



MIDI INTELLIGENT SYNTHESIZER

E-15

MIDI implementation

E-15 INTELLIGENT SYNTHESIZER

1 Receive data

- Channel Voice Message -

■ Note off

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

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 kk=Note number : 00H - 7FH (0 - 127)
 vv=Velocity : 00H - 7FH (0 - 127)

*Velocity is ignored.

■ Note on

Status	Second	Third
9nH	kkH	vvH

n= MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 kk= Note number : 00H - 7FH (0 - 127)
 vv= Velocity : 01H - 7FH (1 - 127)

■ Polyphonic key pressure

Status	Second	Third
AnH	kkH	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 kk=Note number : 00H - 7FH (0 - 127)
 vv=Value : 00H - 7FH (0 - 127)

*Recognized when "Rx.Polyphonic key pressure = ON"

■ Control change

*Recognized when "Rx.Control change = ON"

Bank select

Status	Second	Third
BnH	00H	mmH
BnH	20H	11H

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 mm=Bank number : 00H, 7FH, (0 - 127)
 11=Bank number : 00H, 7FH, (0 - 127)

* see Table 1
 * the MSB 7-bit is ignored
 * "Bank select" is suspended until receiving "Program change"

Modulation

Status	Second	Third
BnH	01H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Modulation depth : 00H - 7FH (0 - 127)

*Recognized when "Rx.Modulation = ON(default setting)"

Portamento time

Status	Second	Third
BnH	05H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Portamento time : 00H - 7FH (0 - 127)

Data entry

Status	Second	Third
BnH	06H	mmH
BnH	26H	11H

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 mm,11=Value of the specified parameter with RPN and/or NRPN

Volume

Status	Second	Third
BnH	07H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Volume : 00H - 7FH (0 - 127)

*You can adjust the volume of specified channel(part).
 *Recognized when "Rx.Volume = ON(default setting)".

Panpot

Status	Second	Third
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Panpot : 00H - 40H 7FH (Left - Center - Right)

*Resolution of panpot is approx. 7-bit (127 steps).
 *Recognized when "Rx.Panpot = ON(default setting)".

Expression

Status	Second	Third
BnH	0BH	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Expression : 00H - 7FH (0 - 127)

*You can adjust the volume of specified channel(part).
 *Recognized when "Rx.Expression = ON(default setting)".

Hold1

Status	Second	Third
BnH	40H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Hold1 = ON(default setting)".

Portamento

Status	Second	Third
BnH	41H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Portamento = ON(default setting)".
 *In poly mode, you cannot specify the portamento source pitch.
 If you wish to specify the source pitch, you may use LGC.

Sostenuto

Status	Second	Third
BnH	42H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Sostenuto = ON(default setting)".

Soft

Status Second Third
BnH 43H vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Soft = ON(default setting)".

LGC (Legato Control)

Status Second Third
BnH 54H kkH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
kk=Legato source key number :00H - 7FH (0 - 127)

Effect1 depth(Reverb send depth)

Status Second Third
BnH 5BH vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Reverb send depth : 00H - 7FH (0 - 127)

Effect3 depth(Chorus send depth)

Status Second Third
BnH 5DH vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Chorus send depth : 00H - 7FH (0 - 127)

NRPN MSB/LSB

Status Second Third
BnH 63H mmH
BnH 62H llH

n =MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16
mm =MSB of the specified parameter by NRPN
ll =LSB of the specified parameter by NRPN

*Recognized when "Rx.NRPN = ON(OFF=default setting)".

NRPN

NRPN (Non Registered Parameter Number) is an expanded message of the control change. Each function of NRPN is described by manufacturer.

You can change the value of several GS and E-15 parameters. First, set NRPN MSB/LSB before send data entry.

E-15 can receive parameters as shown below;

NRPN		Data entry	Description
MSB	LSB	MSB	
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	rrH	mmH	Pitch coarse of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-40H-7FH (-64 - 0 - +63 semitone)
1AH	rrH	mmH	TVA level of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)
1CH	rrH	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	rrH	mmH	Reverb send depth of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-7FH (zero - maximum)

The following part on/off NRPN messages are always received on Basic Midi channel

4FH	10H	mmH	(Upper1)	Part 0 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	11H	mmH	(Lower)	Part 1 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	12H	mmH	(M.Bass)	Part 2 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	14H	mmH	(S.Effect)	Part 4 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	19H	mmH	(M.Drums)	Part 9 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	1AH	mmH	(Acc.Drum)	Part 10 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	1BH	mmH	(Acc.Bass)	Part 11 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	1CH	mmH	(Acc.1)	Part 12 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	1DH	mmH	(Acc.2)	Part 13 on/off	(mm=00H -> Off; mm=7FH -> On)
4FH	1EH	mmH	(Acc.3)	Part 14 on/off	(mm=00H -> Off; mm=7FH -> On)

*Data entry LSB is ignored.

RPN MSB/LSB

Status Second Third
BnH 65H mmH
BnH 64H llH

n =MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16
mm =MSB of the specified parameter by RPN
ll =MSB of the specified parameter by RPN

*Recognized when "Rx.RPN = ON(default setting)".

RPN

RPN (Registered Parameter Number) is the expand message of control change. Each function of RPN is described by MIDI.

You can change the value of RPN parameters. First, set RPN MSB/LSB before send data entry.

E-15 can receive Pitch bend sensitivity(RPN#0), Master fine tuning(RPN#1), Master coarse tuning(RPN#2) and RPN reset(RPN#16383).

RPN MSB	LSB	Data entry		Description
		MSB	LSB	
00H	00H	mmH	----	Pitch bend sensitivity mm: 00H-18H (0 - 24 semitone) ll: ignored (Up to 2 octaves, power on default is two semitones)
00H	01H	mmH	llH	Master fine tuning mm, ll: 00H,00H-40H,00H-7FH,7FH (-8192*100/8192 - 0 - +8191*100/8192 cent)
00H	02H	mmH	----	Master coarse tuning mm: 28H-40H-58H (-24 - 0 - +24 semitone) ll: ignored
7FH	7FH	----	----	RPN reset Return to no specified parameter of RPN and NRPN. Current setting value is no change. mm, ll: ignored

■ Program change

Status	Second
CnH	ppH
n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16	
pp=Program number : 00H - 7FH (0 - 127)	

* see Table 1

*Recognized when "Rx.Program change = ON(default setting)".

■ Channel pressure

Status	Second
DnH	vvH
n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16	
vv=Value : 00H - 7FH (0 - 127)	

*Recognized when "Rx.Channel pressure = ON".

■ Pitch bend change

Status	Second	Third
EnH	llH	mmH
n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16		
mm, ll=Value : 00H,00H - 40H,00H - 7FH,7FH (-8192 - 0 - +8191)		

*Recognized when "Rx.Pitch bend change = ON(default setting)".

Channel Mode Message

■ All sounds off

Status	Second	Third
BnH	78H	00H

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

*When "All sounds off" is received, all sounds of specified channel turn off immediately. However, the state of channel message is no change.

■ Reset all controllers

Status	Second	Third
BnH	79H	00H

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

*When "reset all controllers" is received, the following controller value of specified channel return to default at power on.

Controller	Value
Polyphonic key pressure	0(off)
Channel pressure	0(off)
Hold1	0(off)
Portamento	0(off)
Sostenuto	0(off)
Soft	0(off)

■ All notes off

Status	Second	Third
BnH	7BH	00H

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

*When "All notes off" is received, all on state notes turn to off in the specified channel. However, sound remains when hold1 and/or sostenuto is on.

■ OMNI OFF

Status	Second	Third
BnH	7CH	00H

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

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

■ MONO

Status	Second	Third
BnH	7EH	mmH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
mm=number of mono :00H - 10H (0 - 16)

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

■ POLY

Status	Second	Third
BnH	7FH	00H

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

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

System Real Time Message

■ Active sensing

Status
FEH

*Having received "active sensing", E-15 expects the interval of any data up to 300 milli-second.
If the interval is over 400 milli-second, E-15 resets all controller and turns off the received notes from MIDI IN.

■ Sequencer start

Status
FAH

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

■ Sequencer stop

Status
FCH

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

■ Timing clock

Status
F8H

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

note: if the parameter "Syn" is "Internal" this message is not received.

System Exclusive Message

■ Status Data

F0H iiH,ddH,.....,eeH
F7H

F0H : System exclusive
 ii=ID number :41H (65) or 40H (64)
 dd,....,ee=data :00H-7FH (0-127)
F7H : EOX (End of Exclusive/System common)

2 Transmit data

- Channel Voice Message -

■ Note off

Status Second Third
9nH kkH 00H

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
kk=Note number : 0CH - 78H (12 -120)

■ Note on

Status Second Third
9nH kkH vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
kk=Note number : 0CH - 78H (12 -120)
vv=Velocity : 01H - 7FH (1 - 127)

■ Control change

Bank select

Status Second Third
BnH 00H mmH
BnH 20H llH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
mm=Bank number : 00H,-7FH, (0 - 127)
ii=Bank number : 00H,-7FH, (0 - 127)

* see Table 1
* the MSB 7-bit is ignored

Modulation

Status Second Third
BnH 01H vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Modulation depth : 00H - 7FH (0 - 127)

Data entry

Status Second Third
BnH 06H mmH
BnH 26H llH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
mm,ll=Value of the specified parameter with RPN and/or NRPN

Volume

Status Second Third
BnH 07H vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Volume : 00H - 7FH (0 - 127)

Hold1

Status Second Third
BnH 40H vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

NRPN MSB/LSB

Status	Second	Third
BnH	63H	mmH
BnH	62H	llH

n =MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16
mm =MSB of the specified parameter by NRPN
ll =LSB of the specified parameter by NRPN

NRPN (Non Registered Parameter Number) is an expanded message of the control change. Each function of NRPN is described by manufacturer.

You can change the value of several GS and E-15 parameters. First, set NRPN MSB/LSB before send data entry.

The following part on/off NRPN messages are always transmitted on Basic Midi Channel:

NRPN	Data entry	Description
MSB	LSB	MSB
4FH	10H	mmH (Upper1) Part 0 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	11H	mmH (Lower) Part 1 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	12H	mmH (M.Bass) Part 2 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	14H	mmH (S.Effect) Part 4 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	19H	mmH (M.Drums) Part 9 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	1AH	mmH (Acc.Drum) Part 10 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	1BH	mmH (Acc.Bass) Part 11 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	1CH	mmH (Acc.1) Part 12 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	1DH	mmH (Acc.2) Part 13 on/off (mm=00H -> Off; mm=7FH -> On)
4FH	1EH	mmH (Acc.3) Part 14 on/off (mm=00H -> Off; mm=7FH -> On)

* Data entry LSB is ignored

■ Program change

Status	Second
CnH	ppH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
pp=Program number : 00H - 7FH (0 - 127)

* see Table 1

*Transmitted when "Tx.Program change = ON(default setting)".

System Realtime Message

Active sensing

Status
FEH

Active sense is always transmitted every 300 milli-second.

Sequencer start

Status
FAH

"Sequencer start" is transmitted if START/STOP button is pushed and the internal sequencer/arranger is in STOP mode.

Sequencer stop

Status
FCH

"Sequencer stop" is transmitted if START/STOP button is pushed and the internal sequencer/arranger is in START mode.

Timing clock

Status
F8H

"Timing clock" is always transmitted.

System Exclusive Message

Status	Data
F0H	ii H, ddH,.....,eeH
F7H	

F0H : System exclusive
ii=ID number=41H (65) or 40H (64)
dd,....,ee=data :00H-7FH (0-127)
F7H : EOX (End of Exclusive/System common)

3 Exclusive communications

E-15 can transmit and receive the many parameters using system exclusive message.

One way communication

Request data 1 RQ1 (11H)

Byte	Description
F0H	Exclusive status
41H	Manufacture's ID (Roland)
10H	Device ID (UNIT#=17)
40H	Model ID (E-15)
11H	Command ID (RQ1)
aaH	Address MSB
bbH :	
ccH	Address LSB
ssH	Size MSB
ttH	@:
uuH	Size LSB
sum	Check sum
F7H	EOX (End of exclusive)

Data set 1 DT1 (12H)

Byte	Description
F0H	Exclusive status
41H	Manufacture's ID (Roland)
10H	Device ID (UNIT#=17)
40H 42H	Model ID (E-15 or GS)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address LSB
ddH	Data
:	@:
ddH	Data
sum	Check sum
F7H	EOX (End of exclusive)

4 Parameter address map (Model ID=42H)

The address and size are described with 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

Parameter base address

There are two types of the GS exclusive message. One is an individual parameter communication. Another is a bulk dump.

Coarse address map of the exclusive communication is shown below;

[SYSTEM PARAMETERS]

Address(H)	SIZE(H)	Data(H)	Parameter	Description
40 00 00 40 00 01# 40 00 02# 40 00 03#	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 ~ +100.0 [cent] Use nibbled data.
40 00 04	00 00 01	00 - 7F	MASTER VOLUME	0 - 127
40 00 7F	00 00 01	00,	SW of GS	00H = Reset & GS MODE

For example:

As you set +100.0 cent for master tune, you must send the message as follow.

F0 41 10 42 12 40 00 00 07 0E 08 xx F7

As you set 100 for master volume, you must send the message as follow.

F0 41 10 42 12 40 00 04 64 xx F7

[PATCH PARAMETERS]

Address(H)	SIZE(H)	Data(H)	Parameter	Description
40 01 00 # 40 01 0F#	00 00 10	20 - 7F	PATCH NAME	16 ASCII Characters
40 01 10 40 01 11# # 40 01 1F#	00 00 10	00 - 17	PARTIAL RESERVE PART 0 (Drums)	PART 15 A sum of partial reserves must be up to 17H(24 decimal).
40 01 20	00 00 01	00 - 0F	ASSIGNER SEPARATE WALL	0 - 15 [top part number of the wall]
40 01 30 40 01 31 40 01 32 40 01 33 40 01 34 40 01 35 40 01 36	00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01	00 - 07 00 - 07 00 - 07 00 - 7F 00 - 7F 00 - 7F 00 - 7F	REVERB MACRO REVERB CHARACTER REVERB PRE-LPF REVERB LEVEL REVERB TIME REVERB DELAY FEEDBACK REVERB SEND LEVEL TO CHORUS	
40 01 38 40 01 39 40 01 3A 40 01 3B 40 01 3C 40 01 3D 40 01 3E 40 01 3F	00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01	00 - 07 00 - 07 00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 7F	CHORUS MACRO CHORUS PRE-LPF CHORUS LEVEL CHORUS FEEDBACK CHORUS DELAY CHORUS RATE CHORUS DEPTH CHORUS SEND LEVEL TO REVERB	

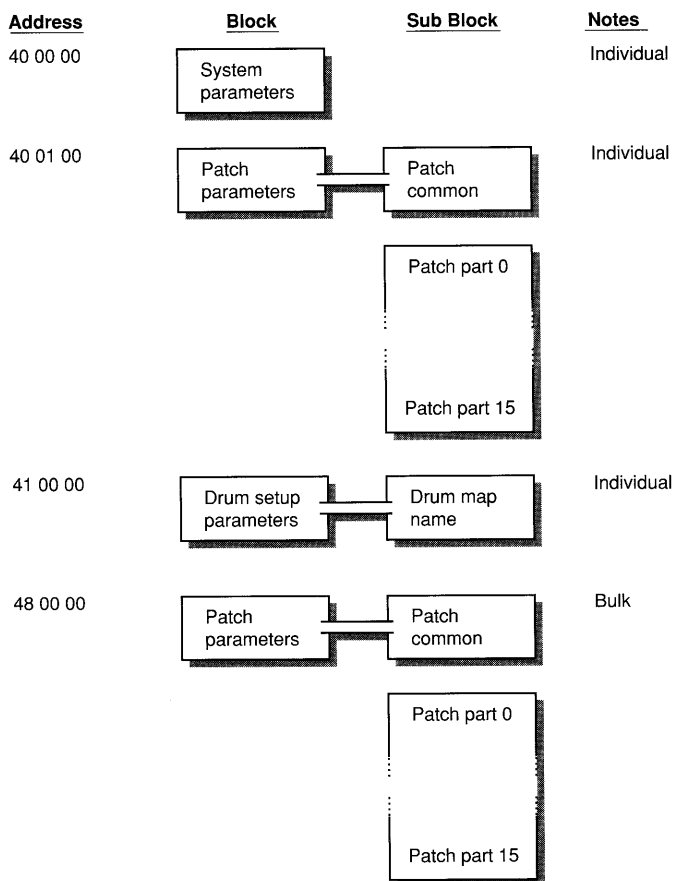
— n...part number (0 - F)
40 1n 00 00 00 02
40 1n 01# 00 - 7F P.C.
TONE NUMBER CC#00 VALUE
VALUE

— n...part number (0 - E)
40 1n 02 00 00 01
Rx. CHANNEL 1 - 16, OFF

— n...part number (0 - F)
40 1n 03 00 00 01
40 1n 04 00 00 01
40 1n 05 00 00 01
40 1n 06 00 00 01
40 1n 07 00 00 01
40 1n 08 00 00 01
40 1n 09 00 00 01
40 1n 0A 00 00 01
40 1n 0B 00 00 01
40 1n 0C 00 00 01
40 1n 0D 00 00 01
40 1n 0E 00 00 01
40 1n 0F 00 00 01
40 1n 10 00 00 01
40 1n 11 00 00 01
40 1n 12 00 00 01
Rx. PITCH BEND OFF / ON
Rx. CH PRESSURE(CA) OFF / ON
Rx. PROGRAM CHANGE OFF / ON
Rx. CONTROL CHANGE OFF / ON
Rx. POLY PRESSURE(PA) OFF / ON
Rx. NOTE MESSAGE OFF / ON
Rx. RPN OFF / ON
Rx. NRPN OFF / ON
Rx. MODULATION OFF / ON
Rx. VOLUME OFF / ON
Rx. PANPOT OFF / ON
Rx. EXPRESSION OFF / ON
Rx. HOLD1 OFF / ON
Rx. PORTAMENTO OFF / ON
Rx. SOSTENUTO OFF / ON
Rx. SOFT OFF / ON

40 1n 13 00 00 01 00 - 01 MONO/POLY MODE Mono / Poly

40 1n 14 00 00 01 00 - 02 ASSIGN MODE 0 = SINGLE
1 = LIMITED-MULTI
2 = FULL-MULTI
40 1n 15 00 00 01 00 - 02 USE FOR RHYTHM PART OFF / MAP1 / MAP2



Notes: Address map of the individual parameter

One system exclusive message "F0 F7" can only have one parameter. And you cannot use any address having "#" for the top address in a system exclusive message.

E-15 cannot receive a system exclusive data request of the following parameters.

40 1n 16	00 00 01	10 - 58	PITCH KEY SHIFT	-48 - +24 [semitone]	40 2n 49	00 00 01	00 - 7F	CC1 LFO2 TVF DEPTH	0 - 2400 [cent], OFF
40 1n 17	00 00 01	08 - F8	PITCH OFFSET FINE	-12.0 - +12.0 [Hz]	40 2n 4A	00 00 01	00 - 7F	CC1 LFO2 TVA DEPTH	0 - 100.0 [%], OFF
40 1n 18#				Use nibblized data.					
40 1n 19	00 00 01	00 - 7F	PART LEVEL	0 - 127	40 2n 50	00 00 01	00 - 7F	CC2 PITCH CONTROL	-48 - +24 [semitone], OFF
40 1n 1A	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40 2n 51	00 00 01	00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF
40 1n 1B	00 00 01	00 - 7F	VELOCITY SENSE OFFSET	0 - 127	40 2n 52	00 00 01	00 - 7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF
40 1n 1C	00 00 01	00 - 7F	PART PANNING	Random, -63(LEFT) - +63(RIGHT)	40 2n 53	00 00 01	00 - 7F	CC2 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF
40 1n 1D	00 00 01	00 - 7F	KEY RANGE LOW	C-1 - G9	40 2n 54	00 00 01	00 - 7F	CC2 LFO1 PITCH DEPTH	0 - 600 [cent], OFF
40 1n 1E	00 00 01	00 - 7F	KEY RANGE HIGH	C-1 - G9	40 2n 55	00 00 01	00 - 7F	CC2 LFO1 TVF DEPTH	0 - 2400 [cent], OFF
40 1n 1F	00 00 01	00 - 7F	CC1 CONTROLLER NUMBER	0 - 127	40 2n 56	00 00 01	00 - 7F	CC2 LFO1 TVA DEPTH	0 - 100.0 [%], OFF
40 1n 20	00 00 01	00 - 7F	CC2 CONTROLLER NUMBER	0 - 127	40 2n 57	00 00 01	00 - 7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF
40 1n 21	00 00 01	00 - 7F	CHORUS SEND DEPTH	0 - 127	40 2n 58	00 00 01	00 - 7F	CC2 LFO2 PITCH DEPTH	0 - 600 [cent], OFF
40 1n 22	00 00 01	00 - 7F	REVERB SEND DEPTH 0	- 127	40 2n 59	00 00 01	00 - 7F	CC2 LFO2 TVF DEPTH	0 - 2400 [cent], OFF
					40 2n 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 [%], OFF
40 1n 30	00 00 01	0E - 72	TONE MODIFY 1	-50 - +50					
40 1n 31	00 00 01	0E - 72	TONE MODIFY 2	-50 - +50					
40 1n 32	00 00 01	0E - 72	TONE MODIFY 3	-50 - +50					
40 1n 33	00 00 01	0E - 72	TONE MODIFY 4	-50 - +50					
40 1n 34	00 00 01	0E - 72	TONE MODIFY 5	-50 - +50					
40 1n 35	00 00 01	0E - 72	TONE MODIFY 6	-50 - +50					
40 1n 36	00 00 01	0E - 72	TONE MODIFY 7	-50 - +50					
40 1n 37	00 00 01	0E - 72	TONE MODIFY 8	-50 - +50					
40 1n 40	0000 0C	00 - 7F	SCALE TUNING C -	-64 - +63 [cent]					
40 1n 41#		00 - 7F	SCALE TUNING C#	-64 - +63 [cent]					
40 1n 42#		00 - 7F	SCALE TUNING D	-64 - +63 [cent]					
40 1n 43#		00 - 7F	SCALE TUNING D#	-64 - +63 [cent]					
40 1n 44#		00 - 7F	SCALE TUNING E	-64 - +63 [cent]					
40 1n 45#		00 - 7F	SCALE TUNING F	-64 - +63 [cent]					
40 1n 46#		00 - 7F	SCALE TUNING F#	-64 - +63 [cent]					
40 1n 47#		00 - 7F	SCALE TUNING G	-64 - +63 [cent]					
40 1n 48#		00 - 7F	SCALE TUNING G#	-64 - +63 [cent]					
40 1n 49#		00 - 7F	SCALE TUNING A	-64 - +63 [cent]					
40 1n 4A#		00 - 7F	SCALE TUNING A#	-64 - +63 [cent]					
40 1n 4B#		00 - 7F	SCALE TUNING B	-64 - +63 [cent]					
40 2n 00	00 00 01	00 - 7F	MOD PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 01	00 00 01	00 - 7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 03	00 00 01	00 - 7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 04	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 05	00 00 01	00 - 7F	MOD LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 06	00 00 01	00 - 7F	MOD LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 07	00 00 01	00 - 7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 08	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 09	00 00 01	00 - 7F	MOD LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 0A	00 00 01	00 - 7F	MOD LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 10	00 00 01	00 - 7F	BEND PITCH CONTROL	-24 - +24 [semitone], OFF					
40 2n 11	00 00 01	00 - 7F	BEND TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 12	00 00 01	00 - 7F	BEND AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 13	00 00 01	00 - 7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 14	00 00 01	00 - 7F	BEND LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 15	00 00 01	00 - 7F	BEND LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 16	00 00 01	00 - 7F	BEND LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 17	00 00 01	00 - 7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 18	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 19	00 00 01	00 - 7F	BEND LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 1A	00 00 01	00 - 7F	BEND LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 20	00 00 01	00 - 7F	CAI PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 21	00 00 01	00 - 7F	CAI TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 22	00 00 01	00 - 7F	CAI AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 23	00 00 01	00 - 7F	CAI LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 24	00 00 01	00 - 7F	CAI LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 25	00 00 01	00 - 7F	CAI LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 26	00 00 01	00 - 7F	CAI LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 27	00 00 01	00 - 7F	CAI LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 28	00 00 01	00 - 7F	CAI LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 29	00 00 01	00 - 7F	CAI LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 2A	00 00 01	00 - 7F	CAI LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 30	00 00 01	00 - 7F	PAI PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 31	00 00 01	00 - 7F	PAI TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 32	00 00 01	00 - 7F	PAI AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 33	00 00 01	00 - 7F	PAI LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 34	00 00 01	00 - 7F	PAI LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 35	00 00 01	00 - 7F	PAI LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 36	00 00 01	00 - 7F	PAI LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 37	00 00 01	00 - 7F	PAI LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 38	00 00 01	00 - 7F	PAI LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 39	00 00 01	00 - 7F	PAI LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 3A	00 00 01	00 - 7F	PAI LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 40	00 00 01	00 - 7F	CC1 PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 41	00 00 01	00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 42	00 00 01	00 - 7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 43	00 00 01	00 - 7F	CC1 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 44	00 00 01	00 - 7F	CC1 LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 45	00 00 01	00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 46	00 00 01	00 - 7F	CC1 LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 47	00 00 01	00 - 7F	CC1 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 48	00 00 01	00 - 7F	CC1 LFO2 PITCH DEPTH	0 - 600 [cent], OFF					

[DRUM SETUP PARAMETER]

Address(H)	SIZE(H)	Data(H)	Parameter	Description
41 m0 00 # 41 m0 0B#	00 00 0C	20 - 7F	DRUMS MAP NAME	ASCII Character
41 m1 rr 41 m2 rr 41 m3 rr 41 m4 rr 41 m5 rr 41 m6 rr 41 m7 rr 41 m8 rr	00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01	00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 01 00 - 01 Rx.	PLAY KEY NUMBER LEVEL GROUP NUMBER PANPOT REVERB DEPTH CHORUS DEPTH Rx. NOTE NOTE ON OFF / ON	NON, 1 - 127 Random, -63(LEFT) - +63(RIGHT)

*m:Map number (0 - 1)

*rr:rhythm part key number (00 - 7F)

[Bulk Dump]

1-packet = 128 byte(MIDI)

— PATCH ALL (64 + (112 * 16) = 0x740 byte)
— 0x740 * 2(nibblize) = 1D 00 (MIDI)

Address(H)	SIZE(H)	Data(H)	Parameter	Description
48 00 00 # 48 1C 1F#	00 1D 00	29 packets		

— PATCH COMMON (64 = 0x40 byte)
— 0x40 * 2(nibblize) = 01 00 (MIDI)

Address(H)	SIZE(H)	Data(H)	Parameter	Description
48 00 00 # 48 00 7F#	00 01 00	1 packet		

— PATCH PART (112 = 0x70 byte)
— 0x70 * 2(nibblize) = 01 60 (MIDI)

Address(H)	SIZE(H)	Data(H)	Parameter	Description
48 01 00 # 48 02 5F#	00 01 60	PART 0	2 packet	
48 02 60 # 48 04 3F#	00 01 60	PART 1	2 packet	
48 04 40 # 48 06 1F#	00 01 60	PART2	2 packet	
48 06 20 # 48 07 FF#	00 01 60	PART3	2 packet	
48 08 00 # 48 09 5F#	00 01 60	PART4	2 packet	
48 09 60 # 48 0B 5F#	00 01 60	PART5	2 packet	
48 0B 60 # 48 0D 3F#	00 01 60	PART6	2 packet	
48 0D 40 # 48 0E 1F#	00 01 60	PART7	2 packet	
48 0E 20 # 48 0F FF#	00 01 60	PART8	2 packet	
48 10 00 # 48 11 5F#	00 01 60	PART9	2 packet	
48 11 60 # 48 13 3F#	00 01 60	PART10	2 packet	
48 13 40 # 48 15 1F#	00 01 60	PART11	2 packet	
48 15 20 # 48 16 FF#	00 01 60	PART12	2 packet	
48 17 00 # 48 18 5F#	00 01 60	PART13	2 packet	
48 18 60 # 48 1A 3F#	00 01 60	PART14	2 packet	
48 1A 40 # 48 1C 1F#	00 01 60	PART15	2 packet	

5 Parameter address map (Model ID=40H)

The address and size are described with 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 40 00	Song
00 78 10	Global parameter (see table 2)
08 00 00	Chord Rx/Tx enable
09 00 00	Chord Rx/Tx data
40 00 7F	Exit from GS MODE and return to E-15 MODE

Global parameter area

System exclusive	'Data set'	: F0 41 10 40 12 00 78 10 CHKSUM F7
System exclusive	'Data request'	: F0 41 10 40 11 00 78 10 00 00 1C 5C F7

Composer data area

System exclusive	'Data set'	: F0 41 10 40 12 00 40 00 CHKSUM F7
System exclusive	'Data request'	: F0 41 10 40 11 00 40 00 00 28 00 18 F7

Chord Tx/Rx Enable

System exclusive	'Data set'	: F0 41 10 40 12 08 00 00 7F 79 F7	Rx/Tx Enable
System exclusive	'Data request'	: F0 41 10 40 12 08 00 00 00 78 F7	Rx/Tx Disable

Chord Tx/Rx data

System exclusive	'Data set'	: F0 41 10 40 12 09 00 00 CHKSUM F7
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Exit from GS MODE and return to E-15 MODE

System exclusive	'Data set'	: F0 41 10 40 12 40 00 7F 00 41 F7
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System exclusive chord information

F0 41 10 40 12 09 00 00 aa aa bb bb cc dd c1 c2 cn CHKSUM F7

09 00 00	Address
aa aa bb bb	Chord number in 'C' tonality
cc	First note to left
dd	Chord root
c1, c2, ..., cn	ASCII chord name

Table 1

* Tone program change *

A 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	Piano1
00H	00H	01H	Piano2
00H	00H	02H	Piano3
00H	00H	03H	Honky
00H	00H	04H	ElPiano1
00H	00H	05H	ElPiano2
00H	00H	06H	Harpsi
00H	00H	07H	Clavi
00H	00H	08H	Celesta
00H	00H	09H	Glock
00H	00H	0AH	MusicBox
00H	00H	0BH	Vibe
00H	00H	0CH	Marimba
00H	00H	0DH	Xilphone
00H	00H	0EH	TubeBell
00H	00H	0FH	Santur
00H	00H	10H	ElOrgan1
00H	00H	11H	ElOrgan2
00H	00H	12H	ElOrgan3
00H	00H	13H	ChrcOrg
00H	00H	14H	ReedOrg
00H	00H	15H	Accordn
00H	00H	16H	Harmonic
00H	00H	17H	Bandneon
00H	00H	18H	AcouGtr1
00H	00H	19H	AcouGtr2
00H	00H	1AH	JazzGtr
00H	00H	1BH	CleanGtr
00H	00H	1CH	MutedGtr
00H	00H	1DH	DriveGtr
00H	00H	1EH	LeadGtr
00H	00H	1FH	HarmoGtr
00H	00H	20H	AcouBass
00H	00H	21H	FingBass
00H	00H	22H	PickBass
00H	00H	23H	Fretless
00H	00H	24H	SlapBas1
00H	00H	25H	SlapBas2
00H	00H	26H	SynBass1
00H	00H	27H	SynBass2
00H	00H	28H	Violin
00H	00H	29H	Viola
00H	00H	2AH	Cello
00H	00H	2BH	Contrbas
00H	00H	2CH	TremStr
00H	00H	2DH	PizzStr
00H	00H	2EH	Harp
00H	00H	2FH	Timpani
00H	00H	30H	Strings
00H	00H	31H	SlowStr
00H	00H	32H	SynStr1
00H	00H	33H	SynStr2
00H	00H	34H	ChoirAhs
00H	00H	35H	VoiceOhs
00H	00H	36H	SynVox
00H	00H	37H	OrcheHit
00H	00H	38H	Trumpet
00H	00H	39H	Trombone
00H	00H	3AH	Tuba
00H	00H	3BH	MuteTrmp
00H	00H	3CH	FrHorn
00H	00H	3DH	BrsSect
00H	00H	3EH	SynBrs1
00H	00H	3FH	SynBrs2
00H	00H	40H	SoprSax
00H	00H	41H	AltoSax
00H	00H	42H	TenrSax
00H	00H	43H	BariSax
00H	00H	44H	Oboe
00H	00H	45H	EnglHorn
00H	00H	46H	Bassoon
00H	00H	47H	Clarinet

mmH	iiH	ppH	Sound Name	* Style Program Change *				
00H	00H	48H	Piccolo	A Style is selected by the message: BnH 00H mmH BnH 20H iiH CnH				
00H	00H	49H	Flute	ppH				
00H	00H	4AH	Recorder	n=MIDI channel number: 0H-FH (0-15) 0=ch. 1 15=ch.16				
00H	00H	4BH	PanFlute	01H	05H	ppH	Style #11	Rock1 Basic
00H	00H	4CH	BottBlow	01H	06H	ppH	Style #12	Rock2 Basic
00H	00H	4DH	Shaku	21H	01H	ppH	Style #13	Rap Basic
00H	00H	4EH	Whistle	02H	04H	ppH	Style #14	Dance Basic
00H	00H	4FH	Ocarina	03H	03H	ppH	Style #15	Funk1 Basic
00H	00H	50H	Square	03H	04H	ppH	Style #16	Funk2 Basic
00H	00H	51H	Saw	04H	03H	ppH	Style #17	Ballad1 Basic
00H	00H	52H	Calliope	05H	03H	ppH	Style #18	Sl Rock1 Basic
00H	00H	53H	Chiffer	06H	03H	ppH	Style #21	8beat1 Basic
00H	00H	54H	Charang	06H	04H	ppH	Style #22	8beat2 Basic
00H	00H	55H	Solo Vox	07H	04H	ppH	Style #23	16beat1 Basic
00H	00H	56H	5th Saw	07H	05H	ppH	Style #24	16beat2 Basic
00H	00H	57H	BassLead	08H	03H	ppH	Style #25	Reggae Basic
00H	00H	58H	Fantasia	09H	02H	ppH	Style #26	Boogie Basic
00H	00H	59H	Warm Pad	0AH	04H	ppH	Style #27	Twist Basic
00H	00H	5AH	Polysynt	0BH	01H	ppH	Style #28	Dixie Basic
00H	00H	5BH	SpaceVox	0CH	02H	ppH	Style #31	Swing Basic
00H	00H	5CH	BowGlass	0EH	01H	ppH	Style #32	Big Band Basic
00H	00H	5DH	MetalPad	0FH	02H	ppH	Style #33	Shuffle Basic
00H	00H	5EH	HaloPad	10H	02H	ppH	Style #34	Country Basic
00H	00H	5FH	SweepPad	12H	02H	ppH	Style #35	Sl Waltz Basic
00H	00H	60H	Ice Rain	11H	05H	ppH	Style #36	Waltz Basic
00H	00H	61H	SndTrack	13H	03H	ppH	Style #37	Polka Basic
00H	00H	62H	Crystal	14H	02H	ppH	Style #38	March Basic
00H	00H	63H	Atmosphe	15H	01H	ppH	Style #41	Baroque Basic
00H	00H	64H	Brightns	16H	03H	ppH	Style #42	Bossa Basic
00H	00H	65H	Goblin	17H	01H	ppH	Style #43	Rhumba Basic
00H	00H	66H	EchoDrop	18H	01H	ppH	Style #44	ChaCha Basic
00H	00H	67H	StarThem	19H	01H	ppH	Style #45	Salsa Basic
00H	00H	68H	Sitar	1AH	02H	ppH	Style #46	Tango Basic
00H	00H	69H	Banjo	1BH	03H	ppH	Style #47	Samba Basic
00H	00H	6AH	Shamisen	16H	04H	ppH	Style #48	Latin Basic
00H	00H	6BH	Koto	01H	05H	ppH	Style #51	Rock1 Advanced
00H	00H	6CH	Kalimba	01H	06H	ppH	Style #52	Rock2 Advanced
00H	00H	6DH	BagPipe	21H	01H	ppH	Style #53	Rap Advanced
00H	00H	6EH	Kokyu	02H	04H	ppH	Style #54	Dance Advanced
00H	00H	6FH	Shanai	03H	03H	ppH	Style #55	Funk1 Advanced
00H	00H	70H	TnklBell	03H	04H	ppH	Style #56	Funk2 Advanced
00H	00H	71H	Agogo	04H	03H	ppH	Style #57	Ballad1 Advanced
00H	00H	72H	SteelDrm	05H	03H	ppH	Style #58	Sl Rock1 Advanced
00H	00H	73H	WoodBlick	06H	03H	ppH	Style #61	8beat1 Advanced
00H	00H	74H	Taiko	06H	04H	ppH	Style #62	8beat2 Advanced
00H	00H	75H	MelodTom	07H	04H	ppH	Style #63	16beat1 Advanced
00H	00H	76H	SynDrum	07H	05H	ppH	Style #64	16beat2 Advanced
00H	00H	77H	RevCymb1	08H	03H	ppH	Style #65	Reggae Advanced
00H	00H	78H	GuitNois	09H	02H	ppH	Style #66	Boogie Advanced
00H	00H	79H	KeyClick	0AH	04H	ppH	Style #67	Twist Advanced
00H	00H	7AH	SeaShore	0BH	01H	ppH	Style #68	Dixie Advanced
00H	00H	7BH	Birds	0CH	02H	ppH	Style #71	Swing Advanced
00H	00H	7CH	Telephon	0EH	01H	ppH	Style #72	Big Band Advanced
00H	00H	7DH	Elicopt	0FH	02H	ppH	Style #73	Shuffle Advanced
00H	00H	7EH	Applause	10H	02H	ppH	Style #74	Country Advanced
00H	00H	7FH	GunShot	12H	02H	ppH	Style #75	Sl Waltz Advanced
				11H	05H	ppH	Style #76	Waltz Advanced
				13H	03H	ppH	Style #77	Polka Advanced
				14H	02H	ppH	Style #78	March Advanced
				15H	01H	ppH	Style #81	Baroque Advanced
				16H	03H	ppH	Style #82	Bossa Advanced
				17H	01H	ppH	Style #83	Rhumba Advanced
				18H	01H	ppH	Style #84	ChaCha Advanced
				19H	01H	ppH	Style #85	Salsa Advanced
				1AH	02H	ppH	Style #86	Tango Advanced
				1BH	03H	ppH	Style #87	Samba Advanced
				16H	04H	ppH	Style #88	Latin Advanced

* Values of ppH *

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

* E-15 User program Area *

Offset	Description	
** VOLUMES		
00H	Upper VOLUME	on/off (bit7),volume(bit6-0) [0-127]
01H	Lower VOLUME	on/off (bit7),volume(bit6-0) [0-127]
02H	Bass VOLUME	on/off (bit7),volume(bit6-0) [0-127]
03H	Accomp VOLUME	on/off (bit7),volume(bit6-0) [0-127]
04H	AccDrum VOLUME	on/off (bit7),volume(bit6-0) [0-127]
05H	S. Effect VOLUME	on/off (bit7),volume(bit6-0) [0-127]
** VOICES		
06H	Upper VOICE	free(bit7), group(bit6), bank(bit5-3), number(bit2-0)
07H	Lower VOICE	free(bit7), group(bit6), bank(bit5-3), number(bit2-0)
08H	ManBass VOICE	free(bit7), group(bit6), bank(bit5-3), number(bit2-0)
09H	Style	free(bit7-6), bank(bit5-3), number(bit2-0)
** TEMPO		
0AH	TEMPO	in B.P.M (bit7-0) [20-250]
** MIDI RX/TX PARTS		
0BH	Upper PART	on/off (bit7), free (bit6-4), channel (bit3-0)
0CH	Lower PART	on/off (bit7), free (bit6-4), channel (bit3-0)
0DH	ManBass PART	on/off (bit7), free (bit6-4), channel (bit3-0)
0EH	ManDrum PART	on/off (bit7), free (bit6-4), channel (bit3-0)
0FH	Acc1 PART	on/off (bit7), free (bit6-4), channel (bit3-0)
10H	Acc2 PART	on/off (bit7), free (bit6-4), channel (bit3-0)
11H	Acc3 PART	on/off (bit7), free (bit6-4), channel (bit3-0)
12H	AccBass PART	on/off (bit7), free (bit6-4), channel (bit3-0)
13H	AccDrum PART	on/off (bit7), free (bit6-4), channel (bit3-0)
14H	S.Effect PART	on/off (bit7), free (bit6-4), channel (bit3-0)
15H	Rx Only PART	on/off (bit7), free (bit6-4), channel (bit3-0)
16H	Note to Arr PART	on/off (bit7), free (bit6-4), channel (bit3-0)
17H	Style P.Ch. PART	on/off (bit7), free (bit6-4), channel (bit3-0)
18H	Basic MIDI Ch. PART	on/off (bit7), free (bit6-4), channel (bit3-0)
** MIDI PARAMETERS		
19H	Internal clock	on/off (bit7)
	Auto clock	on/off (bit6)
	Midi clock	on/off (bit5)
	Sustain Rx/Tx	on/off (bit4)
	Modulation Rx/Tx	on/off (bit3)
	Pitch Bender Rx/Tx	on/off (bit2)
	Program Change Rx/Tx	on/off (bit1)
	Volume Rx/Tx	on/off (bit0)
** TUNE		
1AH	Master Tune	(bit7-0) [-99,+99]
** TRANSPOSE		
1BH	Transpose	(bit7-0) [-12,+12]
		[-12(\$F4),-11(\$F5),-10(\$F6),-9(\$F7),-8(\$F8),-7(\$F9), -6(\$FA),-5(\$FB),-4(\$FC),-3(\$FD),-2(\$FE),-1(\$FF),0(\$00), +1,+2,+3,+4,+5,+6,+7,+8,+9,+10,+11,+12]

MIDI IMPLEMENTATION CHART

MODEL: ROLAND E-15

Date: April 1991

Version: 1.00

FUNCTION		TRANSMITTED	RECOGNIZED	REMARKS
Basic	Default	1-2-3-4-5-6-7-8-10-11	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 1 5 = Accomp 1 6 = Accomp 2 7 = Accomp 3 8 = Acc. Bass 9 = Rx only 10 = Man. Drums, Acc. Drums, Style Pg. ch. 11 = Sound Eff.
Channel	Changed	1-16, OFF	1-16, OFF	
Mode	Default Messages Altered	X X *****	Mode 3 X X	*2 *2
Note Number	True voice	12—120 *****	0—127 *1 0—127	
Velocity	Note ON Note OFF	○ X	○ X	
After Touch	Key's Ch's	X X	○ ○	
Pitch Bender		*1	*1	
Control Change	0,32 1 5 6,38 7 10 11 64 65 66 67 84 91 93 98,99 100,101 120 121	*1 *1 X X *1 X X *1 X X X ○ X X ○ X X X X X X	*1 (MSB only) *1 ○ ○ *1 ○ ○ *1 ○ ○ ○ ○ ○ (Reverb) ○ (Chorus) ○ ○ ○ ○ ○ ○ ○	Bank select Modulation Portamento time Data entry Volume Panpot Expression Hold 1 Portamento Sostenuto Soft LGC Effect 1 depth Effect 3 depth NRPN LSB, MSB RPN LSB, MSB All sounds off Reset all controllers
Program Change	True #	*1 *****	*1 0—127	
System Exclusive		○	○	
System Common	: Song Pos : Song Sel : Tune	X X X	X X X	
System Real Time	: Clock : Commands	*1 *1	*1 *1	
Aux Messages	: Local ON/OFF : All notes OFF : Active Sense : Reset	X X ○ X	X ○ (123-127) ○ X	
Notes		*1 ○ X can be selectable *2 Recognized as "all note off"		

Mode 1: OMNI ON, POLY
Mode 3: OMNI OFF, POLY

Mode 2: OMNI ON, MONO
Mode 4: OMNI OFF, MONO

○: YES
X: NO

"GS Standard" Multi Timbral Sound Generation

1 Receive data

- Channel Voice Message -

■ Note off

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

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 kk=Note number : 00H - 7FH (0 - 127)
 vv=Velocity : 00H - 7FH (0 - 127)

*Velocity is ignored.

■ Note on

Status	Second	Third
9nH	kkH	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 kk=Note number : 00H - 7FH (0 - 127)
 vv=Velocity : 01H - 7FH (1 - 127)

■ Polyphonic key pressure

Status	Second	Third
AnH	kkH	vvH

n= MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 kk= Note number : 00H - 7FH (0 - 127)
 vv= Value : 00H - 7FH (0 - 127)

*Recognized when "Rx.Polyphonic key pressure = ON" and set on "controller function".

■ Control change

*Recognized when "Rx.Control change = ON" and set on "controller function".

Bank select

Status	Second	Third
BnH	00H	mmH
BnH	20H	11H

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 mm,ll=Bank number : 00H,00H - 7FH,7FH (1 - 16384)

* The MSB 7-bit is ignored.

* "Bank select" is suspended until receiving "Program change"

Modulation

Status	Second	Third
BnH	01H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Modulation depth : 00H - 7FH (0 - 127)

*Recognized when "Rx.Modulation = ON(default setting)" and set on "controller function(default setting is pitch modulation)".

Portamento time

Status	Second	Third
BnH	05H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Portamento time : 00H - 7FH (0 - 127)

Data entry

Status	Second	Third
BnH	06H	mmH
BnH	26H	11H

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 mm,ll=Value of the specified parameter with RPN and/or NRPN

Volume

Status	Second	Third
BnH	07H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Volume : 00H - 7FH (0 - 127)

*You can adjust the volume of specified channel(part).

*Recognized when "Rx.Volume = ON(default setting)".

Panpot

Status	Second	Third
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Panpot : 00H - 40H 7FH (Left - Center - Right)

*Resolution of panpot is approx. 7-bit (127 steps).

*Recognized when "Rx.Panpot = ON(default setting)".

Expression

Status	Second	Third
BnH	0BH	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Expression : 00H - 7FH (0 - 127)

*You can adjust the volume of specified channel(part).

*Recognized when "Rx.Expression = ON(default setting)".

Hold1

Status	Second	Third
BnH	40H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Hold1 = ON(default setting)".

Portamento

Status	Second	Third
BnH	41H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Portamento = ON(default setting)".

*In poly mode, you cannot specify the portamento source pitch.
 If you wish to specify the source pitch, you may use LGC.

Sostenuto

Status	Second	Third
BnH	42H	vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
 vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Sostenuto = ON(default setting)".

Soft

Status Second Third
BnH 43H vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Control Value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

*Recognized when "Rx.Soft = ON(default setting)".

LGC (Legato Control)

Status Second Third
BnH 54H kkH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
kk=Legato source key number :00H - 7FH (0 - 127)

*When a note on is just come after LGC, the voice is turned re-tuning on from the pitch of legato source key according to the portamento time (no need to use portamento on/off).
If a voice turned on before LGC and the key number is equal to the legato source key number of LGC and other note on come after LGC, the pitch of previous voice is re-tuned.

For example:

On MIDI	Description	Result
90 3C 40	Note on C4	C4 on
B0 54 3C	LGC from C4	no change
90 40 40	Note on E4	Re-tuning from C4 to E4
80 3C 40	Note off C4	no change
80 40 40	Note off E4	E4 off

Effect1 depth(Reverb send depth)

Status Second Third
BnH 5BH vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Reverb send depth : 00H - 7FH (0 - 127)

Effect3 depth(Chorus send depth)

Status Second Third
BnH 5DH vvH

n=MIDI channel number : 0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Chorus send depth : 00H - 7FH (0 - 127)

NRPN MSB/LSB

Status Second Third
BnH 63H mmH
BnH 62H llH

n =MIDI channel number :0H - FH (0 - 15) 0=ch.1 15=ch.16
mm =MSB of the specified parameter by NRPN
ll =LSB of the specified parameter by NRPN

*Recognized when "Rx.NRPN = ON(OFF=default setting)".

NRPN

NRPN (Non Registered Parameter Number) is an expanded message of the control change. Each function of NRPN is described by manufacturer.

You can change the value of several GS and E-15 parameters. First, set NRPN MSB/LSB before send data entry.

GS can receive parameters as shown below;

NRPN Data entry
MSB LSB MSB LSB 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	rrH	mmH	Pitch coarse of drum instrument absolute change on specified drum instrument rr: key number of drum instrument mm: 00H-40H-7FH (-64 - 0 - +63 semitone)
1AH	rrH	mmH	TVA level of drum instrument absolute change on specified drum instrumen rr: key number of drum instrument mm: 00H-7FH (zero - maximum)
1CH	rrH	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	rrH	mmH	Reverb send depth 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.

RPN MSB/LSB

Status Second Third
BnH 65H mmH
BnH 64H llH

n =MIDI channel number :0H -FH (0 - 15) 0=ch.1 15=ch.16
mm =MSB of the specified parameter by RPN
ll =MSB of the specified parameter by RPN

*Recognized when "Rx.RPN = ON(default setting)".

RPN

RPN (Registered Parameter Number) is the expand message of control change. Each function of RPN is described by MIDI.

You can change the value of RPN parameters. First, set RPN MSB/LSB before send data entry.

GS can receive Pitch bend sensitivity(RPN#0), Master fine tuning(RPN#1), Master coarse tuning(RPN#2) and RPN reset(RPN#16383).

RPN MSB LSB	Data entry MSB LSB	Description
00H 00H	mmH ----	Pitch bend sensitivity mm: 00H-18H (0 - 24 semitone) l l: ignored (Up to 2 octaves, power on default is two semitones)
00H 01H	mmH l l H	Master fine tuning mm, l l: 00H,00H-40H,00H-7FH,7FH (-8192*100/8192 - 0 - +8191*100/8192 cent)
00H 02H	mmH ----	Master coarse tuning mm: 28H-40H-58H (-24 - 0 - +24 semitone) l l: ignored
7FH 7FH	---- ----	RPN reset Return to no specified parameter of RPN and NRPN. Current setting value is no change. mm, l l: ignored

■ Program change

Status CnH	Second ppH
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16
pp=Program number :	00H - 7FH (0 - 127)
*Recognized when "Rx.Program change = ON(default setting)".	

■ Channel pressure

Status DnH	Second vvH
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16
vv=Value :	00H - 7FH (0 - 127)
*Recognized when "Rx.Channel pressure = ON" and set on "controller function".	

■ Pitch bend change

Status EnH	Second l l H	Third mmH
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
mm, l l=Value :	00H,00H - 40H,00H - 7FH,7FH (-8192 - 0 - +8191)	
*Recognized when "Rx.Pitch bend change = ON(default setting)" and set on "controller function(default setting is pitch bend)".		

Channel Mode Message -

■ All sounds off

Status BnH	Second 78H	Third 00H
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
*When "All sounds off" is received, all sounds of specified channel turn off immediately. However, the state of channel message is no change.		

■ Reset all controllers

Status BnH	Second 79H	Third 00H
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
*When "reset all controllers" is received, the following controller value of specified channel return to default at power on.		
Controller	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	No specified parameters.	
NRPN	No specified parameters.	

■ All notes off

Status BnH	Second 7BH	Third 00H
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
*When "All notes off" is received, all on state notes turn to off in the specified channel. However, sound remains when hold1 and/or sostenuto is on.		

■ OMNI OFF

Status BnH	Second 7CH	Third 00H
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
*OMNI OFF is only recognized as "all notes off". Mode doesn't change.		

■ OMNI ON

Status BnH	Second 7DH	Third 00H
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
*OMNI ON is only recognized as "all notes off". Mode doesn't change, still OMNI OFF.		

■ MONO

Status BnH	Second 7EH	Third mmH
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
mm=number of mono :	00H - 10H (0 - 16)	
*MONO is recognized as "all notes off". And the specified channel turns to Mode4 (m=1), even if mm is not equal to 1 (mm is ignored).		

■ POLY

Status BnH	Second 7FH	Third 00H
n=MIDI channel number :	0H - FH (0 - 15) 0=ch.1 15=ch.16	
*POLY is recognized as "all notes off". And the specified channel turns to Mode3.		

System Real Time Message

■ Active sensing

Status
FEH

*Having received "active sensing", GS expects the interval of any data to occur within 300 milli-second.
If the interval is over 420 milli-second, GS does "All sounds off", "All sounds off" and "Reset all controllers" and turns on normal operation. (Will not check interval time).

System Exclusive Message

Status Data
F0H ii H, ddH,.....,eeH
F7H

F0H : System exclusive
 ii=ID number=41H (65)
 dd,....,ee=data :00H-7FH (0-127)
F7H : EOX (End of Exclusive/System common)

*Refer to section 3,4.

2 Transmit data

System Realtime Message

■ Active sensing

Status
FEH

3 Exclusive communications

GS can transmit and receive the the patch parameters using system exclusive message.

One way communication

Data set 1 DT1 (12H)

Byte	Description
F0H	Exclusive status
41H	Manufacture's ID (Roland)
10H	Device ID (UNIT#=17)
42H	Model ID (GS)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address LSB
ddH	Data
:	@:
ddH	Data
sum	Check sum
F7H	EOX (End of exclusive)

4 Parameter address map (Model ID=42H)

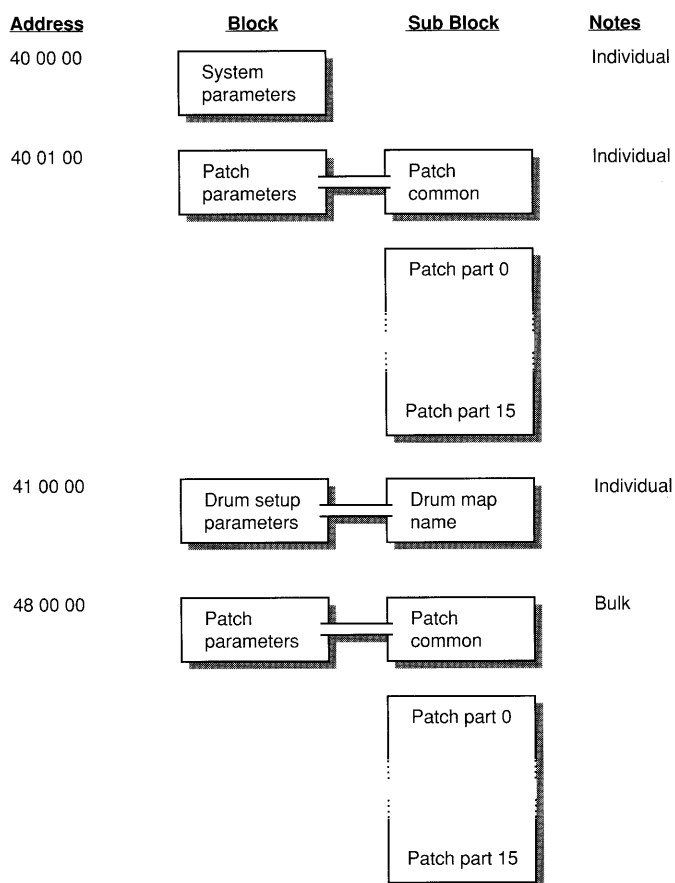
The address and size are described with 7-bit hexadecimal.

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

Parameter base address

There are two types of the GS exclusive message. One is an individual parameter communication. Another is a bulk dump.

Coarse address map of the exclusive communication is shown below;



Notes: Address map of the individual parameter

One system exclusive message "F0 F7" can only have one parameter. And you cannot use any address having "#" for the top address in a system exclusive message.

E-15 cannot receive a system exclusive data request of the following parameters.

[SYSTEM PARAMETERS]

Address(H)	SIZE(H)	Data(H)	Parameter	Description
40 00 00 40 00 01# 40 00 02# 40 00 03#	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 - +100.0 [cent] Use nibbled data.
40 00 04	00 00 01	00 - 7F	MASTER VOLUME	0 - 127
40 00 7E NUMBER	00 00 01	00 - 7F	LGC CONTROLLER	0 - 127 (default=54H)
40 00 7F	00 00 01	00,		Reset GS

For example:

As you set +100.0 cent for master tune, you must send the message as follow.

F0 41 10 42 12 40 00 00 07 0E 08 xx F7

As you set 100 for master volume, you must send the message as follow.

F0 41 10 42 12 40 00 04 64 xx F7

[PATCH PARAMETERS]

Address(H)	SIZE(H)	Data(H)	Parameter	Description
40 01 00 # 40 01 0F#	00 00 10	20 - 7F	PATCH NAME	16 ASCII Characters
40 01 10 40 01 11# # 40 01 1F#	00 00 10	00 - 17	PARTIAL RESERVE PART 0 (Drums)	PART 15 A sum of partial reserves must be up to 17H(24 decimal).
40 01 20	00 00 01	00 - 0F	ASSIGNER SEPARATE WALL	0 - 15 [top part number of the wall]
40 01 30 40 01 31 40 01 32 40 01 33 40 01 34 40 01 35 40 01 36	00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01	00 - 07 00 - 07 00 - 07 00 - 7F 00 - 7F 00 - 7F 00 - 7F	REVERB MACRO REVERB CHARACTER REVERB PRE-LPF REVERB LEVEL REVERB TIME REVERB DELAY FEEDBACK REVERB SEND LEVEL TO CHORUS	
40 01 38 40 01 39 40 01 3A 40 01 3B 40 01 3C 40 01 3D 40 01 3E 40 01 3F	00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01	00 - 07 00 - 07 00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 7F 00 - 7F	CHORUS MACRO CHORUS PRE-LPF CHORUS LEVEL CHORUS FEEDBACK CHORUS DELAY CHORUS RATE CHORUS DEPTH CHORUS SEND LEVEL TO REVERB	
40 1n 00 40 1n 01#	00 00 02	00 - 7F 00 - 7F P.C.	TONES NUMBER	CC#00 VALUE VALUE
40 1n 02 40 1n 03 40 1n 04 40 1n 05 40 1n 06 40 1n 07 40 1n 08 40 1n 09 40 1n 0A 40 1n 0B 40 1n 0C 40 1n 0D 40 1n 0E 40 1n 0F 40 1n 10 40 1n 11 40 1n 12	00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01 00 00 01	00 - 11 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01 00 - 01	Rx. CHANNEL1 - 16 Rx. PITCH BEND Rx. CH PRESSURE(CA#) Rx. PROGRAM CHANGE Rx. CONTROL CHANGE Rx. POLY PRESSURE(PA#) Rx. NOTE MESSAGE Rx. RPN Rx. NRPN Rx. MODULATION Rx. VOLUME Rx. PANPOT Rx. EXPRESSION Rx. HOLD1 Rx. PORTAMENTO Rx. SOSTENUTO Rx. SOFT	OFF OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON OFF / ON
40 1n 13	00 00 01	00 - 01	MONO/POLY MODE	Mono / Poly
40 1n 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE 1 = LIMITED-MULTI 2 = FULL-MULTI
40 1n 15	00 00 01	00 - 02	USE FOR RHYTHM PART	OFF / MAP1 / MAP2
40 1n 16	00 00 01	10 - 58	PITCH KEY SHIFT	-48 - +24 [semitone]

40 1n 17	00 00 01	08 - F8	PITCH OFFSET FINE	-12.0 - +12.0 [Hz]	40 2n 50	00 00 01	00 - 7F	CC2 PITCH CONTROL	-48 - +24 [semitone], OFF
40 1n 18#			Use nibblized data.		40 2n 51	00 00 01	00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF
40 1n 19	00 00 01	00 - 7F	PART LEVEL	0 - 127	40 2n 52	00 00 01	00 - 7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF
40 1n 1A	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40 2n 53	00 00 01	00 - 7F	CC2 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF
40 1n 1B	00 00 01	00 - 7F	VELOCITY SENSE OFFSET	0 - 127	40 2n 54	00 00 01	00 - 7F	CC2 LFO1 PITCH DEPTH	0 - 600 [cent], OFF
40 1n 1C	00 00 01	00 - 7F	PART PANNING	Random, -63(LEFT) - +63(RIGHT)	40 2n 55	00 00 01	00 - 7F	CC2 LFO1 TVF DEPTH	0 - 2400 [cent], OFF
40 1n 1D	00 00 01	00 - 7F	KEY RANGE LOW	C-1 - G9	40 2n 56	00 00 01	00 - 7F	CC2 LFO1 TVA DEPTH	0 - 100.0 [%], OFF
40 1n 1E	00 00 01	00 - 7F	KEY RANGE HIGH	C-1 - G9	40 2n 57	00 00 01	00 - 7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF
40 1n 1F	00 00 01	00 - 7F	CC1 CONTROLLER NUMBER	0 - 127	40 2n 58	00 00 01	00 - 7F	CC2 LFO2 PITCH DEPTH	0 - 600 [cent], OFF
40 1n 20	00 00 01	00 - 7F	CC2 CONTROLLER NUMBER	0 - 127	40 2n 59	00 00 01	00 - 7F	CC2 LFO2 TVF DEPTH	0 - 2400 [cent], OFF
40 1n 21	00 00 01	00 - 7F	CHORUS SEND DEPTH	0 - 127	40 2n 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 [%], OFF
40 1n 22	00 00 01	00 - 7F	REVERB SEND DEPTH 0	- 127					
40 1n 30	00 00 01	0E - 72	TONE MODIFY 1	-50 - +50					
40 1n 31	00 00 01	0E - 72	TONE MODIFY 2	-50 - +50					
40 1n 32	00 00 01	0E - 72	TONE MODIFY 3	-50 - +50					
40 1n 33	00 00 01	0E - 72	TONE MODIFY 4	-50 - +50					
40 1n 34	00 00 01	0E - 72	TONE MODIFY 5	-50 - +50					
40 1n 35	00 00 01	0E - 72	TONE MODIFY 6	-50 - +50					
40 1n 36	00 00 01	0E - 72	TONE MODIFY 7	-50 - +50					
40 1n 37	00 00 01	0E - 72	TONE MODIFY 8	-50 - +50					
40 1n 40 00	00 0C 00 - 7F		SCALE TUNING C -64 - +63 [cent]						
40 1n 41#	00 - 7F		SCALE TUNING C#	-64 - +63 [cent]					
40 1n 42#	00 - 7F		SCALE TUNING D	-64 - +63 [cent]					
40 1n 43#	00 - 7F		SCALE TUNING D#	-64 - +63 [cent]					
40 1n 44#	00 - 7F		SCALE TUNING E	-64 - +63 [cent]					
40 1n 45#	00 - 7F		SCALE TUNING F	-64 - +63 [cent]					
40 1n 46#	00 - 7F		SCALE TUNING F#	-64 - +63 [cent]					
40 1n 47#	00 - 7F		SCALE TUNING G	-64 - +63 [cent]					
40 1n 48#	00 - 7F		SCALE TUNING G#	-64 - +63 [cent]					
40 1n 49#	00 - 7F		SCALE TUNING A	-64 - +63 [cent]					
40 1n 4A#	00 - 7F		SCALE TUNING A#	-64 - +63 [cent]					
40 1n 4B#	00 - 7F		SCALE TUNING B	-64 - +63 [cent]					
40 2n 00	00 00 01	00 - 7F	MOD PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 01	00 00 01	00 - 7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 03	00 00 01	00 - 7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 04	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 05	00 00 01	00 - 7F	MOD LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 06	00 00 01	00 - 7F	MOD LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 07	00 00 01	00 - 7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 08	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 09	00 00 01	00 - 7F	MOD LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 0A	00 00 01	00 - 7F	MOD LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 10	00 00 01	00 - 7F	BEND PITCH CONTROL	-24 - +24 [semitone], OFF					
40 2n 11	00 00 01	00 - 7F	BEND TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 12	00 00 01	00 - 7F	BEND AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 13	00 00 01	00 - 7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 14	00 00 01	00 - 7F	BEND LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 15	00 00 01	00 - 7F	BEND LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 16	00 00 01	00 - 7F	BEND LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 17	00 00 01	00 - 7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 18	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 19	00 00 01	00 - 7F	BEND LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 1A	00 00 01	00 - 7F	BEND LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 20	00 00 01	00 - 7F	CAI PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 21	00 00 01	00 - 7F	CAI TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 22	00 00 01	00 - 7F	CAI AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 23	00 00 01	00 - 7F	CAI LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 24	00 00 01	00 - 7F	CAI LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 25	00 00 01	00 - 7F	CAI LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 26	00 00 01	00 - 7F	CAI LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 27	00 00 01	00 - 7F	CAI LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 28	00 00 01	00 - 7F	CAI LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 29	00 00 01	00 - 7F	CAI LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 2A	00 00 01	00 - 7F	CAI LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 30	00 00 01	00 - 7F	PAI PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 31	00 00 01	00 - 7F	PAI TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 32	00 00 01	00 - 7F	PAI AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 33	00 00 01	00 - 7F	PAI LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 34	00 00 01	00 - 7F	PAI LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 35	00 00 01	00 - 7F	PAI LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 36	00 00 01	00 - 7F	PAI LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 37	00 00 01	00 - 7F	PAI LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 38	00 00 01	00 - 7F	PAI LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 39	00 00 01	00 - 7F	PAI LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 3A	00 00 01	00 - 7F	PAI LFO2 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 40	00 00 01	00 - 7F	CC1 PITCH CONTROL	-48 - +24 [semitone], OFF					
40 2n 41	00 00 01	00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cent], OFF					
40 2n 42	00 00 01	00 - 7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 [%], OFF					
40 2n 43	00 00 01	00 - 7F	CC1 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 44	00 00 01	00 - 7F	CC1 LFO1 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 45	00 00 01	00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 46	00 00 01	00 - 7F	CC1 LFO1 TVA DEPTH	0 - 100.0 [%], OFF					
40 2n 47	00 00 01	00 - 7F	CC1 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz], OFF					
40 2n 48	00 00 01	00 - 7F	CC1 LFO2 PITCH DEPTH	0 - 600 [cent], OFF					
40 2n 49	00 00 01	00 - 7F	CC1 LFO2 TVF DEPTH	0 - 2400 [cent], OFF					
40 2n 4A	00 00 01	00 - 7F	CC1 LFO2 TVA DEPTH	0 - 100.0 [%], OFF					

[DRUM SETUP PARAMETER]

Address(H)	SIZE(H)	Data(H)	Parameter	Description
41 m0 00 # 41 m0 0B#	00 00 0C	20 - 7F	DRUMS MAP NAME	ASCII Character
41 m1 rr	00 00 01	00 - 7F	PLAY KEY NUMBER	
41 m2 rr	00 00 01	00 - 7F	LEVEL	
41 m3 rr	00 00 01	00 - 7F	GROUP NUMBER	NON, 1 - 127
41 m4 rr	00 00 01	00 - 7F	PANPOT	Random, -63(LEFT) - +63(RIGHT)
41 m5 rr	00 00 01	00 - 7F	REVERB DEPTH	
41 m6 rr	00 00 01	00 - 7F	CHORUS DEPTH	
41 m7 rr	00 00 01	00 - 01	Rx. NOTE	OFF OFF / ON
41 m8 rr	00 00 01	00 - 01 Rx.	NOTE ON OFF / ON	

*m:Map number (0 - 1)

*rr:rhythm part key number (00 - 7F)

[Bulk Dump]

1-packet = 128 byte(MIDI)

— PATCH ALL (64 + (112 * 16) = 0x740 byte)
— 0x740 * 2(nibblize) = 1D 00 (MIDI)

Address(H)	SIZE(H)	Data(H)	Parameter	Description
48 00 00 # 48 1C 1F#	00 1D 00			29 packets

— PATCH COMMON (64 = 0x40 byte)
— 0x40 * 2(nibblize) = 01 00 (MIDI)

Address(H)	SIZE(H)	Data(H)	Parameter	Description
48 00 00 # 48 00 7F#	00 01 00			1 packet

— PATCH PART (112 = 0x70 byte)
— 0x70 * 2(nibblize) = 01 60 (MIDI)

Address(H)	SIZE(H)	Data(H)	Parameter	Description
48 01 00 # 48 02 5F#	00 01 60		PART 0	2 packet
48 02 60 # 48 04 3F#	00 01 60		PART 1	2 packet
48 04 40 # 48 06 1F#	00 01 60		PART2	2 packet
48 06 20 # 48 07 FF#	00 01 60		PART3	2 packet
48 08 00 # 48 09 5F#	00 01 60		PART4	2 packet
48 09 60 # 48 0B 5F#	00 01 60		PART5	2 packet
48 0B 60 # 48 0D 3F#	00 01 60		PART6	2 packet
48 0D 40 # 48 0E 1F#	00 01 60		PART7	2 packet
48 0E 20 # 48 0F FF#	00 01 60		PART8	2 packet
48 10 00 # 48 11 5F#	00 01 60		PART9	2 packet
48 11 60 # 48 13 3F#	00 01 60		PART10	2 packet
48 13 40 # 48 15 1F#	00 01 60		PART11	2 packet
48 15 20 # 48 16 FF#	00 01 60		PART12	2 packet
48 17 00 # 48 18 5F#	00 01 60		PART13	2 packet
48 18 60 # 48 1A 3F#	00 01 60		PART14	2 packet
48 1A 40 # 48 1C 1F#	00 01 60		PART15	2 packet

MIDI IMPLEMENTATION CHART

(Multi Timbral Sound Generation)
"GS STANDARD"

Date: April 1991
Version: 1.00

FUNCTION		TRANSMITTED	RECOGNIZED	REMARKS
Basic Channel	Default Changed	X X	1-16 1-16 each	Can be memorized
Mode	Default Messages Altered	X X *****	Mode 3 Mode 3, 4 (m = 1)	*2
Note Number	True voice	X *****	0—127 0—127	
Velocity	Note ON Note OFF	X X	○ X	
After Touch	Key's Ch's	X X	*1 *1	
Pitch Bender		X	*1	Resolution: 12 bit
Control Change	0,32	X	*3 (MSB only)	Bank select
	1	X	*1	Modulation
	5	X	*3	Portamento time
	6,38	X	*3	Data entry
	7	X	*1	Volume
	10	X	*1	Panpot
	11	X	*1	Expression
	64	X	*1	Hold 1
	65	X	*1	Portamento
	66	X	*1	Sostenuto
	67	X	*1	Soft
	84	X	*3	LGC
	91	X	*3 (Reverb)	Effect 1 depth
	93	X	*3 (Chorus)	Effect 3 depth
	98,99	X	*1	NRPN LSB, MSB
	100, 101	X	*1	RPN LSB, MSB
	120	X	○	All sounds off
	121	X	○	Reset all controllers
Program Change	True #	X *****	*1 0—127	
System Exclusive		X	○	
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	○ (123-127)	
Messages	: Active Sense	○	○	
	: Reset	X	X	
Notes		*1 ○ X can be selectable *2 Recognized as m = 1 even if m! = 1 *3 ○ X can be selectable, only using the receive switch of control change (all)		

Mode 1: OMNI ON, POLY
Mode 3: OMNI OFF, POLY

Mode 2: OMNI ON, MONO
Mode 4: OMNI OFF, MONO

○: YES
X: NO

