
06H	05H	ppH	Style #23	8beat3
06H	06H	ppH	Style #24	8beat4
07H	04H	ppH	Style #25	16beat1
07H	05H	ppH	Style #26	16beat2
07H	06H	ppH	Style #27	16beat3
07H	07H	ppH	Style #28	16beat4
09H	02H	ppH	Style #31	Boogie
0AH	03H	ppH	Style #32	Rock'n
0AH	04H	ppH	Style #33	Twist
0BH	02H	ppH	Style #34	Charlest
05H	03H	ppH	Style #35	Sl rock1
05H	04H	ppH	Style #36	Sl rock2
04H	03H	ppH	Style #37	Ballad1
04H	04H	ppH	Style #38	Ballad2
0DH	01H	ppH	Style #41	Sl swing1
0DH	02H	ppH	Style #42	Sl swing2
0CH	02H	ppH	Style #43	Swing
22H	01H	ppH	Style #44	Foxtrot
0EH	01H	ppH	Style #45	Big band
0FH	02H	ppH	Style #46	Shuffle
11H	06H	ppH	Style #47	Sw waltz
0BH	01H	ppH	Style #48	Dixie
16H	03H	ppH	Style #51	Bossa
1BH	03H	ppH	Style #52	Samba
16H	04H	ppH	Style #53	Latin
19H	01H	ppH	Style #54	Salsa
18H	01H	ppH	Style #55	Chacha
17H	01H	ppH	Style #56	Rhumba
26H	01H	ppH	Style #57	Mambo
1AH	02H	ppH	Style #58	Tango
12H	02H	ppH	Style #61	Sl waltz
11H	05H	ppH	Style #62	Waltz
14H	02H	ppH	Style #63	March
13H	03H	ppH	Style #64	Polka
15H	01H	ppH	Style #65	Baroque
10H	02H	ppH	Style #66	Country
27H	02H	ppH	Style #67	Beguine
08H	03H	ppH	Style #68	Reggae
28H	01H	ppH	Style #71	Pdoble
2FH	00H	ppH	Style #72	Kars
30H	00H	ppH	Style #73	Anadolu
31H	00H	ppH	Style #74	Arab
32H	00H	ppH	Style #75	Malfouf
33H	00H	ppH	Style #76	Keroncng
34H	00H	ppH	Style #77	Trot
29H	04H	ppH	Style #78	Enka
0CH	01H	ppH	Style #E1	Swing2
06H	02H	ppH	Style #E2	8beat3
07H	02H	ppH	Style #E3	16beat3
02H	02H	ppH	Style #E4	Disco3
11H	04H	ppH	Style #E5	Waltz4
13H	02H	ppH	Style #E6	2beat
16H	01H	ppH	Style #E7	Latin
05H	01H	ppH	Style #E8	Sl rock2
70H	00H	ppH	Card style	#C1
70H	01H	ppH	Card style	#C2
70H	02H	ppH	Card style	#C3
70H	03H	ppH	Card style	#C4
70H	04H	ppH	Card style	#C5
70H	05H	ppH	Card style	#C6
70H	06H	ppH	Card style	#C7
70H	07H	ppH	Card style	#C8

Values of ppH

ppH	Description	
00H	Original Basic	
01H	Original Advanced	
08H	Variation Basic	
09H	Variation Advanced	
40H	Intro Basic	
41H	Intro Advanced	
48H	Ending Basic	
49H	Ending Advanced	
58H	Fill in to Original Basic	
59H	Fill in to Original Advanced	
60H	Fill in to variation Basic	
61H	Fill in to variation Advanced	
70H	Break Mute	
50H	Fill in to Variation	‹
51H	Fill in to Original	‹
52H	Intro	‹ E-series compatibility
53H	Ending	‹
54H	Break Mute	‹

Table 2

It is not allowed to send to E-56 a "System exclusive Data set" of the current User program.

*** E-56 User program Area ***

Offset	Description			
	** VOLUMES			
00H	Upper	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
01H	Lower	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
02H	M.Bass	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
03H	AccBass	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
04H	Effect	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
05H	Acc1	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
06H	Acc2	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
07H	Acc3	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
08H	AccDrum	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
09H	M.drum	VOLUME	on/off (bit7),volume (bit6-0)	[0-255]
	** VOICES			
0AH	Upper	VOICE	group(bit7-6) bank(bit5-3) number(bit2-0)	
0BH	TonVar	VOICE	number(bit3-0) free(bit7-bit4)	
0CH	Lower	VOICE	group(bit7-6) bank(bit5-3) number(bit2-0)	
0DH	TonVar	VOICE	number(bit3-0) free(bit7-bit4)	
0EH	M.bass	VOICE	group(bit7-6) bank(bit5-3) number(bit2-0)	
0FH	TonVar	VOICE	number(bit3-0) free(bit7-bit4)	
10H	M.Drum	VOICE	free(bit7-6) bank (bit5-3) number(bit2-0)	
12H	Style		free(bit7) card(bit6) bank(bit5-3) number (bit2-0)	
	** TEMPO			
13H	Tempo in B.P.M			[20-250]
	** PITCH BENDER			
14H	Pitch bender range			[0-24]
	** TRANSPOSE			
15H	Transposer -11(F5),-10(F6),-9(F7),-8(F8),-7(F9),-6(FA) 5(FB),-4(FC),-3(FD),-2(FE),-1(FF),0,1,2,3,4, 5,6,7,8,9,A,B			[-11,+11]
	** TRANSPOSE MODE TRANSPOSE ON/OFF			
16H	Transposer mode (bit1-0) transp on/off (bit7)			00=intern. 01=midi 10=all
	** EFFECTS			
17H	Reverb	Type	number (bit7-4)	
18H	Chorus	Type	number (bit7-4)	

** OCTAVE

19H	octave up/down	m.bass(bit7-6) lower(bit5-4) free (bit3-2) Upper (bit1-0) 00=deflt 01=down 10=up

** S.EFF PAD

1AH	s.effect a	
1BH	s.effect b	
1CH	s.effect c	
1DH	s.effect d	
1EH	s.effect e	
1FH	s.effect f	
20H	s.effect g	
21H	s.effect h	

** LEDS

22H	led image user program	syn.str(bit7) syn.stp(bit6) rev.bas(bit5) arr.hld(bit4) adv.arr(bit3) variat (bit2) (bit1) chr.int (bit0)
23H	led image user program	chorus (bit7)(T) reverb (bit6)(X). (bit5) (bit4) (bit3) lwr.hld(bit2)(T) mld.int(bit1)(T). (bit0)

** STYLE CARD NUMBER

24H	Number TN-SC2-xx	number(bit6-0)	[0-99]

** SCALE TUNING

25H	C tune	-64 +63 cent
26H	C# tune	-64 +63 cent
27H	D tune	-64 +63 cent
28H	Eb tune	-64 +63 cent
29H	E tune	-64 +63 cent
2AH	F tune	-64 +63 cent
2BH	F# tune	-64 +63 cent
2CH	G tune	-64 +63 cent
2DH	G# tune	-64 +63 cent
2EH	A tune	-64 +63 cent
2FH	Bb tune	-64 +63 cent
30H	B tune	-64 +63 cent

** KBD SENSITIVITY

31H	number(bit1-0)	00 = M 01 = L 10 = H

** SPLIT

32H	kbd split point	(bit7-0)	[C3-C#5]

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***E-56 global parameter area* (GM/GS OFF)**

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** MIDI TX/RX

00H	Midi tx/rx Upper	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
01H	Midi tx/rx Lower	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
02H	Midi tx/rx M.bass	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
03H	Midi tx/rx M.drum	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
04H	Midi tx/rx S.effect	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
05H	Midi tx/rx A.bass	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
06H	Midi tx/rx Acc1	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
07H	Midi tx/rx Acc2	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
08H	Midi tx/rx Acc3	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
09H	Midi tx/rx A.drum	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
0AH	Midi rx Receive only	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
0BH	Midi rx Note to arr	channel on/off(bit7) channel value(bit3-0)
0CH	Midi tx/rx Style p.ch	channel on/off(bit7) channel value(bit3-0) free (bit6-4)
0DH	Midi tx/rx Basic md.ch	channel on/off(bit7) channel value(bit3-0) free (bit6-4)

** NOTE TO ARRANGER LIMIT

0EH	Low	limit NOTE TO ARRANGER	[12-120]
0FH	Hig	limit NOTE TO ARRANGER	[12-120]

** TUNE

10H	master tune	(bit7-0)

** TX-RX FLAGS

11H		F8,FA,FC on/off(bit7) pitch.bnd on/off (bit6) volume on/off. (bit5) p.change on/off (bit4) 00=int/01=midi/10=auto (bit3-2) midi soft thru on/off (bit1).....(bit0)

** RX VELOCITY

12H	rx velocity	velocity.on/off(bit7) velocity.value (bit6-0)

==========

E56 global parameter area* (GM/GS ON)

==========

17H	ch0vol	VOLUME	value (bit6-0)	[0-255]
18H	ch0pan	PAN.POT	value (bit6-0)	[0-127]
19H	ch0rev	REVERB DEPTH	value (bit6-0)	[0-127]
1AH	ch0chor	CHORUS DEPTH	value (bit6-0)	[0-127]
1BH	ch1vol	VOLUME	value (bit6-0)	[0-255]
1CH	ch1pan	PAN.POT	value (bit6-0)	[0-127]
1DH	ch1rev	REVERB DEPTH	value (bit6-0)	[0-127]
1EH	ch1chor	CHORUS DEPTH	value (bit6-0)	[0-127]
1FH	ch2vol	VOLUME	value (bit6-0)	[0-255]
20H	ch2pan	PAN.POT	value (bit6-0)	[0-127]
21H	ch2rev	REVERB DEPTH	value (bit6-0)	[0-127]
22H	ch2chor	CHORUS DEPTH	value (bit6-0)	[0-127]
23H	ch3vol	VOLUME	value (bit6-0)	[0-255]
24H	ch3pan	PAN.POT	value (bit6-0)	[0-127]
25H	ch3rev	REVERB DEPTH	value (bit6-0)	[0-127]
26H	ch3chor	CHORUS DEPTH	value (bit6-0)	[0-127]
27H	ch4vol	VOLUME	value (bit6-0)	[0-255]
28H	ch4pan	PAN.POT	value (bit6-0)	[0-127]
29H	ch4rev	REVERB DEPTH	value (bit6-0)	[0-127]
2AH	ch4chor	CHORUS DEPTH	value (bit6-0)	[0-127]
2BH	ch5vol	VOLUME	value (bit6-0)	[0-255]
2CH	ch5pan	PAN.POT	value (bit6-0)	[0-127]
2DH	ch5rev	REVERB DEPTH	value (bit6-0)	[0-127]
2EH	ch5chor	CHORUS DEPTH	value (bit6-0)	[0-127]
2FH	ch6vol	VOLUME	value (bit6-0)	[0-255]
30H	ch6pan	PAN.POT	value (bit6-0)	[0-127]
31H	ch6rev	REVERB DEPTH	value (bit6-0)	[0-127]
32H	ch6chor	CHORUS DEPTH	value (bit6-0)	[0-127]
33H	ch7vol	VOLUME	value (bit6-0)	[0-255]
34H	ch7pan	PAN.POT	value (bit6-0)	[0-127]
35H	ch7rev	REVERB DEPTH	value (bit6-0)	[0-127]
36H	ch7chor	CHORUS DEPTH	value (bit6-0)	[0-127]
37H	ch8vol	VOLUME	value (bit6-0)	[0-255]
38H	ch8pan	PAN.POT	value (bit6-0)	[0-127]
39H	ch8rev	REVERB DEPTH	value (bit6-0)	[0-127]
3AH	ch8chor	CHORUS DEPTH	value (bit6-0)	[0-127]
3BH	ch9vol	VOLUME	value (bit6-0)	[0-255]
3CH	ch9pan	PAN.POT	value (bit6-0)	[0-127]
3DH	ch9rev	REVERB DEPTH	value (bit6-0)	[0-127]
3EH	ch9chor	CHORUS DEPTH	value (bit6-0)	[0-127]
3FH	ch10vol	VOLUME	value (bit6-0)	[0-255]
40H	ch10pan	PAN.POT	value (bit6-0)	[0-127]
41H	ch10rev	REVERB DEPTH	value (bit6-0)	[0-127]
42H	ch10chor	CHORUS DEPTH	value (bit6-0)	[0-127]
43H	ch11vol	VOLUME	value (bit6-0)	[0-255]
44H	ch11pan	PAN.POT	value (bit6-0)	[0-127]
45H	ch11rev	REVERB DEPTH	value (bit6-0)	[0-127]
46H	ch11chor	CHORUS DEPTH	value (bit6-0)	[0-127]
47H	ch12vol	VOLUME	value (bit6-0)	[0-255]
48H	ch12pan	PAN.POT	value (bit6-0)	[0-127]
49H	ch12rev	REVERB DEPTH	value (bit6-0)	[0-127]
4AH	ch12chor	CHORUS DEPTH	value (bit6-0)	[0-127]

4BH	ch13vol	VOLUME	value (bit6-0)	[0-255]
4CH	ch13pan	PAN.POT	value (bit6-0)	[0-127]
4DH	ch13rev	REVERB DEPTH	value (bit6-0)	[0-127]
4EH	ch13chor	CHORUS DEPTH	value (bit6-0)	[0-127]
4FH	ch14vol	VOLUME	value (bit6-0)	[0-255]
50H	ch14pan	PAN.POT	value (bit6-0)	[0-127]
51H	ch14rev	REVERB DEPTH	value (bit6-0)	[0-127]
52H	ch14chor	CHORUS DEPTH	value (bit6-0)	[0-127]
53H	ch15vol	VOLUME	value (bit6-0)	[0-255]
54H	ch15pan	PAN.POT	value (bit6-0)	[0-127]
55H	ch15rev	REVERB DEPTH	value (bit6-0)	[0-127]
56H	ch15chor	CHORUS DEPTH	value (bit6-0)	[0-127]
57H	Upper midi channel		channel value(bit4-0) bit4 on/off	[0-16]

** TUNE

58H master tune (bit7-0)

** TRANSPOSE

59H Transpose -11(F5),-10(F6),-9(F7),-8(F8),7(F9),-6(FA) [-11,+11]
5(FB),-4(FC),-3(FD),-2(FE),-1(FF),0,1,2,3,4
5,6,7,8,9,A,B

** TRANSPOSE MODE TRANSPOSE ON/OFF

5AH Transpose mode (bit1-0) transp on/off (bit7)
00=interno
01=midi
10=all

** SCALE TUNING

5BH	C tune	-64 +63 cent
5CH	C# tune	-64 +63 cent
5DH	D tune	-64 +63 cent
5EH	Eb tune	-64 +63 cent
5FH	E tune	-64 +63 cent
60H	F tune	-64 +63 cent
61H	F# tune	-64 +63 cent
62H	G tune	-64 +63 cent
63H	G# tune	-64 +63 cent
64H	A tune	-64 +63 cent
65H	Bb tune	-64 +63 cent
66H	B tune	-64 +63 cent

** KBD SENSITIVITY

67H number(bit1-0)
00 = M
01 = L
10 = H

** MIDI CHANNEL ON/OFF

68H midi channel on/off chnl7 (bit7) chnl6 (bit6) chnl5 (bit5)
chnl4 (bit4) chnl3 (bit3) chnl2 (bit2)
chnl1 (bit1) chnl0 (bit0)

69H midi channel on/off chnl15 (bit7) chnl14 (bit6) chnl13 (bit5)
chnl12 (bit4) chnl11 (bit3) chnl10 (bit2)
chnl9 (bit1) chnl8 (bit0)

** GS MELODY ON/OFF

6CH	mel.vol	ON/OFF	on/off (bit7),
	local	ON/OFF	on/off (bit6)
	tx	ON/OFF	on/off (bit5)

** GS BASE VOLUME & ON/OFF

6DH base.vol VOLUME & ON/OFF on/off (bit7) value (bit6-0) [0-127]

4 Useful Information

Decimal and Hexadecimal

It is common to use 7-bit Hexadecimal numbers in MIDI communication. The following is a conversion table between decimal numbers and 7-bit Hexadecimal numbers.

Decimal	Hexa-decimal	Decimal	Hexa-decimal	Decimal	Hexa-decimal	Decimal	Hexa-decimal
0	00H	32	20H	64	40H	96	60H
1	01H	33	21H	65	41H	97	61H
2	02H	34	22H	66	42H	98	62H
3	03H	35	23H	67	43H	99	63H
4	04H	36	24H	68	44H	100	64H
5	05H	37	25H	69	45H	101	65H
6	06H	38	26H	70	46H	102	66H
7	07H	39	27H	71	47H	103	67H
8	08H	40	28H	72	48H	104	68H
9	09H	41	29H	73	49H	105	69H
10	0AH	42	2AH	74	4AH	106	6AH
11	0BH	43	2BH	75	4BH	107	6BH
12	0CH	44	2CH	76	4CH	108	6CH
13	0DH	45	2DH	77	4DH	109	6DH
14	0EH	46	2EH	78	4EH	110	6EH
15	0FH	47	2FH	79	4FH	111	6FH
16	10H	48	30H	80	50H	112	70H
17	11H	49	31H	81	51H	113	71H
18	12H	50	32H	82	52H	114	72H
19	13H	51	33H	83	53H	115	73H
20	14H	52	34H	84	54H	116	74H
21	15H	53	35H	85	55H	117	75H
22	16H	54	36H	86	56H	118	76H
23	17H	55	37H	87	57H	119	77H
24	18H	56	38H	88	58H	120	78H
25	19H	57	39H	89	59H	121	79H
26	1AH	58	3AH	90	5AH	122	7AH
27	1BH	59	3BH	91	5BH	123	7BH
28	1CH	60	3CH	92	5CH	124	7CH
29	1DH	61	3DH	93	5DH	125	7DH
30	1EH	62	3EH	94	5EH	126	7EH
31	1FH	63	3FH	95	5FH	127	7FH

*To indicate a decimal number for the MIDI channel, Bank number, and Program number, add one to the values in the table.
*The resolution of 7-bit Hexadecimal numbers is 128. Use several bytes for values which require more resolution.
i.e. The number "ad bbH" in 7-bit Hexadecimal is "ad x 128 + bb" in Decimal form.
*A signed number (with a sign +/-) is indicated as 00H = -64, 40H = %0, 7FH = +63.
So the signed number "aaH" in 7-bit Hexadecimal is "ad - 64" (ad is the decimal number of aaH).
In case of two bytes, it is regarded as 00 00H = -8192, 40 00H = %0, 7F 7FH = +8191.
So the signed number "ad bbH" in 7-bit Hexadecimal is "ad bbH - 40 00H = ad x 128 + bb - 64 x 128", where, ad and bb is the decimal number of aaH and bbH respectively.
*The data indicated as "nibbled" is a 4-bit Hexadecimal number.
i.e. "0a 0bH" is "a x 16 + b".

<Example 1> Convert "5AH" in Hexadecimal to a Decimal number.
(By using the table)5AH = 90

<Example 2> Convert "12 34H" in 7-bit Hexadecimal to a Decimal number.
(By using the table) 12H = 18, 34H = 52
So,18 x 128 + 52 = 2356

<Example 3> Convert "0A 03 09 0D" in nibblized form to a Decimal number.
(By using the table)0AH = 10, 03H = 3, 09H = 9, 0DH = 13
So,((10 x 16 + 3) x 16 + 9) x 16 + 13 = 41885

Example of actual MIDI messages

<Example 1> 92 3E 5F
"9n" is a status of a Note On message, and "n" is a MIDI channel number.
The second byte is the Note number, and the third is Velocity.
2H = 2, 3EH = 62, 5FH = 95
So, this is a Note On message of MIDI channel=3, Note number=62(D4) and Velocity=95.

<Example 2> CE 49
"Cn" is a status of a Program change message, and "n" is a MIDI channel number.
The second byte is a Program number.
EH = 14, 49H = 73
So, this is a Program change message of MIDI channel=15, Program number= 74 (Flute in GS).

<Example 3> EA 00 28
"EnH" is a status of a Pitch bend change message, and "n" is a MIDI channel number.
The second byte (00H) is an LSB and the third (28H) is an MSB of a Pitch bend value (%signed).

The Pitch bend value is:
28 00H - 40 00H = 40 x 128 + 0 - (64 x 128 + 0) = 5120 - 8192 = -3072
So, this is a Pitch bend change message of MIDI channel=11,
Pitch bend value = -3072

If the Pitch bend sensitivity is set to 2 semitones, and the Pitch bend value -8192 (00 00H) is defined as -200 cents,
The actual pitch bend value of this message is: -200 x (-3072) % (-8192) = -75 cent

<Example 4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F
"Bn" is a status of a Control change message, and "n" is a MIDI channel number.
The second byte is a Control number and the third is the value.
This packet uses the running status rule, that is, when you send a series of messages with the same status, you can omit the following status bytes.
This message contains :

B3 64 00	MIDI CH = 4	LSB	of RPN parameter number	: 00H
(B3) 65 00	MIDI CH = 4	MSB	of RPN parameter number	: 00H
(B3) 06 0C	MIDI CH = 4	MSB	of Data entry	: 0CH
(B3) 26 00	MIDI CH = 4	LSB	of Data entry	: 00H
(B3) 64 7F	MIDI CH = 4	LSB	of RPN parameter number	: 7FH
(B3) 65 7F	MIDI CH = 4	MSB	of RPN parameter number	: 7FH

This message string means 'send data "0C 00H" to RPN parameter number"00 00H", after that, set RPN parameter number to "7F 7F"'.

RPN parameter number "00 00H" is Pitch bend sensitivity and the unit of the MSB value is a semitone, so 0CH = 12 is a value
to set the Pitch bend sensitivity = 12 semitones (one octave).
GS devices ignore the LSB value of Pitch bend sensitivity. However, you had better send both MSB and LSB(=00H) to maintain data compatibility.

Once an RPN or NRPN number is set, all the Data entry messages sent after are effective.
Sometimes this rule may cause a problem if the MIDI data is played by a sequencer and it is operated in fast forward or backward made. It is recommended, therefore, to set the RPN or NRPN number to 7F 7FH after sending the Data entry messages.

*To use running-status for several MIDI event like <example 4> in a song data (e.g. Standard MIDI File data) is not recommended.
There may be a sequencer which can not handle such data correctly when it is operated in fast forward or backward. Putting the status byte for every event is the reliable way.
*The parameter number and the value of RPN or NRPN must be sent in correct order. As some sequencers may send those recorded data in different order if an event is too close to another, it is recommended to place each event in a different tick. (1-CLK for TPQN=92, or 5-CLK for TPQN=480 is recommended.)

The send order may be different as each sequencer if the events are in the same clock in sequence data.

Checksum of Roland System Exclusive messages
Roland System Exclusive messages (RQ1 and DT1) have a Checksum at the end of the data (just before EOX) to be able to check
for communication errors.
The Checksum is determined by values of address and data (or size) included in the message.

<How to calculate Checksums> ("H" indicates Hexadecimal.)

The error checking process employs a sum-ckeck error detection. It provides binary bit figures whose lower 7 bits are zero when values for an address, data (or size) and the Checksum are summed.

One practical equation to determine Checksum is:

If the address is "ad bb ccH" and the data(or the size) is "dd ee ffH"
ad + bb + cc + dd + ee + ff = sum
sum % 128 = quotient % remainder
128 - remainder = checksum

<Example 1> Set "REVERB MACRO" to "ROOM 3"

According to the Parameter Address Map, the Address of REVERB MACRO is 40 01 30H, and the Value correspond to ROOM 3 is 02H.
So, the message should be :

F0 41 10 42 12 40 01 30 02 ?? F7

(1) (2) (3) (4) (5) address data checksum (6)

(1)Exclusive Status (2)ID (Roland) (3)Device ID (16) (4)Model ID (GS) (5)Command ID (DT1) (6)End of Exclusive

The Checksum is :
40H + 01H + 30H + 02H = 64 + 1 + 48 + 2 = 115(sum)
115(sum) % 128 = 0(quotient) % 115(remainder)
checksum = 128 - 115(remainder) = 13 = 0DH

Therefore, the message to send is : F0 41 10 42 12 40 01 30 02 0D F7

<Example 2> To request LEVEL of NOTE NUMBER 75(D#5; Claves) in DRUM MAP 1

NOTE NUMBER 75(D#5) is 4BH in Hexadecimal.
The Address of "LEVEL of NOTE NUMBER 75(D#5; Claves) in DRUM MAP 1" is 41 02 4BH, and the size is 00 00 01H. So, the message should be :

F0 41 10 42 11 41 02 4B 00 00 01 ?? F7

(1) (2) (3) (4) (5) address data checksum (6)

(1)Exclusive Status (2)ID (Roland) (3)Device ID (16) (4)Model ID (GS) (5)Command ID (RQ1) (6)End of Exclusive

The Checksum is :
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

Therefore, the message to send is : F0 41 10 42 11 41 02 4B 00 00 01 71 F7

<Example 3> Set "MASTER TUNE" to +23.4 cents by System Exclusive
The Address of "MASTER TUNE" is 40 00 00H, and the Size is 00 00 04H.
The Value should be nibblized data whose resolution is 0.1 cents, and which is a signed value
(00 04 00 00H (= 1024) = %0).
+23.4[cents] = 234 + 1024 = 1258 =(hexadecimal)=> 04 EAH =(nibblized)=> 00 04 0E 0AH

So, the message should be :

F0 41 10 42 12 41 00 00 00 04 0A ?? F7

(1) (2) (3) (4) (5) address data checksum (6)

(1)Exclusive Status (2)ID (Roland) (3)Device ID (16) (4)Model ID (GS) (5)Command ID (DT1) (6)End of Exclusive

The Checksum is :
41H + 00H + 00H + 00H + 04H + 0EH + 0AH = 65 + 0 + 0 + 0 + 4 + 14 + 10 = 93(sum)
93(sum) % 128 = 0(quotient) % 93(remainder)
checksum = 128 - 93(remainder) = 35 = 23H

Therefore, the message to send is : F0 41 10 42 11 41 00 00 00 04 0E 0A 23 F7

MIDI IMPLEMENTATION CHART

[INTELLIGENT SYNTHESIZER] (Arranger Section)
Model E-56

Date: February 1993
Version: 1.00

FUNCTION		TRANSMITTED	RECOGNIZED	REMARKS
Basic	Default	1-2-3-4-5-6-7-8-9-10-11	1-2-3-4-5-6-7-8-9-10-11	1=Note to Arr, Basic Midi ch 2=Man Bass 3=Lower 4=Upper 5=Accomp 1 6=Accomp 2 7=Accomp 3 8=Acc Bass 9= Rx only 10=Man Drums, Acc. Drums, Style Pg 11=Sound Eff.
Channel	Changed	1-16, OFF	1-16, OFF	
Mode	Default	X	Mode 3	
	Messages	X	O *2	
	Altered	**********	O *2	
Note Number:	True voice	0-127 **********	12-120 *1 0-127	
Velocity	Note ON	O *1	O *1	
	Note OFF	X	X	
After Touch	Key's	X	O *1	
	Ch's	X	O *1	
Pitch Bender		O *1	O *1	
Control Change	0,32	O *1	O (MSB only) *1	Bank select
	1	O	O *1	Modulation
	5	X	O *1	Portamento time
	6,38	O	O *1	Data entry
	7	O *1	O *1	Volume
	10	X	O *1	Panpot
	11	X	O *1	Expression
	64	O	O *1	Hold 1
	65	X	O *1	Portamento
	66	X	O *1	Sostenuto
	67	X	O *1	Soft
	84	X	O *1	Portamento control
	91	X	O (Reverb) *1	Effect 1 depth
	93	X	O (Chorus) *1	Effect 3 depth
	98,99	O	O *1	NRPN LSB, MSB
	100,101	X	O *1	RPN LSB, MSB
	120	X	O	All sound off
	121	X	O	Reset all controllers
Prog change:	True #	O *1 **********	O *1 0-127	Prog. 1-128
System Exclusive		O	O	
System Common	: Song Pos	X	X	
	: Song Sel	X	X	
	: Tune	X	X	
System Real Time	: Clock	O *1	X *1	
	: Commands	O *1	X *1	
Aux Messages	: Local ON/OFF	O	X	
	: All Notes OFF	X	O (123-125)	
	: Active Sense	O	O	
	: Reset	X	X	
Notes		*1 O X is selectable *2 Recognize as "all note off", Mode does not change		

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

O: YES
X: NO

E-56 INTELLIGENT SYNTHESIZER

MIDI IMPLEMENTATION **Version 1.00** **Date: February 1993**

SOUND MODULE & KEYBOARD SECTION

1 Receive data (Sound Module & Keyboard Section)

- Channel Voice Message -

■ Note off

Status	Second	Third
8nH	kkH	vvH
9nH	kkH	00H

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

*Ignored when "Rx.Note message = OFF".
*In the drum part, recognized when "Rx.Note off = ON" for each instrument.
*Velocity is ignored.

■ Note on

Status	Second	Third
9nH	kkH	vvH

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

*Ignored when "Rx.Note message = OFF".
*In the drum part, ignored when "Rx.Note on = OFF" for each instrument.

■ Polyphonic key pressure

Status	Second	Third
AnH	kkH	vvH

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

*Ignored when "Rx.Polyphonic key pressure = OFF".
*Effect to the parameter set on "PAf controller function".
The default setting has no effect.

■ Control change

*Ignored all control change messages other than channel mode messages when "Rx.Control change = OFF".
*The values set by Control change messages won't reset by receiving new Program change messages.

Bank select

Status	Second	Third
BnH	00H	mmH
BnH	20H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, ll=Bank number : 00H,00H - 7FH,7FH (bank1 - bank16384)
Default Value = 00 00H (bank.1)

*Ignored when "Rx.Bank Select = OFF".
"Rx.Bank Select" is set to ON by "GS RESET".(Power-on default value is ON.)
*The LSB 7-bits are ignored (always regards as llH=00H).
However, when sending Bank Select messages, you have to send both of the MSB(mm) and LSB(ll) together.
*"Bank select" is suspended until receiving "Program change".
To select a Tone of another bank, you have to send Bank select(mm,ll) before sending the Program change.
*The "Variation number" of GS Format is defined as the decimal expression of the MSB value (Control change number 00H) of the Bank select.

Modulation

Status	Second	Third
BnH	01H	vvH

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

*Ignored when "Rx.Modulation = OFF".
*Effect to the parameter set on "MOD controller function".
The default setting is pitch modulation depth.

Portamento time

Status	Second	Third
BnH	05H	vvH

n=MIDI channel number : 0H - FH (ch.1- ch.16)
vv=Portamento time : 00H - 7FH (0 - 127)
Default Value = 00H (0)

*The Portamento time value changes the rate of pitch change when Portamento is ON or when using portamento control messages.
Value 0 is the fastest.

Data entry

Status	Second	Third
BnH	06H	mmH
BnH	26H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll=Value of the parameter specified with RPN and/or NRPN

Volume

Status	Second	Third
BnH	07H	vvH

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

*Volume messages control the volume level of the specified channel (part).
Use Volume messages to control volume balance of each part.
*Ignored when "Rx.Volume = OFF".

Panpot

Status	Second	Third
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Panpot : 00H - 40H 7FH (Left - Center - Right)

*127 steps from Left to Center to Right.
*Within the Drum Part, the panpot provides overall control of a stereophonic image.
*Ignored when "Rx.Panpot = OFF".

Expression

Status	Second	Third
BnH	0BH	vvH

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

*Expression and Volume messages are cumulative, and the result will control the overall volume.
Use Expression messages for expression pedal, or creating expressive effects, such as crescendo, decrescendo, while playing.
*Ignored when "Rx.Expression = OFF".

Hold1

Status	Second	Third
BnH	40H	vvH

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

*Ignored when "Rx.Hold1 = OFF".

Portamento

Status	Second	Third
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

*Ignored when "Rx.Portamento = OFF".

Sostenuto

Status	Second	Third
BnH	42H	vvH

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

*Ignored when "Rx.Sostenuto = OFF".

Soft

Status	Second	Third
BnH	43H	vvH

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

*Ignored when "Rx.Soft = OFF".

Portamento Control

Status	Second	Third
BnH	54H	kkH

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

*When a Note On message is received after a Portamento Control message, the voice's pitch will glide from the pitch specified by the source note number of the Portamento Control message at the rate set by the portamento time controller (regardless portamento on/off.)
If there is a currently sounding voice whose note number is coincident with the source note number, the voice's pitch will glide to the new Note On's pitch according to the portamento time without re-triggering (played in legato). Then no new voice should be assigned.

Example 1.

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

Example 2.

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

Effect1 depth(Reverb send level)

Status	Second	Third
BnH	5BH	vvH

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

*Effect1 depth messages control the Send Level of the specified channel (part) to the internal Reverb unit.

Effect3 depth(Chorus send level)

Status	Second	Third
BnH	5DH	vvH

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

*Effect3 depth messages control the Send Level of the specified channel (part) to the internal Chorus unit.

NRPN MSB/LSB

Status	Second	Third
BnH	63H	mmH
BnH	62H	llH

n =MIDI channel number :0H - FH (ch.1 - ch.16)
mm =MSB of the NRPN
ll =LSB of the NRPN

*Recognized when "Rx.NRPN = ON". "Rx.NRPN" is set ON by "GS RESET".
*The values set by NRPN won't reset by receiving new Program Change messages or Reset All Controllers.

NRPN
An NRPN (Non Registered Parameter Number) is an expanded control change message.
Each function of an NRPN is described by the individual manufacturer.
To use NRPN, set NRPN number (MSB/LSB) before sending data. Then send data by Data entry message(Control Change # 6/38).
And then, it is recommended to send RPN null (RPN number = 7FH/7FH) to prevent the data from being unexpectedly change. For more explanation, refer to Chapter 4. Useful Information, Example of actual MIDI messages <EXAMPLE 4>.

You can change the following parameters by using NRPN.

NRPN MSB	NRPN LSB	Data entry MSB	Description
01H	08H	mmH	Vibrato rate relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	09H	mmH	Vibrato depth relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	0AH	mmH	Vibrato delay relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	20H	mmH	TVF cutoff frequency relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	21H	mmH	TVF resonance relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	63H	mmH	TVF&TVA Env. Attack time relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)

01H	64H	mmH	TVF&TVA Env. Decay time relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
01H	66H	mmH	TVF&TVA Env. Release time relative change on specified channel mm: 0EH-40H-72H (-50 - 0 - +50)
18H	r r H	mmH	Pitch coarse of drum instrument relative change on specified drum instrument rr: key number of drum instrument mm: 00H-40H-7FH (-64 - 0 - +63 semitone)
1AH	r r H	mmH	TVA level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)
1CH	r r H	mmH	Panpot of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H,01H-40H-7FH (Random, Left-Center-Right)
1DH	r r H	mmH	Reverb send level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)
1EH	r r H	mmH	Chorus send level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)

*Data entry LSB is ignored.
*The relative change means that the parameter value(e.g.-50 - 0 - +50) will be added to the preset value.
*The absolute change means that the parameter value will be replaced by the received value.

RPN MSB/LSB

Status	Second	Third
BnH	65H	mmH
BnH	64H	l l H

n =MIDI channel number :0H -FH (ch.1 - ch.16)
mm =MSB of the RPN
l l =MSB of the RPN

*Ignored when "Rx.RPN = OFF".
*The values set by an RPN won't be reset by receiving new Program Change messages or Reset All Controllers.

RPN
An RPN (Registered Parameter Number) is an expanded control change message.
Each function of an RPN is described by the MIDI Standard.
To use RPN, set RPN number (MSB/LSB) before sending data. Then send data by Data entry message(Control Change # 6/38). And then, it is recommended to send RPN null (RPN number = 7FH/7FH) to prevent the data from being unexpectedly change. For more explanation, refer to Chapter 4. Useful Information, Example of actual MIDI messages <EXAMPLE 4>.

You can change the following parameters by using RPN.

RPN MSB	RPN LSB	Data entry MSB	Data entry LSB	Description
00H	00H	mmH	----	Pitch bend sensitivity mm: 00H-18H (0 - 24 semitone) Default value=02H (two semitones) l l: ignored (value=00H) (Up to 2 octaves)
00H	01H	mmH	l l H	Master fine tuning mm, l l: 00 00H-40 00H-7F 7FH (-8192x100/8192 - 0 - +8191x100/8192 cents)
00H	02H	mmH	----	Master coarse tuning mm: 28H-40H-58H (-24 - 0 - +24 semitones) l l: ignored (value=00H)
7FH	7FH	----	----	RPN null Return to disable condition. The parameter already set retains its value. mm,l l: ignored.

■ **Program change**

Status	Second
CnH	ppH

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

*The Tone of the voices already ON before receiving a program change message isn't affected.
The Tone will be changed by a new Not-on message after the program change is received.
*Ignored when "Rx.Program change = OFF".
*In the drum part, Program change messages are ignored when the Bank is set at 129 - 16384 (ie. the value of the control change number 0 is not 00H).

■ **Channel pressure**

Status	Second
DnH	vvH

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

*Effect to the parameter set on "MOD controller function".
The default setting has no effect.
*Ignored when "Rx.Channel pressure = OFF".

■ **Pitch bend change**

Status	Second	Third
EnH	l l H	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, l l=Value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

*Effect to the parameter set on "MOD controller function".
The default setting is pitch bend.
*Ignored when "Rx.Pitch bend change = OFF"

Channel Mode Messages

■ **All sounds off**

Status	Second	Third
BnH	78H	00H

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

*When "All sounds off" is received, all sounds on a specified channel turn off immediately.
However, the state of channel messages does not change. You must not use "All sound off" message for "Note off".

■ **Reset all controllers**

Status	Second	Third
BnH	79H	00H

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

*When "reset all controllers" is received, the controller value of specified channel return to the default at values as follows.

Controller	Default Value
Pitch bend change	0(Center)
Polyphonic key pressure	0(off)
Channel pressure	0(off)
Modulation	0(off)
Expression	127(maximum)
Hold1	0(off)
Portamento	0(off)
Sostenuto	0(off)
Soft	0(off)
RPN	disabled. The parameter already set retains its old value.
NRPN	disabled. The parameter already set retains its old value.

■ **All notes off**

Status	Second	Third
BnH	7BH	00H

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

*When "All notes off" is received, all notes are turned off in the specified channel.
However, sound continues while hold1 and/or sostenuto is on.

■ **OMNI OFF**

Status	Second	Third
BnH	7CH	00H

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

*OMNI OFF is only recognized as "all notes off". Mode doesn't change.

■ **OMNI ON**

Status	Second	Third
BnH	7DH	00H

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

*OMNI ON is only recognized as "all notes off". Mode doesn't change (OMNI OFF remains).

■ **MONO**

Status	Second	Third
BnH	7EH	mmH

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

**MONO is recognized as "all sounds off". The specified channel turns to Mode4 (M=1), even if mm is not equal to 1 (mm is ignored).

■ **POLY**

Status	Second	Third
BnH	7FH	00H

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

*POLY is recognized as "all sounds off". The specified channel turns to Mode3.

System Real Time Message

■ **Active sensing**

Status
FEH

*Having received an "active sensing" message, GS expects to receive additional active sensing messages at 300ms intervals.
If the interval is greater than 420ms, GS executes "All sounds off", "All notes off" and "Reset all controllers" and returns to normal operation. (Monitoring of active sensing messages will terminate.)

System Exclusive Message

Status	Data	Status
F0H	iiH,ddH,.....,eeH	F7H

F0H : System exclusive
ii=ID number : The ID number identifies the manufacturer of a MIDI device that triggers an exclusive message. Value 7EH and 7FH are reserved to use as universal messages which are used for extension of the MIDI Standard.
41H : Roland's Manufacturer-ID.
7EH : Universal Non-Realtime Message
7FH : Universal Realtime Message
dd,...,ee=data: 00H-7FH (0-127)
F7H: EOX (End of Exclusive/System common)

System Exclusive Messages of Mode Change

System Exclusive Messages of Mode Change are the messages used to initialize the internal parameters of the device to General MIDI mode or GS default mode. "GS reset" and "Exit GS mode" use a form of Roland Exclusive Message. "Turn General MIDI System On" and "Turn General MIDI System Off" use a form of Universal Non-real Time Message.

GS reset

Status	Data Byte	Status
F0H	41H, 10H, 42H, 12H, 40H, 00H, 7FH, 00H, 41H	F7H

Byte	Description	
F0H	Exclusive status	
41H	ID number	(Roland)
10H	Device ID	(dev => 10H)
42H	Model ID	(GS)
12H	Command ID	(DT1)
40H	Address MSB	
00H	:	
7FH	Address LSB	
00H	Data	(GS reset)
41H	Checksum	
F7H	EOX	(End of exclusive)

*Upon receiving this message, all the internal parameters are set to the default settings of the GS Format. (Rx.NRPN SW will be turned ON by this message.)
*It takes about 100 ms to execute this message.

Exit GS mode

Status	Data Byte	Status
F0H	41H, 10H, 42H, 12H, 40H, 00H, 7FH, 7FH, 42H	F7H

Byte	Description	
F0H	Exclusive status	
41H	ID number	(Roland)
10H	Device ID	(dev => 10H)
42H	Model ID	(GS)
12H	Command ID	(DT1)
40H	Address MSB	
00H	:	
7FH	Address LSB	
7FH	Data	(Exit GS mode)
42H	Checksum	
F7H	EOX	(End of exclusive)

*Upon receiving this message, the unit changes from GS to E-56 default mode.
*It takes about 100 ms to execute this message.

Turn General MIDI System On

Status	Data Byte	Status
F0H	7EH, 7FH, 09H, 01H	F7H

Byte	Description	
F0H	Exclusive status	
7EH	ID number	(Universal non-real time message)
7FH	ID of target device	(Broadcast)
09H	sub-ID#1	(General MIDI message)
01H	sub-ID#2	(General MIDI On)
F7H	EOX	(End of exclusive)

*Upon receiving this message, all the internal parameters are set to the default settings of General MIDI System Level 1.
*It takes about 100 ms to execute this message.

Turn General MIDI System Off

Status	Data Byte	Status
F0H	7EH, 7FH, 09H, 02H	F7H

Byte	Description	
F0H	Exclusive status	
7EH	ID number	(Universal non-real time message)
7FH	ID of target device	(Broadcast)
09H	sub-ID#1	(General MIDI message)
02H	sub-ID#2	(General MIDI Off)
F7H	EOX	(End of exclusive)

*Upon receiving this message, the unit changes from General MIDI mode to E-56 default mode.
*It takes about 100 ms to execute this message.

■ Data Transfer

E-56 can transmit and receive the various parameters using System Exclusive messages of the following data format.
GS Common Exclusive messages use Model ID = 42H and Device ID = 17(10H).
E-56 has a unique Exclusive communication function which has it's own Model IDs in addition to the GS Common Exclusive messages.

■ Request data 1RQ1

This message is sent out to request the remote device to send back the required data.
It contains data for the address and size that specify designation and length, respectively.
On receiving a proper RQ1 message for the device, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will not send anything.

Status	Data Byte	Status
F0H	41H, 10H, 42H, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum	F7H

Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID	(Roland)
10H	Device ID	(dev => 10H)
42H	Model ID	(GS)
11H	Command ID	(RQ1)
aaH	Address MSB	
bbH	:	
ccH	Address LSB	
ssH	Size MSB	
ttH	:	
uuH	Size LSB	
sum	Checksum	
F7H	EOX	(End of exclusive)

*E-56 only recognizes the RQ1 messages whose address and size match the Parameter Address Map (Section 3).
*The error checking process uses a Checksum. Refer to Section 4 to calculate a Checksum.

■ Data set 1 DT1

This message corresponds to the actual data transfer process.
On receiving a DT1 message, the device writes the data to internal memory according to the address.

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

Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID	(Roland)
10H	Device ID	(dev => 10H)
42H	Model ID	(GS)
12H	Command ID	(DT1)
aaH	Address MSB	
bbH	:	
ccH	Address LSB	
ddH	Data	
:	:	
eeH	Data	
sum	Checksum	
F7H	EOX	(End of exclusive)

*E-56 only recognizes the DT1 messages whose address and size match the Parameter Address Map (Section 3).
*To send large DT1 messages at a time, insert 40ms - intervals at least in between each packet.
*The error checking process uses a Checksum. Refer to Section 4 to calculate a Checksum.

2 Transmit Data (Sound Module & Keyboard Section)

- Channel Voice Messages -

■ Note off

Status	Second	Third
9nH	kkH	00H

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

■ Note on

Status	Second	Third
9nH	kkH	vvH

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

* The E-56 does not send this message if Upper Tx channel = Off

■ Control change

Bank select

Status	Second	Third
BnH	00H	mmH
BnH	20H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, ll =Bank number : Bank number:00H,00H - 7FH,7FH (bank1 - bank16384)

* The E-56 does not send this message if Upper Tx channel = Off

Modulation

Status	Second	Third
BnH	01H	vvH

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

* The E-56 does not send this message if Upper Tx channel = Off

Volume

Status	Second	Third
BnH	07H	vvH

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

* The E-56 does not send this message if Upper Tx channel = Off

Panpot

Status	Second	Third
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Panpot: 00H - 40H - 7FH (Left - Center - Right)

* The E-56 does not send this message if Upper Tx channel = Off

Hold1

Status	Second	Third
BnH	40H	vvH

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

* The E-56 does not send this message if Upper Tx channel = Off

■ **Effect1 depth (Reverb send level)**

Status	Second	Third
BnH	5BH	vvH

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

*Effect1 depth messages control the Send Level of the specified channel (part) to the internal Reverb unit.
* The E-56 does not send this message if Upper Tx channel = Off

■ **Effect3 depth (Chorus send level)**

Status	Second	Third
BnH	5DH	vvH

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

*Effect3 depth messages control the Send Level of the specified channel (part) to the internal Chorus unit.
* The E-56 does not send this message if Upper Tx channel = Off

■ **Program change**

Status	Second
CnH	ppH

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

* The E-56 does not send this message if Upper Tx channel = Off

■ **Pitch bend change**

Status	Second	Third
EnH	l l H	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm, l l=Value : 00H,00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

* The E-56 does not send this message if Upper Tx channel = Off

System Realtime Message

Active sensing

Status
FEH

*Transmits at about 250ms intervals.

System Exclusive Message

■ **Data Transfer**
E-56 transmits "Data set 1 (DT1)" message when receiving a proper "Request Data 1(RQ1)" message. Refer to section 1(System Exclusive Message)

■ **Data set 1 DT1 (12H)**

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

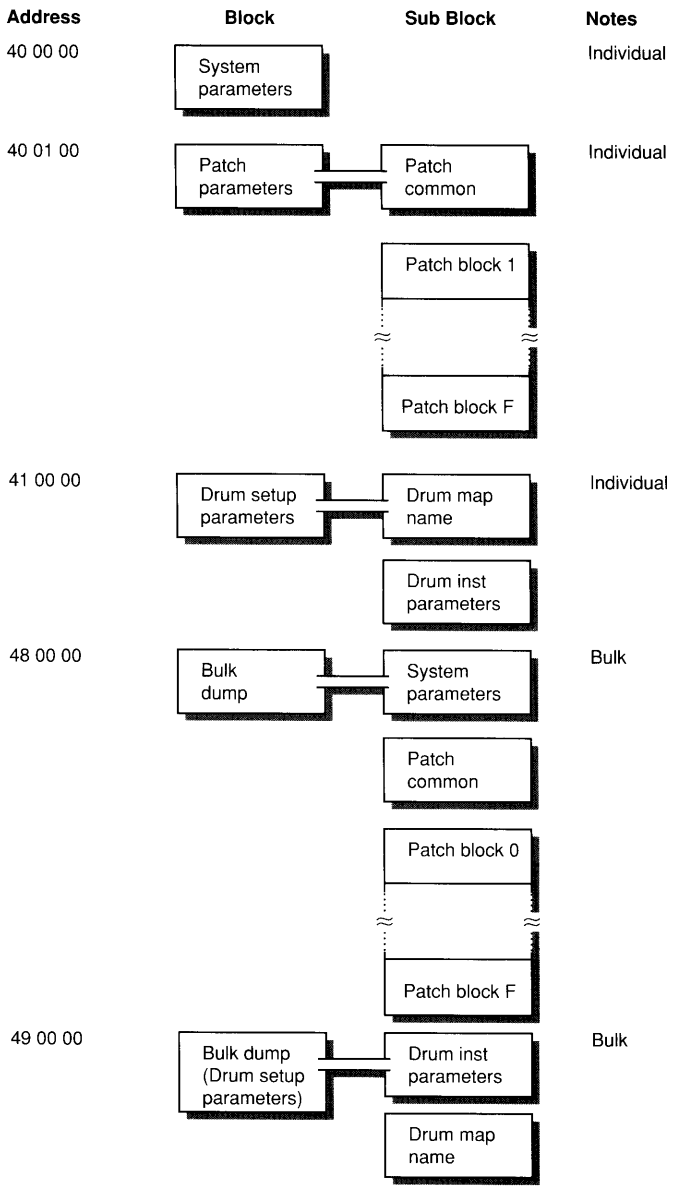
Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID	(Roland)
10H	Device ID	(dev => 10H)
42H	Model ID	(GS)
12H	Command ID	(DT1)
aaH	Address MSB	
bbH	Address	
ccH	Address LSB	
ddH	Data	
:	:	
eeH	Data	
sum	Checksum	
F7H	EOX	(End of exclusive)

*E-56 only sends the DT1 messages whose address and size match the Parameter Address Map (Section 3).
*If the data to send is a large data (more than 128 bytes), then the data will be sent out in separate packets.
*Refer to Section 4 to calculate a Checksum.

3 Parameter address map (Model ID=42H)

This map indicates address, size, Data (range), Parameter, Description, and Default Value of parameters which can be transferred using "Request data 1 (RQ1)" and "Data set 1 (DT1)".
All the numbers of address, size, Data, and Default Value are indicated in 7-bit Hexadecimal-form.

■ **Address Block map**
An outlined address map of the Exclusive Communication is shown below;



There are two types of GS Exclusive message. One is an individual parameter communication, the other is a bulk dump communication.

Individual parameter

You can use individual parameter communication to send or request an individual parameter value.
One packet of System Exclusive messages "F0 ..... F7" can only have one parameter (which may contain several bytes).
You cannot use any address having "#" for the top address in a System Exclusive message.

[SYSTEM PARAMETERS]

Address(H)	*SIZE(H)*	*Data(H)*	*Parameter*	*Description*	*Default value (H)*
40 00 00 40 00 01# 40 00 02# 40 00 03#	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 - +100.0 [cent] Use nibblized data.	00 04 00 00
40 00 04	00 00 01	00 - 7F	MASTER VOLUME	0 - 127	7F
40 00 05	00 00 01	28-58	MASTER KEY SHIFT	- 24 - +24 semitones	40
40 00 06	00 00 01	01 - 7F	MASTER PAN		40
40 00 7F	00 00 01	00, 7F	MODE SET (Rx Only)	00 = GS Reset 127 = Exit GS	

Refer to "System Exclusive Messages of Mode Change" Page ...

[PATCH PARAMETERS]

E-56 has 16 parts. The parameters of each part are called PATCH PARAMETERS. To send or request a PATCH PARAMETER, use not the part number (which is usually same as the MIDI channel number) but the BLOCK NUMBER in the message.

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

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

Address(H)	*SIZE(H)*	*Data(H)*	*Parameter*	*Description*	*Default value (H)*
40 01 00 40 01 : # 40 01 0F#	00 00 10	20-7F	PATCH NAME	16 ASCII Characters	
40 01 10	00 00 10	00 - 18	VOICE RESERVE	PART 10 (Drum Part)	02
40 01 11#				PART 1	06
40 01 12#				PART 2	02
40 01 13#				PART 3	02
40 01 14#				PART 4	02
40 01 15#				PART 5	02
40 01 16#				PART 6	02
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 : #				:	
40 01 1F#				PART 16	00

The sum total of voices in the voice reserve function must be equal or less than the number of the maximum polyphony. The number of the maximum polyphony of E-56 is 28.
For the compatibility to other GS models, it is recommended to be equal or less than 24.

40 01 30	00 00 01	00 - 07	REVERB MACRO	00:Room 1 01: Room 2 02: Room 3 03: Hall 1 04: Hall 2 05: Plate 06: Delay 07: Panning Delay	04
40 01 31	00 00 01	00 - 07	REVERB CHARACTER		04
40 01 32	00 00 01	00 - 07	REVERB PRE-LPF		00
40 01 33	00 00 01	00 - 7F	REVERB LEVEL		40
40 01 34	00 00 01	00 - 7F	REVERB TIME		40
40 01 35	00 00 01	00 - 7F	REVERB DELAY FEEDBACK		00
40 01 36	00 00 01	00 - 7F	REVERB SEND LEVEL TO CHORUS		00

REVERB MACRO is a parameter used to select the preset type of the effect. When set to another REVERB MACRO, all other reverb parameters will reset to the values set for each type of REVERB MACRO.

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
40 01 39	00 00 01	00 - 07	CHORUS PRE-LPF		00
40 01 3A	00 00 01	00 - 7F	CHORUS LEVEL		40
40 01 3B	00 00 01	00 - 7F	CHORUS FEEDBACK		08
40 01 3C	00 00 01	00 - 7F	CHORUS DELAY		50
40 01 3D	00 00 01	00 - 7F	CHORUS RATE		03
40 01 3E	00 00 01	00 - 7F	CHORUS DEPTH		13
40 01 3F	00 00 01	00 - 7F	CHORUS SEND LEVEL TO REVERB		00

CHORUS MACRO is a parameter used to select the preset type of effect. When set to another CHORUS MACRO, then all other chorus parameters will reset to the values set for each type of CHORUS MACRO.

40 1x 00	00 00 02	00 - 7F	TONE NUMBER	CC#00 VALUE	00
40 1x 01#		00 - 7F	P.C. VALUE		00
40 1x 02	00 00 01	00 - 10	Rx. CHANNEL	1 - 16,OFF	same as the Part#
40 1x 03	00 00 01	00 - 01	Rx. PITCH BEND	OFF / ON	01
40 1x 04	00 00 01	00 - 01	Rx. CH PRESSURE(CAf)	OFF / ON	01
40 1x 05	00 00 01	00 - 01	Rx. PROGRAM CHANGE	OFF / ON	01
40 1x 06	00 00 01	00 - 01	Rx. CONTROL CHANGE	OFF / ON	01
40 1x 07	00 00 01	00 - 01	Rx. POLY PRESSURE(PAf)	OFF / ON	01
40 1x 08	00 00 01	00 - 01	Rx. NOTE MESSAGE	OFF / ON	01
40 1x 09	00 00 01	00 - 01	Rx. RPN	OFF / ON	01
40 1x 0A	00 00 01	00 - 01	Rx. NRPN	OFF / ON	00(01*)

* Rx. NRPN is set to ON by "GS RESET".

40 1x 0B	00 00 01	00 - 01	Rx. MODULATION	OFF / ON	01
40 1x 0C	00 00 01	00 - 01	Rx. VOLUME	OFF / ON	01
40 1x 0D	00 00 01	00 - 01	Rx. PANPOT	OFF / ON	01
40 1x 0E	00 00 01	00 - 01	Rx. EXPRESSION	OFF / ON	01
40 1x 0F	00 00 01	00 - 01	Rx. HOLD1	OFF / ON	01
40 1x 10	00 00 01	00 - 01	Rx. PORTAMENTO	OFF / ON	01
40 1x 11	00 00 01	00 - 01	Rx. SOSTENUTO	OFF / ON	01
40 1x 12	00 00 01	00 - 01	Rx. SOFT	OFF / ON	01
40 1x 13	00 00 01	00 - 01	MONO/POLY MODE	Mono / Poly (=Bn 7E 01 / Bn 7F 00)	01
40 1x 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE 1 =LIMITED-MULTI 2 = FULL-MULTI	00 at x=0 01 at x%0

ASSIGN MODE is a parameter used to select the voice assign manner when "multiple Note Ons" occur(the same note number on the same channel at the same time).
The best assign modes (SINGLE(0) for Drum part and LIMITED-MULTI(1) for the other parts) are selected automatically, so you don't need reset this parameter.

40 1x 15	00 00 01	00 - 02	USE FOR RHYTHM PART	0 = OFF 1 = MAP1 2 = MAP2	00 at x%0 01 at x=0

USE FOR RHYTHM PART is a parameter to define the part to be used as an ordinary part (0), as a drum part using DRUM MAP1(1), or a drum part using DRUM MAP2(2). The default is MAP1(1) for Part10 (MIDI CH-10,x=0), and all other parts are set to ordinary parts(OFF(0)).

40 1x 16	00 00 01	28 - 58	PITCH KEY SHIFT	-24 - +24 [semitone]	40
40 1x 17 40 1x 18#	00 00 02	08 - F8	PITCH OFFSET FINE	-12.0 - +12.0 [Hz]08 Use nibblized data.	00
40 1x 19	00 00 01	00 - 7F	PART LEVEL	0 - 127 (=Bn 07 vv)	64
40 1x 1A	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40
40 1x 1B	00 00 01	00 - 7F	VELOCITY SENSE OFFSET	0 - 127	40
40 1x 1C	00 00 01	00 - 7F	PART PANPOT	Random, -63(LEFT) - +63(RIGHT) (=Bn 0A vv, except random)	40
40 1x 1D	00 00 01	00 - 7F	KEY RANGE LOW	C-1 - G9	00
40 1x 1E	00 00 01	00 - 7F	KEY RANGE HIGH	C-1 - G9	7F
40 1x 1F	00 00 01	00 - 5F	CC1 CONTROLLER NUMBER	0 - 95	10
40 1x 20	00 00 01	00 - 5F	CC2 CONTROLLER NUMBER	0 - 95	11
40 1x 21	00 00 01	00 - 7F	CHORUS SEND LEVEL	0 - 127 (=Bn 5D vv)	00
40 1x 22	00 00 01	00 - 7F	REVERB SEND LEVEL	0 - 127 (=Bn 5B vv)	28
40 1x 23	00 00 01	00 - 01	Rx. Bank Select	OFF / ON	01

Rx. Bank Select is set to ON by power-on reset or by "GS RESET".

40 1x 30	00 00 01	0E - 72	TONE MODIFY 1 Vibrato rate	-50 - +50 (=Bn 63 01 62 08 06 vv)	40
40 1x 31	00 00 01	0E - 72	TONE MODIFY 2 Vibrato depth	-50 - +50 (=Bn 63 01 62 09 06 vv)	40
40 1x 32	00 00 01	0E - 72	TONE MODIFY 3 TVF cutoff freq.	-50 - +50 (=Bn 63 01 62 20 06 vv)	40
40 1x 33	00 00 01	0E - 72	TONE MODIFY 4 TVF resonance	-50 - +50 (=Bn 63 01 62 21 06 vv)	40
40 1x 34	00 00 01	0E - 72	TONE MODIFY 5 TVF&TVA Env.attack	-50 - +50 (=Bn 63 01 62 63 06 vv)	40
40 1x 35	00 00 01	0E - 72	TONE MODIFY 6 TVF&TVA Env.decay	-50 - +50 (=Bn 63 01 62 64 06 vv)	40
40 1x 36	00 00 01	0E - 72	TONE MODIFY 7 TVF&TVA Env.release	-50 - +50 (=Bn 63 01 62 66 06 vv)	40
40 1x 37	00 00 01	0E - 72	TONE MODIFY 8 Vibrato delay	-50 - +50 (=Bn 63 01 62 0A 06 vv)	40

40 1x 40	00 00 0C	00 - 7F	SCALE TUNING C	-64 - +63 [cent]	40
40 1x 41#		00 - 7F	SCALE TUNING C#	-64 - +63 [cent]	40
40 1x 42#		00 - 7F	SCALE TUNING D	-64 - +63 [cent]	40
40 1x 43#		00 - 7F	SCALE TUNING D#	-64 - +63 [cent]	40
40 1x 44#		00 - 7F	SCALE TUNING E	-64 - +63 [cent]	40
40 1x 45#		00 - 7F	SCALE TUNING F	-64 - +63 [cent]	40
40 1x 46#		00 - 7F	SCALE TUNING F#	-64 - +63 [cent]	40
40 1x 47#		00 - 7F	SCALE TUNING G	-64 - +63 [cent]	40
40 1x 48#		00 - 7F	SCALE TUNING G#	-64 - +63 [cent]	40
40 1x 49#		00 - 7F	SCALE TUNING A	-64 - +63 [cent]	40
40 1x 4A#		00 - 7F	SCALE TUNING A#	-64 - +63 [cent]	40
40 1x 4B#		00 - 7F	SCALE TUNING B	-64 - +63 [cent]	40

40 2x 00	00 00 01	28 - 58	MOD PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 01	00 00 01	00 - 7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
40 2x 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40
40 2x 03	00 00 01	00 - 7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 04	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 [cent]	0A
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 - 100.0 [%]	00
40 2x 07	00 00 01	00 - 7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 08	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 [cent]	00
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 - 100.0 [%]	00
40 2x 10	00 00 01	40 - 58	BEND PITCH CONTROL	0 - 24 [semitone]	42
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 [%]	40
40 2x 13	00 00 01	00 - 7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 14	00 00 01	00 - 7F	BEND LFO1 PITCH DEPTH	0- 600 [cent]	00
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 [%]	00
40 2x 17	00 00 01	00 - 7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 18	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 [cent]	00
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 [%]	00
40 2x 20	00 00 01	28 - 58	CAf PITCH CONTROL	-24 - +24 [semitone]	40
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 [%]	40
40 2x 23	00 00 01	00 - 7F	CAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 24	00 00 01	00 - 7F	CAf LFO1 PITCH DEPTH	0 - 600 [cent]	00
40 2x 25	00 00 01	00 - 7F	CAf LFO1 TVF DEPTH	0 - 2400 [cent]	00
40 2x 26	00 00 01	00 - 7F	CAf LFO1 TVA DEPTH	0 - 100.0 [%]	00
40 2x 27	00 00 01	00 - 7F	CAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 28	00 00 01	00 - 7F	CAf LFO2 PITCH DEPTH	0 - 600 [cent]	00
40 2x 29	00 00 01	00 - 7F	CAf LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 2A	00 00 01	00 - 7F	CAf LFO2 TVA DEPTH	0 - 100.0 [%]	00
40 2x 30	00 00 01	28 - 58	PAf PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 31	00 00 01	00 - 7F	PAf TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
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	-10.0 - +10.0 [Hz]	40
40 2x 34	00 00 01	00 - 7F	PAf LFO1 PITCH DEPTH	0 - 600 [cent]	00
40 2x 35	00 00 01	00 - 7F	PAf LFO1 TVF DEPTH	0 - 2400 [cent]	00
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]	40
40 2x 38	00 00 01	00 - 7F	PAf LFO2 PITCH DEPTH	0 - 600 [cent]	00
40 2x 39	00 00 01	00 - 7F	PAf LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 3A	00 00 01	00 - 7F	PAf LFO2 TVA DEPTH	0 - 100.0 [%]	00
40 2x 40	00 00 01	28 - 58	CC1 PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 41	00 00 01	00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
40 2x 42	00 00 01	00 - 7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40
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	0 - 600 [cent]	00
40 2x 45	00 00 01	00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 [cent]	00
40 2x 46	00 00 01	00 - 7F	CC1 LFO1 TVA DEPTH	0 - 100.0 [%]	00
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 - 600 [cent]	00
40 2x 49	00 00 01	00 - 7F	CC1 LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 4A	00 00 01	00 - 7F	CC1 LFO2 TVA DEPTH	0 - 100.0 [%]	00
40 2x 50	00 00 01	28 - 58	CC2 PITCH CONTROL	-24 - +24 [semitone]	40
40 2x 51	00 00 01	00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40
40 2x 52	00 00 01	00 - 7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40
40 2x 53	00 00 01	00 - 7F	CC2 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 54	00 00 01	00 - 7F	CC2 LFO1 PITCH DEPTH	0 - 600 [cent]	00
40 2x 55	00 00 01	00 - 7F	CC2 LFO1 TVF DEPTH	0 - 2400 [cent]	00
40 2x 56	00 00 01	00 - 7F	CC2 LFO1 TVA DEPTH	0 - 100.0 [%]	00
40 2x 57	00 00 01	00 - 7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40
40 2x 58	00 00 01	00 - 7F	CC2 LFO2 PITCH DEPTH	0 - 600 [cent]	00
40 2x 59	00 00 01	00 - 7F	CC2 LFO2 TVF DEPTH	0 - 2400 [cent]	00
40 2x 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 [%]	00

DRUM SETUP PARAMETERS

*m:Map number (0 = MAP1, 1 = MAP2)
*rr:drum part note number (00H - 7FH)

Address(H)	*SIZE(H)*	*Data(H)*	*Parameter*	*Description*
41 m0 00 : # 41 m0 0B#	00 00 0C	20 - 7F	DRUM MAP NAME	ASCII Character
41 m1 rr	00 00 01	00 - 7F	PLAY NOTE NUMBER	Pitch coarse
41 m2 rr	00 00 01	00 - 7F	LEVEL	TVA level (=Bn 63 1A 62 rr 06 vv)
41 m3 rr	00 00 01	00 - 7F	ASSIGN GROUP NUMBER	Non, 1 - 127
41 m4 rr	00 00 01	00 - 7F	PANPOT	Random, -63(LEFT) - +63(RIGHT) (=Bn 63 1C 62 rr 06 vv)
41 m5 rr	00 00 01	00 - 7F	REVERB SEND LEVEL	0.0 - 1.0 Multiplicand of the part reverb depth (=Bn 63 1D 62 rr 06 vv)
41 m6 rr	00 00 01	00 - 7F	CHORUS SEND LEVEL	0.0 - 1.0 Multiplicand of the part chorus depth (=Bn 63 1E 62 rr 06 vv)
41 m7 rr	00 00 01	00 - 01	Rx. NOTE OFF	OFF / ON
41 m8 rr	00 00 01	00 - 01	Rx. NOTE ON	OFF / ON

When you change Drum Sets, all values of the DRUM SETUP PARAMETERS will be initialized.

Bulk Dump

You can send or request bulk data which contains a large amount of parameter data by using Bulk Dump communication.
It is used for storing bulk data in a sequencer or a computer. To send or request bulk data, use the Address and Size indicated in the following map.
You cannot use any address having "#" for the top address in a System Exclusive message except the following case.
Messages which include large data (more than 128 bytes) are sent out in separate packets, then, the top address of the following messages may be the address marked "#".
To send several packets of large DT1 messages at a time, insert intervals of at least 40ms in between those packets.

All Parameters (System Parameters and all Patch Parameters)

Address(H)	*SIZE(H)*	*Description*	*Number of packets*
48 00 00 : # 48 1D 0F#	00 1D 10	ALL	30 packets

System Parameters

Address(H)	*SIZE(H)*	*Description*	*Number of packets*
48 00 00 : # 48 00 0F#	00 00 10	SYSTEM PARAMETERS	1 packet

Patch Parameters

Address(H)	*SIZE(H)*	*Description*	*Number of packets*
48 00 10 : # 48 01 0F#	00 01 00	PATCH COMMON	1 packet
48 01 10 : # 48 02 6F#	00 01 60	BLOCK 0	2 packets
48 02 70 : # 48 04 4F#	00 01 60	BLOCK 1	2 packets
48 04 50 : # 48 06 2F#	00 01 60	BLOCK 2	2 packets
48 06 30 : # 48 08 0F#	00 01 60	BLOCK 3	2 packets
48 08 10 : # 48 09 6F#	00 01 60	BLOCK 4	2 packets
48 09 70 : # 48 0B 4F#	00 01 60	BLOCK 5	2 packets
48 0B 50 : # 48 0D 2F#	00 01 60	BLOCK 6	2 packets
48 0D 30 : # 48 0F 0F#	00 01 60	BLOCK 7	2 packets
48 0F 10 : # 48 10 6F#	00 01 60	BLOCK 8	2 packets
48 10 70 : # 48 12 4F#	00 01 60	BLOCK 9	2 packets
48 12 50 : # 48 14 2F#	00 01 60	BLOCK A	2 packets
48 14 30 : # 48 16 0F#	00 01 60	BLOCK B	2 packets
48 16 10 : # 48 17 6F#	00 01 60	BLOCK C	2 packets
48 17 70 : # 48 19 4F#	00 01 60	BLOCK D	2 packets
48 19 50 : # 48 1B 2F#	00 01 60	BLOCK E	2 packets
48 1B 30 : # 48 1D 0F#	00 01 60	BLOCK F	2 packets

DRUM SETUP PARAMETERS
*m: map number (0 = MAP1, 1 = MAP2)

Address(H)	*SIZE(H)*	*Description*	*Number of packets*
49 m0 00 : 49 m1 7F	00 02 00	PLAY NOTE NUMBER	2 packets
49 m2 00 : 49 m3 7F	00 02 00	LEVEL	2 packets
49 m4 00 : 49 m5 7F	00 02 00	ASSIGN GROUP NUMBER	2 packets
49 m6 00 : 49 m7 7F	00 02 00	PANPOT	2 packets
49 m8 00 : 49 m9 7F	00 02 00	REVERB SEND LEVEL	2 packets
49 mA 00 : 49 mB 7F	00 02 00	CHORUS SEND LEVEL	2 packets
49 mC 00 : 49 mD 7F	00 02 00	Rx. NOTE ON/OFF	2 packets
49 mE 00 : 49 mE 17	00 00 18	DRUM MAP NAME	1 packet

4 Useful Information

Decimal and Hexadecimal
It is common to use 7-bit Hexadecimal numbers in MIDI communication. The following is a conversion table between decimal numbers and 7-bit Hexadecimal numbers.

Decimal	Hexa-decimal	Decimal	Hexa-decimal	Decimal	Hexa-decimal	Decimal	Hexa-decimal
0	00H	32	20H	64	40H	96	60H
1	01H	33	21H	65	41H	97	61H
2	02H	34	22H	66	42H	98	62H
3	03H	35	23H	67	43H	99	63H
4	04H	36	24H	68	44H	100	64H
5	05H	37	25H	69	45H	101	65H
6	06H	38	26H	70	46H	102	66H
7	07H	39	27H	71	47H	103	67H
8	08H	40	28H	72	48H	104	68H
9	09H	41	29H	73	49H	105	69H
10	0AH	42	2AH	74	4AH	106	6AH
11	0BH	43	2BH	75	4BH	107	6BH
12	0CH	44	2CH	76	4CH	108	6CH
13	0DH	45	2DH	77	4DH	109	6DH
14	0EH	46	2EH	78	4EH	110	6EH
15	0FH	47	2FH	79	4FH	111	6FH
16	10H	48	30H	80	50H	112	70H
17	11H	49	31H	81	51H	113	71H
18	12H	50	32H	82	52H	114	72H
19	13H	51	33H	83	53H	115	73H
20	14H	52	34H	84	54H	116	74H
21	15H	53	35H	85	55H	117	75H
22	16H	54	36H	86	56H	118	76H
23	17H	55	37H	87	57H	119	77H
24	18H	56	38H	88	58H	120	78H
25	19H	57	39H	89	59H	121	79H
26	1AH	58	3AH	90	5AH	122	7AH
27	1BH	59	3BH	91	5BH	123	7BH
28	1CH	60	3CH	92	5CH	124	7CH
29	1DH	61	3DH	93	5DH	125	7DH
30	1EH	62	3EH	94	5EH	126	7EH
31	1FH	63	3FH	95	5FH	127	7FH

*To indicate a decimal number for the MIDI channel, Bank number, and Program number, add one to the values in the table.
*The resolution of 7-bit Hexadecimal numbers is 128. Use several bytes for values which require more resolution.
i.e. The number "ad bbH" in 7-bit Hexadecimal is "ad x 128 + bb" in Decimal form.
*A signed number (with a sign +/-) is indicated as 00H = -64, 40H = %0, 7FH = +63.
So the signed number "aaH" in 7-bit Hexadecimal is "ad - 64" (ad is the decimal number of aaH).
In case of two bytes, it is regarded as 00 00H = -8192, 40 00H = %0, 7F 7FH = +8191.
So the signed number "ad bbH" in 7-bit Hexadecimal is "ad bbH - 40 00H = ad x 128 + bb - 64 x 128", where, ad and bb is the decimal number of aaH and bbH respectively.
*The data indicated as "nibbled" is a 4-bit Hexadecimal number.
i.e. "0a 0bH" is "a x 16 + b".

<Example 1> Convert "5AH" in Hexadecimal to a Decimal number.
(By using the table)5AH = 90

<Example 2> Convert "12 34H" in 7-bit Hexadecimal to a Decimal number.
(By using the table) 12H = 18, 34H = 52
So,18 x 128 + 52 = 2356

<Example 3> Convert "0A 03 09 0D" in nibblized form to a Decimal number.
(By using the table)0AH = 10, 03H = 3, 09H = 9, 0DH = 13
So,((10 x 16 + 3) x 16 + 9) x 16 + 13 = 41885

Example of actual MIDI messages

<Example 1> 92 3E 5F
"9n" is a status of a Note On message, and "n" is a MIDI channel number.
The second byte is the Note number, and the third is Velocity.
2H = 2, 3EH = 62, 5FH = 95
So, this is a Note On message of MIDI channel=3, Note number=62(D4) and Velocity=95.

<Example 2> CE 49
"Cn" is a status of a Program change message, and "n" is a MIDI channel number.
The second byte is a Program number.
EH = 14, 49H = 73
So, this is a Program change message of MIDI channel=15, Program number= 74 (Flute in GS).

<Example 3> EA 00 28
"EnH" is a status of a Pitch bend change message, and "n" is a MIDI channel number.
The second byte (00H) is an LSB and the third (28H) is an MSB of a Pitch bend value (%signed).

The Pitch bend value is:
28 00H - 40 00H = 40 x 128 + 0 - (64 x 128 + 0) = 5120 - 8192 = -3072
So, this is a Pitch bend change message of MIDI channel=11, Pitch bend value = -3072

If the Pitch bend sensitivity is set to 2 semitones, and the Pitch bend value -8192 (00 00H) is defined as -200 cents.
The actual pitch bend value of this message is :
-200 x (-3072) % (-8192) = -75 cent

<Example 4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F
"Bn" is a status of a Control change message, and "n" is a MIDI channel number.
The second byte is a Control number and the third is the value.
This packet uses the running status rule, that is, when you send a series of messages with the same status, you can omit the following status bytes.
This message contains :

B3 64 00	MIDI CH = 4	LSB	of RPN parameter number	: 00H
(B3) 65 00	MIDI CH = 4	MSB	of RPN parameter number	: 00H
(B3) 06 0C	MIDI CH = 4	MSB	of Data entry	: 0CH
(B3) 26 00	MIDI CH = 4	LSB	of Data entry	: 00H
(B3) 64 7F	MIDI CH = 4	LSB	of RPN parameter number	: 7FH
(B3) 65 7F	MIDI CH = 4	MSB	of RPN parameter number	: 7FH

This message string means 'send data "0C 00H" to RPN parameter number"00 00H", after that, set RPN parameter number to "7F 7F"'.

RPN parameter number "00 00H" is Pitch bend sensitivity and the unit of the MSB value is a semitone, so 0CH = 12 is a value to set the Pitch bend sensitivity = 12 semitones (one octave).
GS devices ignore the LSB value of Pitch bend sensitivity. However, you had better send both MSB and LSB(=00H) to maintain data compatibility.

Once an RPN or NRPN number is set, all the Data entry messages sent after are effective.
Sometimes this rule may cause a problem if the MIDI data is played by a sequencer and it is operated in fast forward or backward made. It is recommended, therefore, to set the RPN or NRPN number to 7F 7FH after sending the Data entry messages.

*To use running-status for several MIDI event like <example 4> in a song data (e.g. Standard MIDI File data) is not recommended.
There may be a sequencer which can not handle such data correctly when it is operated in fast forward or backward. Putting the status byte for every event is the reliable way.
*The parameter number and the value of RPN or NRPN must be sent in correct order. As some sequencers may send those recorded data in different order if an event is too close to another, it is recommended to place each event in a different tick. (1-CLK for TPQN=92, or 5-CLK for TPQN=480 is recommended.)

The send order may be different as each sequencer if the events are in the same clock in sequence data.

Checksum of Roland System Exclusive messages

Roland System Exclusive messages (RQ1 and DT1) have a Checksum at the end of the data (just before EOX) to be able to check for communication errors.
The Checksum is determined by values of address and data (or size) included in the message.

<How to calculate Checksums> ("H" indicates Hexadecimal.)

The error checking process employs a sum-ckeck error detection. It provides binary bit figures whose lower 7 bits are zero when values for an address, data (or size) and the Checksum are summed.

One practical equation to determine Checksum is:

If the address is "ad bb ccH" and the data(or the size) is "dd ee ffH"
ad + bb + cc + dd + ee + ff = sum
sum % 128 = quotient % remainder
128 - remainder = checksum

<Example 1> Set "REVERB MACRO" to "ROOM 3"

According to the Parameter Address Map, the Address of REVERB MACRO is 40 01 30H, and the Value correspond to ROOM 3 is 02H.
So, the message should be :

F0 41 10 42 12 40 01 30 02 ?? F7
(1) (2) (3) (4) (5) address data checksum (6)

(1)Exclusive Status (2)ID (Roland) (3)Device ID (16) (4)Model ID (GS) (5)Command ID (DT1) (6)End of Exclusive

The Checksum is :
40H + 01H + 30H + 02H = 64 + 1 + 48 + 2 = 115(sum)
115(sum) % 128 = 0(quotient) % 115(remainder)
checksum = 128 - 115(remainder) = 13 = 0DH

Therefore, the message to send is : F0 41 10 42 12 40 01 30 02 0D F7

<Example 2> To request LEVEL of NOTE NUMBER 75(D#5; Claves) in DRUM MAP 1

NOTE NUMBER 75(D#5) is 4BH in Hexadecimal.
The Address of "LEVEL of NOTE NUMBER 75(D#5; Claves) in DRUM MAP 1" is 41 02 4BH, and the size is 00 00 01H. So, the message should be :

F0 41 10 42 11 41 02 4B 00 00 01 ?? F7
(1) (2) (3) (4) (5) address size checksum (6)

(1)Exclusive Status (2)ID (Roland) (3)Device ID (16) (4)Model ID (GS) (5)Command ID (RQ1) (6)End of Exclusive

The Checksum is :
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

Therefore, the message to send is : F0 41 10 42 11 41 02 4B 00 00 01 71 F7

<Example 3> Set "MASTER TUNE" to +23.4 cents by System Exclusive
The Address of "MASTER TUNE" is 40 00 00H, and the Size is 00 00 04H.
The Value should be nibblized data whose resolution is 0.1 cents, and which is a signed value
(00 04 00 00H (= 1024) = %0).
+23.4[cents] = 234 + 1024 = 1258 =(hexadecimal)=> 04 EAH =(nibblized)=> 00 04 0E 0AH

So, the message should be :

F0 41 10 42 12 41 00 00 00 04 0E 0A ?? F7
(1) (2) (3) (4) (5) address data checksum (6)

(1)Exclusive Status (2)ID (Roland) (3)Device ID (16) (4)Model ID (GS) (5)Command ID (DT1) (6)End of Exclusive

The Checksum is :
41H + 00H + 00H + 00H + 04H + 0EH + 0AH = 65 + 0 + 0 + 0 + 4 + 14 + 10 = 93(sum)
93(sum) % 128 = 0(quotient) % 93(remainder)
checksum = 128 - 93(remainder) = 35 = 23H

Therefore, the message to send is : F0 41 10 42 11 41 00 00 00 04 0E 0A 23 F7

MIDI IMPLEMENTATION CHART

[INTELLIGENT SYNTHESIZER] (Sound Module & Keyboard Section) Date: February 1993
Model E-56 Version: 1.00

FUNCTION		TRANSMITTED	RECOGNIZED	REMARKS
Basic Default		4	1-16	
Channel Changed		1-16, OFF	1-16, OFF	
Mode Default		X	Mode 3	
Messages		X	Mode 3, 4 (M=1)	*2
Altered		**********		
Note Number: True voice		0-127 *3	0-127	
		**********	0-127	
Velocity Note ON		O *3	O	
Note OFF		X	X	
After Touch Key's		X	O *1	
Ch's		X	O *1	
Pitch Bender		O *3	O *1	
Control Change	0,32	O *3	O (MSB only) *1	Bank select
	1	O *3	O *1	Modulation
	5	X	O *1	Portamento time
	6,38	X	O *1	Data entry
	7	O *3	O *1	Volume
	10	O *3	O *1	Panpot
	11	X	O *1	Expression
	64	O *3	O *1	Hold 1
	65	X	O *1	Portamento
	66	X	O *1	Sostenuto
	67	X	O *1	Soft
	84	X	O *1	Portamento control
	91	O *3	O (Reverb) *1	Effect 1 depth
	93	O *3	O (Chorus) *1	Effect 3 depth
	98,99	X	O *1	NRPN LSB, MSB
	100,101	X	O *1	RPN LSB, MSB
	120	X	O	All sound off
	121	X	O	Reset all controllers
Prog change: True #		O *3	O *1	
		**********	0-127	Prog. 1-128
System Exclusive		O	O	
System : Song Pos		X	X	
: Song Sel		X	X	
Common : Tune		X	X	
System : Clock		X	X	
Real Time : Commands		X	X	
Aux : Local ON/OFF		X	X	
: All Notes OFF		X	O (123-125)	
Messages : Active Sense		O	O	
: Reset		X	X	

Notes

*1 O X is selectable
*2 Recognize as M=1 even if M%1
*3 O X is selectable, transmitted only when Upper MIDI channel=ON

Mode 1: OMNI ON, POLY **Mode 2:** OMNI ON, MONO O: YES
Mode 3: OMNI OFF, POLY **Mode 4:** OMNI OFF, MONO X: NO

E-56 | 2nd Edition | RES 034-93 Printed in Italy by Alda Tecnografica srl - Grottammare | 93-02-E 56-M.I.-E

Roland