

MIDI IMPLEMENTATION

Model: AT-S Series
Date: May. 8, 2002
Version: 1.00

1. Receive data

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH
9nH	kkH	00H

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

- * For Drum Parts, these messages are received when Rx.NOTE OFF = ON for each Instrument.
- * The velocity values of Note Off messages are ignored.

● Note on

Status	2nd bytes	3rd byte
9nH	kkH	vvH

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

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

● Polyphonic Key Pressure

Status	2nd bytes	3rd byte
AnH	kkH	vvH

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

- * Not received when Rx.POLY PRESSURE (PAf) = OFF. (Initial value is ON)
- * The resulting effect is determined by System Exclusive messages. With the initial settings, there will be no effect.
- * Not Received in Keyboard Part.

● Control Change

- * When Rx.CONTROL CHANGE = OFF, all control change messages except for Channel Mode messages will be ignored.
- * The value specified by a Control Change message will not be reset even by a Program Change, etc.

○ Bank Select (Controller number 0, 32)

Status	2nd bytes	3rd byte
BnH	00H	mmH
BnH	20H	llH

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

- * After receiving "GM1 System ON," Bank Select messages will be ignored. After receiving "GM2 System On" or "GS Reset," Bank Select messages will be recognized.
- * Bank Select processing will be suspended until a Program Change message is received.
- * Not Received in Keyboard Part.

○ Modulation (Controller number 1)

Status	2nd bytes	3rd byte
BnH	01H	vvH

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

- * Not received when Rx.MODULATION = OFF. (Initial value is ON)
- * The resulting effect is determined by System Exclusive messages. With the initial settings, this is Pitch Modulation Depth.

○ Portamento Time (Controller number 5)

Status	2nd bytes	3rd byte
BnH	05H	vvH

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

- * This adjusts the rate of pitch change when Portamento is ON or when using the Portamento Control. A value of 0 results in the fastest change.

○ Data Entry (Controller number 6, 38)

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

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

○ Volume (Controller number 7)

Status	2nd bytes	3rd byte
BnH	07H	vvH

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

- * Volume messages are used to adjust the volume balance of each Part.
- * Not received when Rx.VOLUME = OFF. (Initial value is ON)
- * Not Received in Keyboard Part.

○ Pan (Controller number 10)

Status	2nd bytes	3rd byte
BnH	0AH	vvH

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

- * For Rhythm Parts, this is a relative adjustment of each Instrument's pan setting.
- * Not received when Rx.PANPOT = OFF. (Initial value is ON)
- * Not Received in Keyboard Part.

○ Expression (Controller number 11)

Status	2nd bytes	3rd byte
BnH	0BH	vvH

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

- * It can be used independently from Volume messages. Expression messages are used for musical expression within a performance; e.g., expression pedal movements, crescendo and decrescendo.
- * Not received when Rx.EXPRESSION = OFF. (Initial value is ON)
- * Not Received in Keyboard Part.

○ Glide (Controller number 16)

Status	2nd bytes	3rd byte
BnH	10H	vvH

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

- * It can be used on only keyboard part. Not received on GS part.

○ Hold 1 (Controller number 64)

Status	2nd bytes	3rd byte
BnH	40H	vvH

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

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

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○Portamento (Controller number 65)

Status	2nd bytes	3rd byte
BnH	41H	vvH

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

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

○Sostenuto (Controller number 66)

Status	2nd bytes	3rd byte
BnH	42H	vvH

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

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

* Not Received in Keyboard Part.

○Soft (Controller number 67)

Status	2nd bytes	3rd byte
BnH	43H	vvH

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

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

* Not Received in Keyboard Part.

○Portamento control (Controller number 84)

Status	2nd bytes	3rd byte
BnH	54H	kkH

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

* A Note-on received immediately after a Portamento Control message will change continuously in pitch, starting from the pitch of the Source Note Number.

* If a voice is already sounding for a note number identical to the Source Note Number, this voice will continue sounding (i.e., legato) and will, when the next Note-on is received, smoothly change to the pitch of that Note-on.

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

Example 1.

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

Example 2.

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

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

Status	2nd bytes	3rd byte
BnH	5BH	vvH

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

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

* Not Received in Keyboard Part.

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

Status	2nd bytes	3rd byte
BnH	5DH	vvH

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

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

* Not Received in Keyboard Part.

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

Status	2nd bytes	3rd byte
BnH	63H	mmH
BnH	62H	llH

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

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

* The value set by NRPN will not be reset even if Program Change or Reset All Controllers is received.

* Not Received in Keyboard Part.

NRPN

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used.

To use these messages, you must first use NRPN MSB and NRPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7FH) when you have finished setting the value of the desired parameter. Refer to Section 4. Supplementary material "Examples of actual MIDI messages" <Example 4> (p. 12). On the GS devices, Data entry LSB (llH) of NRPN is ignored, so it is no problem to send Data entry MSB (mmH) only (without Data entry LSB).

On the AT-S, NRPN can be used to modify the following parameters.

NRPN	Data entry	Description
<u>MSB LSB</u>	<u>MSB</u>	<u>Description</u>
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 (relative change on specified drum instrument) rr: key number of drum instrument mm: 00H-40H-7FH (-63 - 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 level of drum instrument (absolute change on specified drum instrument) rr: key number of drum instrument mm: 01H-7FH (zero-maximum)
1EH rrH	mmH	Chorus send level of drum instrument (absolute change on specified drum instrument) rr: key number of drum instrument mm: 01H-7FH (zero-maximum)

* Parameters marked "relative change" will change relative to the preset value.

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

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

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

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

mm = upper byte of parameter number specified by RPN

ll = lower byte of parameter number specified by RPN

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

RPN

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

To use these messages, you must first use RPN MSB and RPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7FH) when you have finished setting the value of the desired parameter. Refer to Section 4. "Examples of actual MIDI messages" <Example 4> (p. 12).

On the AT-S, RPN can be used to modify the following parameters.

RPN	Data entry	Explanation
<u>MSB LSB</u> 00H 00H	<u>MSB LSB</u> mmH ---	Pitch Bend Sensitivity mm: 00H-18H (0-24 semitones), Initial Value = 02H (2 semitones) ll: ignored (processed as 00h) specify up to 2 octaves in semitone steps
00H 01H	mmH llH	Master Fine Tuning mm, ll: 20 00H - 40 00H - 60 00H (-50 - 0 - +50 cents), Initial Value = 40 00H (0 cent) ll: ignored (processed as 00h) specify up to 2 octaves in semitone steps Refer to 4. Supplementary material, "About tuning" (p. 13)
00H 02H	mmH ---	Master Coarse Tuning mm: 10H - 40H - 70H (-48 - 0 - +48 semitones), Initial Value = 40H (0 cent) ll: ignored (processed as 00h)
7FH 7FH	--- ---	RPN null Set condition where RPN and NRPN are unspecified. The data entry messages after set RPN null will be ignored. (No Data entry messages are required after RPN null). Settings already made will not change. mm, ll: ignored

●Program Change

Status	2nd bytes
CnH	ppH

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

pp = Program number: 00H-7FH (prog.1-prog.128)

- * Not received when Rx.PROGRAM CHANGE = OFF. (Initial value is ON)
- * After a Program Change message is received, the sound will change beginning with the next Note-on. Voices already sounding when the Program Change message was received will not be affected.
- * For Drum Parts, Program Change messages will not be received on bank numbers 129-16384 (the value of Control Number 0 is other than 0 (00H)).
- * When MIDI-IN Mode = Mode-2, it should be used System Exclusive messages to change the voice of keyboard part.
- * Not Received in Keyboard Part.

●Channel Pressure

Status	2nd bytes
DnH	vvH

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

vv = Channel Pressure: 00H-7FH (0-127)

- * Not received when Rx.CH PRESSURE (CA) = OFF. (Initial value is ON)
- * The resulting effect is determined by System Exclusive messages. With the initial settings there will be no effect.
- * The initial setting of Keyboard part is Vibrato depth. It can not be changed.

●Pitch Bend Change

Status	2nd byte	3rd bytes
EnH	llH	mmH

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

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

- * Not received when Rx.PITCH BEND = OFF. (Initial value is ON)
- * The resulting effect is determined by System Exclusive messages. With the initial settings the effect is Pitch Bend.

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■ Channel Mode Messages

● All Notes Off (Controller number 123)

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

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

* When All Notes Off is received, all notes on the corresponding channel will be turned off. However if Hold 1 or Sostenuito is ON, the sound will be continued until these are turned off.

● OMNI OFF (Controller number 124)

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

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

* The same processing will be carried out as when All Notes Off is received.
* Not Received in Keyboard Part.

● OMNI ON (Controller number 125)

Status	2nd byte	3rd bytes
BnH	7DH	00H

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

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

● MONO (Controller number 126)

Status	2nd byte	3rd bytes
BnH	7EH	mmH

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

mm = mono number: 00H-10H (0-16)

* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 4 (M = 1) regardless of the value of "mono number."

● POLY (Controller number 127)

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

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

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

■ System Exclusive Message

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

F0H: System Exclusive Message status

ii = ID number: an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H. ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).

dd.....ee = data: 00H-7FH (0-127)

F7H: EOX (End Of Exclusive)

The System Exclusive Messages received by the AT-S are: messages related to mode settings, Universal Realtime System Exclusive messages and Data Set (DT1).

● System exclusive messages related to mode settings

These messages are used to initialize a device to GS or General MIDI mode, or change the operating mode. When creating performance data, a "GM2 System On" or "GM1 System On" message should be inserted at the beginning of a General MIDI score, and a "GS Reset" message at the beginning of a GS music data. Each song should contain only one mode message as appropriate for the type of data. (Do not insert two or more mode setting messages in a single song.)

○ GM1 System On

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

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (General MIDI Message)
01H	Sub ID#2 (General MIDI 1 On)
F7H	EOX (End Of Exclusive)

* When this messages is received, this instrument will turn to the GM mode.

* Not received when the Rx GM1 System On parameter (EDIT: System: Rx GM1 System ON) is OFF.

○ GM2 System On

Status	Data byte	Status
F0H	7EH 7FH 09H 03H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (General MIDI Message)
03H	Sub ID#2 (General MIDI 2 On)
F7H	EOX (End Of Exclusive)

* When this messages is received, this instrument will turn to the GM mode.

* Not received when the Rx GM2 System On parameter (EDIT: System: Rx GM2 System ON) is OFF.

○ GM System Off

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

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

* When this messages is received, this instrument will return to Normal mode.

○GS reset

GS Reset is a command message that resets the internal settings of a device to the GS initial state. This message will appear at the beginning of GS music data, and a GS device that receives this message will automatically be set to the proper state to correctly playback GS music data.

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

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
10H	Device ID (dev: 00H-1FH (1-32), Initial value is 10H (17))
42H	Model ID (GS)
12H	Command ID (DT1)
40H	Address MSB
00H	Address
7FH	Address LSB
00H	Data (GS reset)
41H	Checksum
F7H	EOX (End Of Exclusive)

- * When this message is received, Rx.NRPN will be ON.
- * There must be an interval of at least 50 ms between this message and the next.
- *

○Exit GS mode

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

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
10H	Device ID
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)

- * There must be an interval of at least 50 ms between this message and the next.
- * Not Received in Keyboard Part.

●Universal Realtime System Exclusive Messages

Master volume

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 01H, 11H, mmH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control messages)
01H	Sub ID#2 (Master Volume)
11H	Master volume lower byte
mmH	Master volume upper byte
F7H	EOX (End Of Exclusive)

- * The lower byte (11H) of Master Volume will be handled as 00H.

○Master Fine Tuning

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 03H, 11H, mmH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
03H	Sub ID#2 (Master Fine Tuning)
11H	Master Fine Tuning LSB
mmH	Master Fine Tuning MSB
F7H	EOX (End Of Exclusive)
mm, ll: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +99.9 [cents])	

○Master Coarse Tuning

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 04H, 11H, mmH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
04H	Sub ID#2 (Master Coarse Tuning)
11H	Master Coarse Tuning LSB
mmH	Master Coarse Tuning MSB
F7H	EOX (End Of Exclusive)
11H:	ignored (processed as 00H)
mmH:	28H - 40H - 58H (-24 - 0 - +24 [semitones])

●Global Parameter Control

○Reverb Parameters

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 01H, 01H, ppH, vvH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
05H	Sub ID#2 (Global Parameter Control)
01H	Slot path length
01H	Parameter ID width
01H	Value width
01H	Slot path MSB
01H	Slot path LSB (Effect 0101: Reverb)
ppH	Parameter to be controlled.
vvH	Value for the parameter.
	pp=0 Reverb Type
	vv = 00H Small Room
	vv = 01H Medium Room
	vv = 02H Large Room
	vv = 03H Medium Hall
	vv = 04H Large Hall
	vv = 08H Plate
	pp=1 Reverb Time
	vv = 00H - 7FH 0 - 127
F7H	EOX (End Of Exclusive)

○Chorus Parameters

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 01H, 02H, ppH, vvH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
05H	Sub ID#2 (Global Parameter Control)
01H	Slot path length
01H	Parameter width
01H	Value width
01H	Slot path MSB
02H	Slot path LSB (Effect 0102: Chorus)
ppH	Parameter to be controlled.
vvH	Value for the parameter.
	pp=0 Chorus Type
	vv=0 Chorus1
	vv=1 Chorus2
	vv=2 Chorus3
	vv=3 Chorus4
	vv=4 FB Chorus
	vv=5 Flanger
	pp=1 Mod Rate
	vv= 00H - 7FH 0 - 127
	pp=2 Mod Depth
	vv = 00H - 7FH 0 - 127
	pp=3 Feedback

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vv = 00H - 7FH 0 - 127
 pp=4 Send To Reverb
 vv = 00H - 7FH 0 - 127
 F7H EOX (End Of Exclusive)

○Channel Pressure

Status	Data byte	Status
F0H	7FH, 7FH, 09H, 01H, 0nH, ppH, rrH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (Controller Destination Setting)
01H	Sub ID#2 (Channel Pressure)
0nH	MIDI Channel (00 - 0F)
ppH	Controlled parameter
rrH	Controlled range
pp=0	Pitch Control
rr = 28H - 58H -24 - +24	[semitones]
pp=1	Filter Cutoff Control
rr = 00H - 7FH -9600 - +9450	[cents]
pp=2	Amplitude Control
rr = 00H - 7FH 0 - 200%	
pp=3	LFO Pitch Depth
rr = 00H - 7FH 0 - 600	[cents]
pp=4	LFO Filter Depth
rr = 00H - 7FH 0 - 2400	[cents]
pp=5	LFO Amplitude Depth
rr = 00H - 7FH 0 - 100%	
F7H	EOX (End Of Exclusive)

○Controller

Status	Data byte	Status
F0H	7FH, 7FH, 09H, 03H, 0nH, ccH, ppH, rrH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (Controller Destination Setting)
03H	Sub ID#2 (Control Change)
0nH	MIDI Channel (00 - 0F)
ccH	Controller number (01 - 1F, 40 - 5F)
ppH	Controlled parameter
rrH	Controlled range
pp=0	Pitch Control
rr = 28H - 58H -24 - +24	[semitones]
pp=1	Filter Cutoff Control
rr = 00H - 7FH -9600 - +9450	[cents]
pp=2	Amplitude Control
rr = 00H - 7FH 0 - 200%	
pp=3	LFO Pitch Depth
rr = 00H - 7FH 0 - 600	[cents]
pp=4	LFO Filter Depth
rr = 00H - 7FH 0 - 2400	[cents]
pp=5	LFO Amplitude Depth
rr = 00H - 7FH 0 - 100%	
F7H	EOX (End Of Exclusive)

○Scale/Octave Tuning Adjust

Status	Data byte	Status
F0H	7EH, 7FH, 08H, 08H, ffH, ggH, hhH, ssH...	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
08H	Sub ID#1 (MIDI Tuning Standard)
08H	Sub ID#2 (scale/octave tuning 1-byte form)
ffH	Channel/Option byte 1
	bits 0 to 1 = channel 15 to 16
	bit 2 to 6 = Undefined
ggH	Channel byte 2
	bits 0 to 6 = channel 8 to 14
hhH	Channel byte 3
	bits 0 to 6 = channel 1 to 7
ssH	12 byte tuning offset of 12 semitones from C to B

00H = -64 [cents]
 40H = 0 [cents] (equal temperament)
 7FH = +63 [cents]
 F7H EOX (End Of Exclusive)

○Key-based Instrument Controllers

Status	Data byte	Status
F0H	7FH, 7FH, 0AH, 01H, 0nH, kkH, nnH, vvH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
0AH	Sub ID#1 (Key-Based Instrument Control)
01H	Sub ID#2 (Controller)
0nH	MIDI Channel (00 - 0F)
kkH	Key Number
nnH	Control Number
vvH	Value
nn=07H	Level
vv = 00H - 7FH	0 - 200% (Relative)
nn=0AH	Pan
vv = 00H - 7FH	Left - Right (Absolute)
nn=5BH	Reverb Send
vv = 00H - 7FH	0 - 127 (Absolute)
nn=5D	Chorus Send
vv = 00H - 7FH	0 - 127 (Absolute)
:	:
F7	EOX (End Of Exclusive)

* This parameter affects drum instruments only.

●Data transmission

AT-S can receive the various parameters using System Exclusive messages. The exclusive message of GS format data has a model ID of 42H and a device ID of 10H (17), and it is common to all the GS devices.

○Data set 1DT1

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

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

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
10H	Device ID
42H	Model ID (GS)
12H	Command ID (DT1)
aaH	Address MSB: upper byte of the starting address of the transmitted data
bbH	Address: middle byte of the starting address of the transmitted data
ccH	Address LSB: lower byte of the starting address of the transmitted data
ddH	Data: the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	:
:	:
eeH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

- * The amount of data that can be transmitted at one time depends on the type of data, and data can be received only from the specified starting address and size. Refer to the Address and Size given in Section 3 (p. 8).
- * Data larger than 128 bytes must be divided into packets of 128 bytes or less. If "Data Set 1" is transmitted successively, there must be an interval of at least 40 ms between packets.
- * Regarding the checksum please refer to section 4 (p. 13).

2. Transmit data

Arranger and composer data can not be transmitted.

■ Channel Voice Messages

● Note off

○ Upper Keyboard

Status	2nd byte	3rd byte
8nH	kkH	40H

n = MIDI channel number : 0H-FH (ch.1-ch.16)
 : Initial Value = CH (ch.13)
 kk = note number : 30H-67H (48-103) (AT-90S, 80S, 60S)
 : 30H-60H (48-96) (AT-20S, 10S)

Note off message is sent out with the velocity of 40H.

○ Lower Keyboard

Status	2nd byte	3rd byte
8nH	kkH	40H

n = MIDI channel number: 0H-FH (ch.1-ch.16)
 : Initial Value = BH (ch.12)
 kk = note number : 1CH-67H (28-103) (AT-90S, 80S, 60S)
 : 24H-60H (36-96) (AT-20S)
 : 24H-54H (36-84) (AT-10S)

* Note off message is sent out with the velocity of 40H.

○ Bass Pedalboard

Status	2nd byte	3rd byte
8nH	kkH	40H

n = MIDI channel number : 0H-FH (ch.1-ch.16)
 : Initial Value = DH (ch.14)
 kk = note number : 24H-3CH (36-60) (AT-90S)
 : 24H-37H (36-55) (AT-80S, AT-60S)
 : 24H-30H (36-48) (AT-20S, AT-10S)

* Note off message is sent out with the velocity of 40H.

● Note on

○ Upper Keyboard

Status	2nd bytes	3rd byte
9nH	kkH	vvH

n = MIDI channel number: 0H-FH (ch.1-ch.16)
 : Initial Value = CH (ch.13)
 kk = note number : 30H-67H (48-103) (AT-90S, 80S, 60S)
 : 30H-60H (48-96) (AT-20S, 10S)
 vv = note on velocity: 01H-7FH (1-127)

○ Lower Keyboard

Status	2nd bytes	3rd byte
9nH	kkH	vvH

n = MIDI channel number: 0H-FH (ch.1-ch.16)
 : Initial Value = BH (ch.12)
 kk = note number : 1CH-67H (28-103) (AT-90S, 80S, 60S)
 : 24H-60H (36-96) (AT-20S)
 : 24H-54H (36-84) (AT-10S)
 vv = note on velocity: 01H-7FH (1-127)

○ Bass Pedalboard

Status	2nd bytes	3rd byte
9nH	kkH	vvH

n = MIDI channel number: 0H-FH (ch.1-ch.16)
 : Initial Value = BH (ch.12)
 kk = note number : 24H-3CH (36-60) (AT-90S)
 : 24H-37H (36-55) (AT-80S, AT-60S)
 : 24H-30H (36-48) (AT-20S, AT-10S)
 vv = note on velocity: 01H-7FH (1-127)

● Control Change

○ Bank Select (Controller number 0, 32)

Status	2nd bytes	3rd byte
BnH	00H	mmH
BnH	20H	llH

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

○ Expression (Controller number 11)

Status	2nd bytes	3rd byte
BnH	0BH	vvH

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

○ Hold 1 (Controller number 64)

Status	2nd bytes	3rd byte
BnH	40H	vvH

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

● Program Change

Status	2nd bytes
CnH	ppH

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

■ System Realtime Message

● Realtime Clock

Status
F8H

● Start

Status
FAH

● Continue

Status
FBH

● Stop

Status
FCH



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

■ System exclusive messages

Identity Reply

Status	Data byte	Status
F0H	7EH, 10H, 06H, 02H, 41H, 42H, 00H, 05H, 03H, 00H, 01H, 00H, 00H, F7H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
10H	Device ID (use the same as the device ID of Roland)
06H	Sub ID#1 (General Information)
02H	Sub ID#2 (Identity Reply)
41H	ID number (Roland)
42H	Device family code (LSB)
00H	Device family code (MSB)
05H	Device family number code (LSB)
03H	Device family number code (MSB)
00H	Software revision level
01H	Software revision level
00H	Software revision level
00H	Software revision level
F7H	EOX (End of Exclusive)

MIDI IMPLEMENTATION

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 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 as follows;

Address (H)	Block	
40 00 00	-----+-----	Individual
40 01 3F	SYSTEM PARAMETERS	
40 1x 00	-----+-----	
40 2x 5A	-----+-----	Individual
41 m0 00	PART PARAMETERS (x = 0-F)	
41 m8 7F	-----+-----	Individual
48 00 00	SRUM SETUP PARAMETERS (m = 0-1)	
48 01 10	-----+-----	Bulk
48 1D 0F	SYSTEM PARAMETERS	
49 m0 00	-----+-----	Bulk
49 mE 17	PART PARAMETERS	
	-----+-----	Bulk
	DRUM SETUP PARAMETER (m = 0-1)	

There are two ways in which GS data is transmitted: Individual Parameter Transmission in which individual parameters are transmitted one by one, and Bulk Dump Transmission in which a large amount of data is transmitted at once.

■Individual Parameters

Individual Parameter Transmission transmits data (or requests data) for one parameter as one exclusive message (one packet of "F0 F7").

In Individual Parameter Transmission, you must use the Address and Size listed in the following "Parameter Address Map." Addresses marked at "#" cannot be used as starting addresses.

●System Parameters [Model ID = 42H]

Not Received in Keyboard Part.

Address (H)	Size (H)	Data (H)	Parameter	Description	Default Value (H)	Description
40 00 00	00 00 04	0018-07E8	MASTER TUNE	-100.0 - +100.0 [cent]	00 04 00 00	0 [cent]
40 00 01#			Use nibblized data.			
40 00 02#						
40 00 03#						

* Refer to section 4. Supplementary material, "About tuning" (p. 13).

40 00 04	00 00 01	00-7F	MASTER VOLUME	0-127 (= F0 7F 7F 04 01 00 vv F7)	7F	127
40 00 05	00 00 01	28-58	MASTER KEY-SHIFT	-24 - +24 [semitones]	40	0 [semitones]
40 00 06	00 00 01	01-7F	MASTER PAN	-63 (LEFT) - +63 (RIGHT)	40	0 (CENTER)
40 00 7F	00 00 01	00	MODE SET	00 = GS Reset (Rx. only)	127 = Exit GS	

* Refer to "System exclusive messages related to Mode settings" (p. 4).

40 01 10	00 00 10	00-40	VOICE RESERVE	Part 10 (Drum Part)	02	2
40 01 11#				Part 1	06	6
40 01 12#				Part 2	02	2
40 01 13#				Part 3	02	2
40 01 14#				Part 4	02	2
40 01 15#				Part 5	02	2
40 01 16#				Part 6	02	2
40 01 17#				Part 7	02	2
40 01 18#				Part 8	02	2
40 01 19#				Part 9	02	2
40 01 1A#				Part 11	00	0
40 01:#				:		
40 01 1F#				Part 16	00	0

* The sum total of voices in the voice reserve function must be equal to or less than the number of the maximum polyphony. The maximum polyphony of the AT-S is 64. For compatibility with other GS models, it is recommended that the maximum polyphony 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	04	Hall 2
----------	----------	-------	--------------	--	----	--------

Address (H)	Size (H)	Data (H)	Parameter	Description	Default Value (H)	Description
40 01 31	00 00 01	00-07	REVERB CHARACTER	07: Panning Delay	04	4
40 01 32	00 00 01	00-07	REVERB PRE-LPF	0-7	00	0
40 01 33	00 00 01	00-7F	REVERB LEVEL	0-127	40	64
40 01 34	00 00 01	00-7F	REVERB TIME	0-127	40	64
40 01 35	00 00 01	00-7F	REVERB DELAY FEEDBACK	0-127	00	0

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

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

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

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

●Part Parameters [Model ID = 42H]

AT-S has 16 parts. Parameters that can be set individually for each Part are called Part parameters.

If you use exclusive messages to set Part parameters, specify the address by Block number rather than Part Number (normally the same number as the MIDI channel). The Block number can be specified as one of 16 blocks, from 0 (H) to F (H).

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

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

Address (H)	Size (H)	Data (H)	Parameter	Description	Default Value (H)	Description
40 1x 00	00 00 02	00-7F	TONE NUMBER	CC#00 VALUE 0-127	00	0
40 1x 01#		00-7F		P.C. VALUE 1-128	00	1
40 1x 02	00 00 01	00-10	Rx. CHANNEL	1-16, OFF	Same as the Part Number	
40 1x 03	00 00 01	00-01	Rx. PITCH BEND	OFF/ON	01	ON
40 1x 04	00 00 01	00-01	Rx. CH PRESSURE (CA)	OFF/ON	01	ON
40 1x 05	00 00 01	00-01	Rx. PROGRAM CHANGE	OFF/ON	01	ON
40 1x 06	00 00 01	00-01	Rx. CONTROL CHANGE	OFF/ON	01	ON
40 1x 07	00 00 01	00-01	Rx. POLY PRESSURE (PA)	OFF/ON	01	ON
40 1x 08	00 00 01	00-01	Rx. NOTE MESSAGE	OFF/ON	01	ON
40 1x 09	00 00 01	00-01	Rx. RPN	OFF/ON	01	ON
40 1x 0A	00 00 01	00-01	Rx. NRPN	OFF/ON	00 (01*)	OFF (ON*)

Rx. NRPN is set to OFF by power-on or by receiving "Turn General MIDI System On," and it will be set ON when "GS RESET" is received.

40 1x 0B	00 00 01	00-01	Rx. MODULATION	OFF/ON	01	ON
40 1x 0C	00 00 01	00-01	Rx. VOLUME	OFF/ON	01	ON
40 1x 0D	00 00 01	00-01	Rx. PANPOT	OFF/ON	01	ON
40 1x 0E	00 00 01	00-01	Rx. EXPRESSION	OFF/ON	01	ON
40 1x 0F	00 00 01	00-01	Rx. HOLD1	OFF/ON	01	ON
40 1x 10	00 00 01	00-01	Rx. PORTAMENTO	OFF/ON	01	ON
40 1x 11	00 00 01	00-01	Rx. SOSTENUTO	OFF/ON	01	ON
40 1x 12	00 00 01	00-01	Rx. SOFT	OFF/ON	01	ON
40 1x 13	00 00 01	00-01	MONO/POLY MODE (= CC# 126 01 / CC# 127 00)	Mono/Poly	01	Poly
40 1x 15	00 00 01	00-02	USE FOR RHYTHM PART 1 = MAP1 2 = MAP2	0 = OFF 01 at x = 0	00 at x ≠ 0 MAP1 at x = 0	OFF at x ≠ 0

MIDI IMPLEMENTATION

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

40 1x 16	00 00 01	28-58	PITCH KEY SHIFT	-24 - +24 [semitones]	40	0 [semitones]
40 1x 17	00 00 02	08-F8	PITCH OFFSET FINE	-12.0 - +12.0 [Hz]	08 00	0 [Hz]
40 1x 18#			Use nibblized data.			

PITCH OFFSET FINE allows you to alter, by a specified frequency amount, the pitch at which notes will sound. This parameter differs from the conventional Fine Tuning (RPN #1) parameter in that the amount of frequency alteration (in Hertz) will be identical no matter which note is played. When a multiple number of Parts, each of which has been given a different setting for PITCH OFFSET FINE, are sounded by means of an identical note number, you can obtain a Celeste effect.

40 1x 19	00 00 01	00-7F	PART LEVEL (= CC# 7)	0-127	64	100
40 1x 1A	00 00 01	00-7F	VELOCITY SENSE DEPTH	0-127	40	64
40 1x 1B	00 00 01	00-7F	VELOCITY SENSE OFFSET	0-127	40	64
40 1x 1C	00 00 01	00-7F	PART PANPOT (= CC# 10, except RANDOM)	-64 (RANDOM), -63 (LEFT) - +63 (RIGHT)	40	0 (CENTER)
40 1x 1D	00 00 01	00-7F	KEY RANGE LOW	(C-1)-(G9)	00	C-1
40 1x 1E	00 00 01	00-7F	KEY RANGE HIGH	(C-1)-(G9)	7F	G 9
40 1x 1F	00 00 01	00-5F	CC1 CONTROLLER NUMBER	0-95	10	16
40 1x 20	00 00 01	00-5F	CC2 CONTROLLER NUMBER	0-95	11	17
40 1x 21	00 00 01	00-7F	CHORUS SEND LEVEL (= CC# 93)	0-127	00	0
40 1x 22	00 00 01	00-7F	REVERB SEND LEVEL (= CC# 91)	0-127	28	40
40 1x 30	00 00 01	0E-72	TONE MODIFY 1 Vibrato rate (= NRP# 8)	-50 - +50	40	0
40 1x 31	00 00 01	0E-72	TONE MODIFY 2 Vibrato depth (= NRP# 9)	-50 - +50	40	0
40 1x 32	00 00 01	0E-72	TONE MODIFY 3 TVF cutoff frequency (= NRP# 32)	-50 - +50	40	0
40 1x 33	00 00 01	0E-72	TONE MODIFY 4 TVF resonance (= NRP# 33)	-50 - +50	40	0
40 1x 34	00 00 01	0E-72	TONE MODIFY 5 TVF&TVA Env.attack (= NRP# 99)	-50 - +50	40	0
40 1x 35	00 00 01	0E-72	TONE MODIFY 6 TVF&TVA Env.decay (= NRP# 100)	-50 - +50	40	0
40 1x 36	00 00 01	0E-72	TONE MODIFY 7 TVF&TVA Env.release (= NRP# 102)	-50 - +50	40	0
40 1x 37	00 00 01	0E-72	TONE MODIFY 8 Vibrato delay (= NRP# 10)	-50 - +50	40	0
40 1x 40	00 00 0C	00-7F	SCALE TUNING C	-64 - +63 [cent]	40	0 [cent]
40 1x 41#		00-7F	SCALE TUNING C#	-64 - +63 [cent]	40	0 [cent]
40 1x 42#		00-7F	SCALE TUNING D	-64 - +63 [cent]	40	0 [cent]
40 1x 43#		00-7F	SCALE TUNING D#	-64 - +63 [cent]	40	0 [cent]
40 1x 44#		00-7F	SCALE TUNING E	-64 - +63 [cent]	40	0 [cent]
40 1x 45#		00-7F	SCALE TUNING F	-64 - +63 [cent]	40	0 [cent]
40 1x 46#		00-7F	SCALE TUNING F#	-64 - +63 [cent]	40	0 [cent]
40 1x 47#		00-7F	SCALE TUNING G	-64 - +63 [cent]	40	0 [cent]
40 1x 48#		00-7F	SCALE TUNING G#	-64 - +63 [cent]	40	0 [cent]
40 1x 49#		00-7F	SCALE TUNING A	-64 - +63 [cent]	40	0 [cent]
40 1x 4A#		00-7F	SCALE TUNING A#	-64 - +63 [cent]	40	0 [cent]
40 1x 4B#		00-7F	SCALE TUNING B	-64 - +63 [cent]	40	0 [cent]

* SCALE TUNING is a function that allows fine adjustment to the pitch of each note in the octave. The pitch of each identically-named note in all octaves will change simultaneously. A setting of A70 cent (40H) is equal temperament. Refer to section 4. Supplementary material, "The Scale Tune Feature" (p. 13).

40 2x 00	00 00 01	28-58	MOD PITCH CONTROL	-24 - +24 [semitone]	40	0 [semitones]
40 2x 01	00 00 01	00-7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 02	00 00 01	00-7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 03	00 00 01	00-7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 04	00 00 01	00-7F	MOD LFO1 PITCH DEPTH	0-600 [cent]	0A	47 [cent]
40 2x 05	00 00 01	00-7F	MOD LFO1 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 06	00 00 01	00-7F	MOD LFO1 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 07	00 00 01	00-7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 08	00 00 01	00-7F	MOD LFO2 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 09	00 00 01	00-7F	MOD LFO2 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 0A	00 00 01	00-7F	MOD LFO2 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 10	00 00 01	40-58	BEND PITCH CONTROL	0-24 [semitone]	42	2 [semitones]
40 2x 11	00 00 01	00-7F	BEND TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 12	00 00 01	00-7F	BEND AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 13	00 00 01	00-7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 14	00 00 01	00-7F	BEND LFO1 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 15	00 00 01	00-7F	BEND LFO1 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 16	00 00 01	00-7F	BEND LFO1 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 17	00 00 01	00-7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]

40 2x 18	00 00 01	00-7F	BEND LFO2 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 19	00 00 01	00-7F	BEND LFO2 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 1A	00 00 01	00-7F	BEND LFO2 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 20	00 00 01	28-58	CAf PITCH CONTROL	-24 - +24 [semitone]	40	0 [semitones]
40 2x 21	00 00 01	00-7F	CAf TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 22	00 00 01	00-7F	CAf AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 23	00 00 01	00-7F	CAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 24	00 00 01	00-7F	CAf LFO1 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 25	00 00 01	00-7F	CAf LFO1 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 26	00 00 01	00-7F	CAf LFO1 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 27	00 00 01	00-7F	CAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 28	00 00 01	00-7F	CAf LFO2 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 29	00 00 01	00-7F	CAf LFO2 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 2A	00 00 01	00-7F	CAf LFO2 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 30	00 00 01	28-58	PAf PITCH CONTROL	-24 - +24 [semitone]	40	0 [semitones]
40 2x 31	00 00 01	00-7F	PAf TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 32	00 00 01	00-7F	PAf AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 33	00 00 01	00-7F	PAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 34	00 00 01	00-7F	PAf LFO1 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 35	00 00 01	00-7F	PAf LFO1 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 36	00 00 01	00-7F	PAf LFO1 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 37	00 00 01	00-7F	PAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 38	00 00 01	00-7F	PAf LFO2 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 39	00 00 01	00-7F	PAf LFO2 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 3A	00 00 01	00-7F	PAf LFO2 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 40	00 00 01	28-58	CC1 PITCH CONTROL	-24 - +24 [semitone]	40	0 [semitones]
40 2x 41	00 00 01	00-7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 42	00 00 01	00-7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 43	00 00 01	00-7F	CC1 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 44	00 00 01	00-7F	CC1 LFO1 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 45	00 00 01	00-7F	CC1 LFO1 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 46	00 00 01	00-7F	CC1 LFO1 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 47	00 00 01	00-7F	CC1 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 48	00 00 01	00-7F	CC1 LFO2 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 49	00 00 01	00-7F	CC1 LFO2 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 4A	00 00 01	00-7F	CC1 LFO2 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 50	00 00 01	28-58	CC2 PITCH CONTROL	-24 - +24 [semitone]	40	0 [semitones]
40 2x 51	00 00 01	00-7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 52	00 00 01	00-7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 53	00 00 01	00-7F	CC2 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 54	00 00 01	00-7F	CC2 LFO1 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 55	00 00 01	00-7F	CC2 LFO1 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 56	00 00 01	00-7F	CC2 LFO1 TVA DEPTH	0-100.0 [%]	00	0 [%]
40 2x 57	00 00 01	00-7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 58	00 00 01	00-7F	CC2 LFO2 PITCH DEPTH	0-600 [cent]	00	0 [cent]
40 2x 59	00 00 01	00-7F	CC2 LFO2 TVF DEPTH	0-2400 [cent]	00	0 [cent]
40 2x 5A	00 00 01	00-7F	CC2 LFO2 TVA DEPTH	0-100.0 [%]	00	0 [%]

●Drum Setup Parameters [Model ID = 42H]

m: Map number (0 = MAP1, 1 = MAP2)

rr: drum part note number (00H-7FH)

Address (H)	Size (H)	Data (H)	Parameter	Description
41 m1 rr	00 00 01	00-7F	PLAY NOTE NUMBER	Pitch coarse
41 m2 rr	00 00 01	00-7F	LEVEL (= NRP# 26)	TVA level
41 m3 rr	00 00 01	00-7F	ASSIGN GROUP NUMBER	Non, 1-127
41 m4 rr	00 00 01	00-7F	PANPOT (= NRP# 28, except RANDOM)	-64 (RANDOM), -63 (LEFT) - +63 (RIGHT)
41 m5 rr	00 00 01	00-7F	REVERB SEND LEVEL (= NRP# 29)	0.0-1.0 Multiplicand of the part reverb depth
41 m6 rr	00 00 01	00-7F	CHORUS SEND LEVEL (= NRP# 30)	0.0-1.0 Multiplicand of the part 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

* When the Drum Set is changed, DRUM SETUP PARAMETER values will all be initialized.

MIDI IMPLEMENTATION

4. Supplementary material

●Decimal and Hexadecimal table

In MIDI documentation, data values and addresses/sizes of exclusive messages etc. are expressed as hexadecimal values for each 7 bits.

The following table shows how these correspond to decimal numbers.

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

- * Decimal values such as MIDI channel, bank select, and program change are listed as one (1) greater than the values given in the above table.
- * A 7-bit byte can express data in the range of 128 steps. For data where greater precision is required, we must use two or more bytes. For example, two hexadecimal numbers aa bbH expressing two 7-bit bytes would indicate a value of $aa \times 128 + bb$.
- * In the case of values which have a \pm sign, 00H = -64, 40H = ± 0 , and 7FH = +63, so that the decimal expression would be 64 less than the value given in the above chart. In the case of two types, 00 00H = -8192, 40 00H = ± 0 , and 7F 7FH = +8191. For example if aa bbH were expressed as decimal, this would be $aa \text{ bbH} - 40 \text{ 00H} = aa \times 128 + bb - 64 \times 128$.
- * Data marked "nibbled" is expressed in hexadecimal in 4-bit units. A value expressed as a 2-byte nibble 0a 0bH has the value of $a \times 16 + b$.

<Example1> What is the decimal expression of 5AH?

From the preceding table, 5AH = 90

<Example2> What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?

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

<Example3> What is the decimal expression of the nibbled value 0A 03 09 0D?

From the preceding table, since 0AH = 10, 03H = 3, 09H = 9, 0DH = 13
 $((10 \times 16 + 3) \times 16 + 9) \times 16 + 13 = 41885$

<Example4> What is the nibbled expression of the decimal value 1258?

$$\begin{array}{r} 16 \overline{) 1258} \\ \underline{16 \quad 78} \quad \dots \quad 10 \\ 16 \overline{) \quad 4} \quad \dots \quad 14 \\ \underline{\quad 0} \quad \dots \quad 4 \end{array}$$

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

●Examples of actual MIDI messages

<Example1> 92 3E 5F

9n is the Note-on status, and n is the MIDI channel number. Since 2H = 2, 3EH = 62, and 5FH = 95, this is a Note-on message with MIDI CH = 3, note number 62 (note name is D4), and velocity 95.

<Example2> CE 49

CnH is the Program Change status, and n is the MIDI channel number. Since EH = 14 and 49H = 73, this is a Program Change message with MIDI CH = 15, program number 74 (Flute in GS).

<Example3> EA 00 28

EnH is the Pitch Bend Change status, and n is the MIDI channel number. The 2nd byte (00H = 0) is the LSB and the 3rd byte (28H = 40) is the MSB, but Pitch Bend Value is a signed number in which 40 00H (= $64 \times 128 + 0 = 8192$) is 0, so this Pitch Bend Value is $28 \text{ 00H} - 40 \text{ 00H} = 40 \times 128 + 0 - (64 \times 128 + 0) = 5120 - 8192 = -3072$

If the Pitch Bend Sensitivity is set to 2 semitones, -8192 (00 00H) will cause the pitch to change -200 cents, so in this case $-200 \times (-3072) / (-8192) = -75$ cents of Pitch Bend is being applied to MIDI channel 11.

<Example4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F

BnH is the Control Change status, and n is the MIDI channel number. For Control Changes, the 2nd byte is the control number, and the 3rd byte is the value. In a case in which two or more messages consecutive messages have the same status, MIDI has a provision called "running status" which allows the status byte of the second and following messages to be omitted. Thus, the above messages have the following meaning.

- B3 64 00 MIDI ch.4, lower byte of RPN parameter number: 00H
- (B3) 65 00 (MIDI ch.4) upper byte of RPN parameter number: 00H
- (B3) 06 0C (MIDI ch.4) upper byte of parameter value: 0CH
- (B3) 26 00 (MIDI ch.4) lower byte of parameter value: 00H
- (B3) 64 7F (MIDI ch.4) lower byte of RPN parameter number: 7FH
- (B3) 65 7F (MIDI ch.4) upper byte of RPN parameter number: 7FH

In other words, the above messages specify a value of 0C 00H for RPN parameter number 00 00H on MIDI channel 4, and then set the RPN parameter number to 7F 7FH.

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

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

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

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

* TPQN: Ticks Per Quarter Note

● Example of an Exclusive message and calculating a Checksum

Roland Exclusive messages are transmitted with a checksum at the end (before F7) to make sure that the message was correctly received. The value of the checksum is determined by the address and data (or size) of the transmitted exclusive message.

○ How to calculate the checksum (hexadecimal numbers are indicated by 'H')

The checksum is a value derived by adding the address, size and checksum itself and inverting the lower 7 bits.

Here's an example of how the checksum is calculated. We will assume that in the exclusive message we are transmitting, the address is aa bb ccH and the data or size is dd ee ffH.

```
aa + bb + cc + dd + ee + ff = sum
sum / 128 = quotient ... remainder
128 - remainder = checksum
```

<Example> Setting REVERB MACRO to ROOM 3

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

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

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),
(4) Model ID (GS), (5) Command ID (DT1), (6) End of Exclusive

Next we calculate the checksum.

```
40H + 01H + 30H + 02H = 64 + 1 + 48 + 2 = 115 (sum)
115 (sum) / 128 = 0 (quotient) ... 115 (remainder)
checksum = 128 - 115 (remainder) = 13 = 0DH
```

This means that F0 41 10 42 12 40 01 30 02 0D F7 is the message we transmit.

● About tuning

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

In MIDI, an entire device is tuned by either sending RPN #1 to all MIDI channels being used, or by sending a System Exclusive MASTER TUNE (address 40 00 00H).

RPN #1 allows tuning to be specified in steps of approximately 0.012 cents (to be precise, 100/8192 cent), and System Exclusive MASTER TUNE allows tuning in steps of 0.1 cent. One cent is 1/100th of a semitone.

The values of RPN #1 (Master Fine Tuning) and System Exclusive MASTER TUNE are added together to determine the actual pitch sounded by each Part.

Frequently used tuning values are given in the following table for your reference. Values are in hexadecimal (decimal in parentheses).

Hz in A4	cent	RPN #1	Sys. Ex. 40 00 00
445.0	+19.56	4C 43 (+1603)	00 04 0C 04 (+196)
444.0	+15.67	4A 03 (+1283)	00 04 09 0D (+157)
443.0	+11.76	47 44 (+ 964)	00 04 07 06 (+118)
442.0	+ 7.85	45 03 (+ 643)	00 04 04 0F (+ 79)
441.0	+ 3.93	42 42 (+ 322)	00 04 02 07 (+ 39)
440.0	0.00	40 00 (0)	00 04 00 00 (0)
439.0	- 3.94	3D 3D (- 323)	00 03 0D 09 (- 39)
438.0	- 7.89	3A 7A (- 646)	00 03 0B 01 (- 79)

<Example> Set the tuning of MIDI channel 3 to A4 = 442.0 Hz

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

```
B2 64 00 MIDI ch.3, lower byte of RPN parameter number: 00H
(B2) 65 01 (MIDI ch.3) upper byte of RPN parameter number: 01H
(B2) 06 45 (MIDI ch.3) upper byte of parameter value: 45H
(B2) 26 03 (MIDI ch.3) lower byte of parameter value: 03H
(B2) 64 7F (MIDI ch.3) lower byte of RPN parameter number: 7FH
(B2) 65 7F (MIDI ch.3) upper byte of RPN parameter number: 7FH
```

MIDI IMPLEMENTATION

●AT-S Keyboard Part Tone List

CC0/CC32/PC	Tone Name	No.	90S/ 80S	60S	20S	10S
Organ						
00h/00h/00h	Full Organ1	A11	O	O	O	O
00h/00h/02h	Full Organ2	A12	O	O	O	O
00h/00h/04h	Full Organ3	A13	O	O	O	O
00h/00h/01h	Full Organ4	A14	O	O	O	O
00h/00h/03h	Full Organ5	A15	O	O	O	
00h/00h/05h	Full Organ6	A16	O	O	O	
00h/00h/20h	Full Organ7	A17	O	O	O	
01h/00h/20h	Full Organ8		O			
02h/00h/20h	Full Organ9		O			
00h/00h/06h	Jazz Organ1	B11	O	O	O	O
00h/00h/08h	Jazz Organ2	B12	O	O	O	O
00h/00h/0Ah	Jazz Organ3	B13	O	O	O	O
00h/00h/07h	Jazz Organ4	B14	O	O	O	O
00h/00h/09h	Jazz Organ5	B15	O	O	O	
00h/00h/0Bh	Jazz Organ6	B16	O	O	O	
00h/00h/0Ch	Rock Organ1	B21	O	O	O	O
00h/00h/0Dh	Rock Organ2	B22	O	O	O	
00h/00h/0Eh	Lower Organ1	C11	O	O	O	
00h/00h/10h	Lower Organ2	C12	O	O	O	O
00h/00h/12h	Lower Organ3	C13	O	O	O	
00h/00h/0Fh	Lower Organ4	C14	O	O	O	
00h/00h/11h	Lower Organ5	C15	O	O	O	
00h/00h/13h	Lower Organ6	C16	O	O	O	
00h/00h/14h	Pipe Organ1	D11	O	O	O	O
00h/00h/16h	Pipe Organ2	D12	O	O	O	O
00h/00h/18h	Pipe Organ3	D13	O	O	O	O
00h/00h/15h	Pipe Organ4	D14	O	O	O	
00h/00h/17h	Pipe Organ5	D15	O	O	O	
00h/00h/19h	Pipe Organ6	D16	O	O	O	
00h/00h/21h	Pipe Organ7	D17	O	O	O	
01h/00h/15h	AEx PipeOrg		O	O		
02h/00h/14h	Diapason 8'	D21	O	O	O	O
01h/00h/14h	FluteCeleste		O	O		
01h/00h/21h	Gemshorn 8'		O	O		
02h/00h/21h	Trompet 8'		O	O		
03h/00h/21h	Hautbois 8'		O	O		
04h/00h/21h	Viola 8'		O	O		
05h/00h/21h	ViolaCeleste		O	O		
06h/00h/21h	Bombarde16'		O	O		
01h/00h/22h	T.String 8'		O	O		
02h/00h/22h	VoxHumana 8'		O	O		
03h/00h/22h	T.Tuba 8'		O	O		
04h/00h/22h	T.Trumpet 8'		O	O		
05h/00h/22h	T.Sax 8'		O	O		
06h/00h/22h	T.Oboe 8'		O	O		
07h/00h/22h	T.Krumet 8'		O	O		
08h/00h/22h	Eng.Horn 8'		O	O		
01h/00h/1Ah	Tibia 8'	E18	O	O	O	
00h/00h/1Ah	Theater Or.1	E11	O	O	O	O
00h/00h/1Ch	Theater Or.2	E12	O	O	O	O
00h/00h/1Eh	Theater Or.3	E13	O	O	O	O
00h/00h/1Bh	Theater Or.4	E14	O	O	O	
00h/00h/1Dh	Theater Or.5	E15	O	O	O	
00h/00h/1Fh	Theater Or.6	E16	O	O	O	
00h/00h/22h	Theater Or.7		O	O		
01h/00h/1Eh	AEx Theater		O			
00h/00h/23h	Synth. Org.1	F11	O	O	O	
00h/00h/24h	Synth. Org.2	F12	O	O	O	
01h/00h/23h	Synth. Org.3	F13	O	O	O	
01h/00h/24h	Synth. Org.4		O	O		
02h/00h/23h	Digi Church		O			
02h/00h/24h	Metalic Org.		O			
00h/00h/25h	Pop. Organ1	F21	O	O	O	
00h/00h/26h	Pop. Organ2	F22	O	O	O	
00h/00h/27h	Pop. Organ3		O	O		
00h/00h/4Ah	Org. Attack1	U11	O	O	O	
00h/00h/4Bh	Org. Attack2	U12	O	O	O	
00h/00h/4Ch	Org. Attack3		O	O		
00h/00h/4Dh	Org. Attack4		O	O		

CC0/CC32/PC	Tone Name	No.	90S/ 80S	60S	20S	10S
00h/00h/4Eh	Org. Click	U15	O	O	O	
Strings						
06h/00h/28h	Chamber Str		O			
07h/00h/28h	Chamber Str2		O			
08h/00h/28h	Orch.Str.Ens		O			
00h/00h/28h	Strings1	G11	O	O	O	O
00h/00h/29h	Strings2	G12	O	O	O	
01h/00h/28h	Strings3		O	O		
01h/00h/29h	Strings4		O	O		
02h/00h/28h	Strings5	G15	O	O	O	O
03h/00h/28h	Strings6	G16	O	O	O	
04h/00h/28h	Strings7		O	O		
05h/00h/28h	Strings8		O	O		
09h/00h/28h	AEx Strings	G31	O	O	O	O
0ah/00h/28h	AEx Str+Brs		O			
0bh/00h/28h	AEx Str+Chr		O			
00h/00h/2Ah	Slow Str.1	H11	O	O	O	O
00h/00h/2Bh	Slow Str.2		O	O		
01h/00h/2Ah	Slow Str.3		O	O		
00h/00h/2Ch	Synth. Str.1	H21	O	O	O	O
00h/00h/2Dh	Synth. Str.2	H22	O	O	O	
00h/00h/35h	Synth. Str.3		O	O		
00h/00h/2Eh	Synth. Pad1	H31	O	O	O	O
00h/00h/2Fh	Synth. Pad2	H32	O	O	O	
01h/00h/2Dh	Synth. Pad3		O			
00h/00h/5Ch	Violin	I11	O	O	O	
01h/00h/5Ch	AEx Violin		O			
00h/00h/66h	Viola	I12	O	O	O	
00h/00h/5Dh	Cello	I13	O	O	O	
01h/00h/5Dh	Cello 2					
00h/00h/37h	Pizzicato	I14	O	O	O	O
01h/00h/37h	Mellow Pizz.		O			
Human Voice						
01h/00h/31h	Jazz Scat	J11	O	O	O	O
0bh/00h/31h	Jazz Scat 2		O			
0ch/00h/31h	Jazz Scat 3		O			
02h/00h/31h	Jazz Doo	J13	O	O	O	O
03h/00h/31h	Jazz Doot	J14	O	O	O	O
04h/00h/31h	Jazz Dat	J15	O	O	O	O
05h/00h/31h	Jazz Bap	J16	O	O	O	O
06h/00h/31h	JazzDowfall	J17	O	O	O	O
08h/00h/31h	Soprano					
09h/00h/31h	Soprano 2		O			
07h/00h/31h	Tenor					
0ah/00h/31h	Tenor&Sop.		O			
00h/00h/31h	Pop Voice	J12	O	O	O	O
02h/00h/30h	Classical		O	O		
03h/00h/30h	Boys Choir		O	O		
08h/00h/30h	Boys Choir2		O			
09h/00h/30h	Kids Choir		O			
01h/00h/30h	Gregorian	J22	O	O	O	
06h/00h/30h	Gospel		O			
00h/00h/30h	Choir	J21	O	O	O	O
04h/00h/30h	Female 1		O			
05h/00h/30h	Female 2		O			
0bh/00h/30h	AEx Choir		O			
00h/00h/32h	Synth. Choir	J31	O	O	O	
00h/00h/33h	Synth. Voice		O	O		
00h/00h/34h	Space Voice		O	O		
0ah/00h/30h	Dreamy Choir		O	O		
01h/00h/34h	Vocal Menu		O	O		
02h/00h/34h	Choir Chord		O			
Piano						
02h/00h/38h	Grand Piano	K11	O	O	O	O
00h/00h/38h	Piano1		O	O		
00h/00h/4Fh	Piano2		O	O		
01h/00h/38h	Piano3		O	O		
03h/00h/38h	AEx PianoStr	K15	O	O	O	O
00h/00h/39h	Honky-tonk	K21	O	O	O	O

MIDI IMPLEMENTATION

CC0/CC32/PC	Tone Name	No.	90S/80S	60S	20S	10S
01h/00h/39h	Honky-tonk2		O	O		
02h/00h/3Ah	Stage Rhodes	K35	O	O	O	
03h/00h/3Ah	Dyno Rhodes		O			
00h/00h/3Ah	E.Piano1	K31	O	O	O	O
00h/00h/3Bh	E.Piano2	K32	O	O	O	O
01h/00h/3Ah	E.Piano3		O	O		
01h/00h/3Bh	E.Piano4		O	O		
04h/00h/3Ah	AEx EP+Str		O			
00h/00h/42h	Harpichord	K41	O	O	O	O
00h/00h/50h	Clavi.	K42	O	O	O	
Guitar						
00h/00h/3Ch	Nylon-str.Gt	M11	O	O	O	O
01h/00h/3Ch	Nylon Gt.2		O	O		
03h/00h/3Ch	Fl.Guitar		O			
04h/00h/3Ch	Fl.Gtr.Roll		O			
05h/00h/3Ch	Requinto Gtr		O			
02h/00h/3Ch	AEx Gtr+Str		O	O		
03h/00h/3Dh	Ac.Gtr Sld	M23	O	O	O	O
02h/00h/3Dh	Ac.Gtr Hrm		O			
00h/00h/3Dh	Steel-str.Gt	M21	O	O	O	
01h/00h/3Dh	12str Guitar	M22	O	O	O	O
04h/00h/3Dh	SemAc.Guitar		O			
00h/00h/3Eh	Jazz Guitar	M31	O	O	O	O
01h/00h/3Eh	Clean Guitar	M32	O	O	O	
02h/00h/3Eh	JC E.Guitar		O	O		
00h/00h/3Fh	Overdrive Gt	M41	O	O	O	O
01h/00h/3Fh	DistortionGt		O			
02h/00h/3Fh	Power Guitar		O			
03h/00h/3Fh	Rock Rhythm		O			
04h/00h/3Fh	Muted Guitar		O			
00h/00h/56h	Hawaiian Gt.	N11	O	O	O	O
00h/00h/47h	Banjo	N12	O	O	O	O
01h/00h/47h	Banjo Treml		O	O		
00h/00h/46h	Mandolin	N13	O	O	O	O
01h/00h/43h	Koto		O	O		
02h/00h/43h	Taisho Koto		O	O		
03h/00h/43h	Shamisen	N16	O	O	O	
00h/00h/43h	Harp	N21	O	O	O	O
07h/00h/43h	Harp 2		O			
04h/00h/43h	Celtic Harp		O			
05h/00h/43h	Nylon Harp		O			
06h/00h/43h	Harpvox		O	O		
00h/00h/5Ah	Sitar	N31	O	O	O	
00h/00h/57h	Organ Harp		O	O		
Brass						
06h/00h/40h	BrassSect.1	P17	O	O	O	
05h/00h/40h	BrassSect.2		O			
00h/00h/40h	Tp. Section	P11	O	O	O	O
01h/00h/40h	Brass 1		O			
02h/00h/40h	Brass 2		O			
03h/00h/40h	Brass 3		O			
04h/00h/40h	Power Brass	P15	O	O	O	
07h/00h/40h	Quad Brass		O			
0ah/00h/40h	FatPop Brass		O			
09h/00h/40h	Brass Fall		O			
02h/00h/68h	Twin Bones		O			
08h/00h/40h	Bones Sect.		O			
0bh/00h/40h	AEx Brass		O	O		
06h/00h/58h	Orch.Tutti 1		O			
07h/00h/58h	Orch.Tutti 2		O			
08h/00h/58h	Orch.Tutti 3		O			
00h/00h/58h	Fr.Horn Sect	P21	O	O	O	O
01h/00h/58h	Fr.HornSect2		O	O		
02h/00h/58h	Fr.HornSect3		O			
03h/00h/58h	Fr.HornSect4		O			
04h/00h/58h	Orch.Brs Ens		O	O		
05h/00h/58h	MutedFr.Horn		O			
00h/00h/41h	Sax.Section	P31	O	O	O	O
01h/00h/41h	Sax.Section2		O	O		
02h/00h/41h	Sax.Section3		O			

CC0/CC32/PC	Tone Name	No.	90S/80S	60S	20S	10S
03h/00h/41h	Sax/Brass	P34	O	O	O	
04h/00h/41h	Sax&Clarinet		O			
00h/00h/59h	Synth. Brass	P41	O	O	O	O
00h/00h/5Eh	Trumpet	Q11	O	O	O	O
01h/00h/5Eh	Trumpet2	Q12	O	O	O	
02h/00h/5Eh	Trumpet3		O			
03h/00h/5Eh	Tp/Shake	Q13	O	O	O	
04h/00h/5Eh	Mariachi Tp.		O			
05h/00h/5Eh	Trumpet Fall		O			
06h/00h/5Eh	Twin Tp.		O			
07h/00h/5Eh	AEx Trumpet		O			
00h/00h/5Fh	Mute Trumpet	Q21	O	O	O	O
01h/00h/5Fh	MuteTrumpet2		O	O		
02h/00h/5Fh	Cup Mute Tp.		O			
00h/00h/67h	Flugel Horn	Q41	O	O	O	O
00h/00h/68h	Trombone	Q31	O	O	O	O
01h/00h/68h	Trombone2		O	O		
01h/00h/67h	F.Horn Solo1	Q42	O	O	O	
02h/00h/67h	F.Horn Solo2		O			
00h/00h/69h	Soprano Sax	Q51	O	O	O	O
01h/00h/69h	Soprano Sax2	Q52	O	O	O	
03h/00h/60h	Alto Sax Ex	Q64	O	O	O	
00h/00h/60h	Alto Sax	Q61	O	O	O	O
01h/00h/60h	Alto Sax2		O	O		
02h/00h/60h	Blow Sax		O	O		
04h/00h/60h	AEx AltoSax		O			
02h/00h/61h	Super Tenor		O			
00h/00h/61h	Tenor Sax	Q71	O	O	O	O
01h/00h/61h	Tenor Sax2		O	O		
03h/00h/61h	Baritone Sax		O			
Woodwinds						
00h/00h/62h	Flute	R11	O	O	O	
01h/00h/62h	Flute2		O	O		
02h/00h/62h	Flute3	R13	O	O	O	O
05h/00h/62h	AEx Flute	R16	O	O	O	O
04h/00h/62h	Piccolo		O			
03h/00h/62h	Tin Whistle		O			
00h/00h/36h	Synth. Flute	R21	O	O	O	
00h/00h/63h	Pan Flute	R22	O	O	O	O
01h/00h/63h	Pan Flute 2		O	O		
02h/00h/63h	Bottle Blow		O			
00h/00h/64h	Oboe	R31	O	O	O	O
01h/00h/64h	AEx Oboe		O			
00h/00h/6Ah	Bassoon	R32	O	O	O	O
04h/00h/6Ah	Bassoon 2		O			
01h/00h/6Ah	English Horn		O			
02h/00h/6Ah	Wood Winds		O			
03h/00h/6Ah	Wood Winds 2		O			
00h/00h/65h	Clarinet	R41	O	O	O	O
01h/00h/65h	Clarinet2	R42	O	O	O	
02h/00h/65h	Clarinet3		O	O		
03h/00h/65h	Clarinet4		O	O		
04h/00h/65h	Bs Clarinet		O	O		
00h/00h/6Bh	Shakuhachi	R51	O	O	O	O
00h/00h/6Ch	HumanWhistle	R52	O	O	O	
01h/00h/6Ch	Bagpipe		O			
02h/00h/6Ch	Uilleann Pipe		O			
Lead						
00h/00h/6Dh	Synth. Lead1	S11	O	O	O	O
00h/00h/6Eh	Synth. Lead2	S12	O	O	O	O
00h/00h/6Fh	Synth. Lead3	S13	O	O	O	
00h/00h/70h	Synth. Lead4		O	O		
00h/00h/71h	Synth. Lead5		O	O		
01h/00h/71h	CC Solo		O			
01h/00h/6Dh	JP SuperSaw		O			
02h/00h/71h	Sugar Key	S18	O	O	O	
01h/00h/6Fh	HollowReleas		O			
00h/00h/48h	Accordion	L11	O	O	O	O
00h/00h/55h	Bandoneon	L12	O	O	O	O
00h/00h/49h	Harmonica	L21	O	O	O	O

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CC0/CC32/PC	Tone Name	No.	90S/ 80S	60S	20S	10S
01h/00h/49h	Blues Harp		O			
Bass						
00h/00h/72h	Organ Bass1	T11	O	O	O	O
00h/00h/73h	Organ Bass2	T12	O	O	O	
00h/00h/74h	Pipe Org. Bs	T21	O	O	O	
01h/00h/74h	Theater Bass		O	O		
02h/00h/74h	Bombarde		O	O		
00h/00h/75h	String Bass	T31	O	O	O	O
00h/00h/7Dh	Bass+Cymbal	T32	O	O	O	
01h/00h/75h	String Bass2		O	O		
02h/00h/75h	Str.Bass Pdl		O	O		
03h/00h/75h	Str.BassSolo		O			
04h/00h/75h	Baby Bass		O			
00h/00h/78h	Contrabass1	T41	O	O	O	
00h/00h/79h	Contrabass2	T42	O	O	O	
01h/00h/79h	AEx Bs+Timp		O			
00h/00h/76h	E.Bass1	T51	O	O	O	
00h/00h/77h	E.Bass2	T52	O	O	O	
01h/00h/76h	E.Bass3		O	O		
01h/00h/77h	E.Bass4		O	O		
02h/00h/76h	E.Bass5		O			
00h/00h/7Ah	Tuba	T61	O	O	O	
01h/00h/7Ah	Tuba2		O	O		
02h/00h/7Ah	Tuba3		O	O		
00h/00h/7Bh	Synth. Bass1	T71	O	O	O	
00h/00h/7Ch	Synth. Bass2		O	O		
01h/00h/7Ch	Voice Thum	T81	O	O	O	
Percussion						
01h/00h/7Eh	Timpani	V11	O	O	O	
02h/00h/7Eh	Timpani2		O	O		
03h/00h/7Eh	Soft Timpani		O			
01h/00h/7Dh	Ride Cymbal		O	O		
02h/00h/7Dh	Crash Cymbal		O	O		
0Ch/00h/7Dh	Short Cymbal		O	O		
08h/00h/7Eh	MalletCymRol		O			
03h/00h/7Dh	Tambourine		O	O		
0Ah/00h/7Dh	Castanet		O			
0Dh/00h/7Dh	Triangle		O			
04h/00h/7Dh	Woodblock		O	O		
0Bh/00h/7Dh	Woodblock 2		O	O		
06h/00h/7Dh	Snare Drum		O	O		
07h/00h/7Dh	Bass Drum		O	O		
05h/00h/7Dh	Jingle Bell		O	O		
08h/00h/7Dh	Church Bell		O			
00h/00h/7Eh	Perc. Set1	V31	O	O	O	
00h/00h/7Fh	Perc. Set2	V32	O	O	O	
01h/00h/7Fh	Perc. Set3		O	O		
02h/00h/7Fh	Orch.HitMenu		O	O		
03h/00h/7Fh	DanceHitMenu		O			
04h/00h/7Fh	AcGtrNzMenu		O			
00h/00h/44h	Vibraphone	O11	O	O	O	O
00h/00h/52h	Glockenspiel	O12	O	O	O	O
00h/00h/51h	Celesta	O13	O	O	O	O
01h/00h/51h	Music Box		O			
00h/00h/45h	Marimba	O21	O	O	O	O
01h/00h/45h	MarimbaTrembl	O24	O	O	O	
00h/00h/53h	Xylophone	O22	O	O	O	O
01h/00h/53h	Barafon		O			
00h/00h/54h	Tubular-bell	O31	O	O	O	O
00h/00h/5Bh	Steel Drums	O41	O	O	O	O
01h/00h/5Bh	Steel Drums2		O			
01h/00h/5Ah	Kalimba		O	O		
02h/00h/5Ah	Santur	O43	O	O	O	
01h/00h/54h	Organ Bell		O	O		
03h/00h/54h	Vibra Bells		O	O		
04h/00h/54h	Digi Bells		O			
09h/00h/7Dh	Hand Bell		O			
05h/00h/7Eh	Finger Snap		O	O		
06h/00h/7Eh	Footsteps		O			
07h/00h/7Eh	Key Typing		O			

CC0/CC32/PC	Tone Name	No.	90S/ 80S	60S	20S	10S
04h/00h/7Eh	Bird		O	O		

●AT-S GS Part Tone List

CC0/CC32/PC	Tone Name
00h/00h/00h	Grand Piano1
00h/41h/00h	MIDI Piano1
00h/47h/00h	Piano Choir
00h/48h/00h	Piano 1*
08h/00h/00h	Piano 1w
10h/00h/00h	Piano 1d
00h/00h/01h	Piano 2
00h/40h/01h	Grand Piano2
00h/41h/01h	MIDI Piano2
00h/48h/01h	Piano 2*
08h/00h/01h	Piano 2w
00h/00h/02h	Piano 3
00h/41h/02h	EG+Rhodes 1
00h/42h/02h	EG+Rhodes 2
00h/43h/02h	Bell Piano
00h/48h/03h	Piano 3*
08h/00h/02h	Piano 3w
08h/40h/02h	Rock Piano
08h/41h/02h	Air Grand
08h/42h/02h	PianoStrings
00h/00h/03h	GS Honkytonk
00h/40h/03h	Honky-tonk 1
00h/48h/03h	Honky-tonk*
08h/00h/03h	Honky-tonk 2
00h/00h/04h	GS E.Piano1
00h/41h/04h	Hard Rhodes
00h/42h/04h	Stage Rhodes
00h/48h/04h	E.Piano 1*
08h/00h/04h	Detuned EP 1
08h/40h/04h	Soft E.Piano
08h/41h/04h	Detuned EP 1
08h/42h/04h	Chord EP1
10h/00h/04h	E.Piano 1v
10h/40h/04h	E.Piano 1
10h/41h/04h	Dyno Rhodes*
10h/42h/04h	Suitcase
10h/43h/04h	Dyno Rhodes
18h/00h/04h	60's E.Piano
18h/40h/04h	Sine Rhodes
18h/41h/04h	Wurly
18h/42h/04h	Dist E.Piano
18h/48h/04h	60'sE.Piano*
00h/00h/05h	GS E.Piano2
00h/40h/05h	Hard E.Piano
00h/41h/05h	E.Piano 3
00h/42h/05h	E.Piano 2
00h/43h/05h	EP Phase
00h/48h/05h	E.Piano 2*
08h/00h/05h	Detuned EP 2
08h/40h/05h	St.FM EP
08h/41h/05h	FM+SA EP
08h/42h/05h	Hard FM EP
08h/43h/05h	MellowRhodes
10h/00h/05h	E.Piano 2v
10h/42h/05h	EP Legend
00h/00h/06h	GS Harpsi.
00h/40h/06h	Harpsi.Singl
00h/41h/06h	Harpsichord
00h/48h/06h	Harpsichord*
08h/00h/06h	Coupled Hps.
08h/40h/06h	Harpsi.Doubl
08h/41h/06h	Synth Harpsi
10h/00h/06h	Harpsi.w
18h/00h/06h	Harpsi.o
00h/00h/07h	Soft Clav.
00h/40h/07h	Analog Clav.

MIDI IMPLEMENTATION

CC0/CC32/PC	Tone Name
00h/41h/07h	5th Ana.Clav
00h/42h/07h	Hard Clav.
00h/43h/07h	Clav.
00h/44h/07h	SynRingClav.
00h/45h/07h	Reso Clav.
00h/46h/07h	Phase Clav.
00h/48h/07h	Clav.*
00h/00h/08h	Celesta
00h/40h/08h	Pop Celesta
00h/48h/08h	Celesta*
00h/00h/09h	GS Glocken
00h/40h/09h	Glockenspiel
00h/48h/09h	Glocken*
00h/00h/0Ah	GS Music Box
00h/41h/0Ah	Music Box
00h/48h/0Ah	Music Box*
00h/00h/0Bh	GS Vibe
00h/40h/0Bh	Vibraphone
00h/41h/0Bh	Pop Vibe.
00h/48h/0Bh	Vibraphone*
08h/00h/0Bh	Vibe.w
00h/00h/0Ch	GS Marimba
00h/40h/0Ch	Soft Marimba
00h/48h/0Ch	Marimba*
08h/00h/0Ch	Marimba
08h/40h/0Ch	Balafon
00h/00h/0Dh	Xylophone
00h/48h/0Dh	Xylophone*
00h/00h/0Eh	Tubular-bell
00h/48h/0Eh	Tubularbell*
08h/00h/0Eh	Church Bell
09h/00h/0Eh	Carillon
09h/48h/0Eh	Carillon*
00h/00h/0Fh	GS Santur
00h/40h/0Fh	Santur
00h/48h/0Fh	Santur*
00h/00h/10h	Organ 1
00h/41h/10h	Full Organ 1
00h/42h/10h	Lower Organ1
00h/43h/10h	Full Organ 5
00h/44h/10h	Trem. Organ
00h/48h/10h	Organ 1*
08h/00h/10h	Detuned Or.1
08h/41h/10h	Full Organ 2
08h/42h/10h	Lower Organ2
08h/43h/10h	Full Organ 6
10h/00h/10h	Pop Organ 1
10h/41h/10h	Full Organ 3
10h/42h/10h	Lower Organ3
10h/43h/10h	Full Organ 7
10h/48h/10h	Pop Organ 1*
11h/00h/10h	Pop Organ 2
12h/00h/10h	Pop Organ
20h/00h/10h	Full Organ 4
20h/40h/10h	VS Organ
20h/42h/10h	Metalic Org.
20h/43h/10h	Full Organ 8
20h/44h/10h	Organ 4
00h/00h/11h	Organ 2
00h/40h/11h	Jazz Organ1
00h/41h/11h	Jazz Organ4
00h/42h/11h	Jazz Organ 5
00h/48h/11h	Organ 2*
08h/00h/11h	Detuned Or.2
08h/40h/11h	Jazz Organ3
08h/41h/11h	Organ Bass
08h/42h/11h	Jazz Organ 6
20h/00h/11h	Jazz Organ1
20h/40h/11h	Jazz Organ2
20h/41h/11h	Pipe Org. Bs
20h/42h/11h	Jazz Organ 7
20h/43h/11h	Organ 5
00h/00h/12h	Rock Organ2

CC0/CC32/PC	Tone Name
00h/40h/12h	Rock Organ1
00h/41h/12h	Rotary Org.S
00h/42h/12h	Rotary Org.F
00h/43h/12h	L-Organ
00h/48h/12h	Rock Organ2*
00h/00h/13h	Church Org.1
00h/40h/13h	Organ Flute
00h/43h/13h	Diapason 8'
00h/48h/13h	ChurchOrg.1*
08h/00h/13h	Church Org.2
08h/40h/13h	Trem.Flute
08h/41h/13h	Church Organ
08h/43h/13h	Puff Organ
10h/00h/13h	Church Org.3
10h/40h/13h	Theater Org.
10h/42h/13h	Nason flt 8'
00h/00h/14h	Reed Organ
00h/40h/14h	Digi Church
00h/41h/14h	CheeseOrgan
00h/48h/14h	Reed Organ*
00h/00h/15h	Accordion Fr
00h/40h/15h	Accordion
00h/41h/15h	Hard Accord
00h/48h/15h	AccordionFr*
08h/00h/15h	Accordion It
00h/00h/16h	GS Harmonica
00h/40h/16h	Harmonica
00h/48h/16h	Harmonica*
00h/00h/17h	Bandoneon
00h/48h/17h	Bandoneon*
00h/00h/18h	GS Nylon Gt.
00h/40h/18h	Nylon Guitar
00h/41h/18h	Gut Guitar
00h/42h/18h	Chord Gt1
00h/48h/18h	Nylon-strGt*
08h/00h/18h	Ukulele
08h/40h/18h	Gut Guitar
10h/00h/18h	Nylon Gt.o
20h/00h/18h	Nylon Guitar
20h/40h/18h	Nylon Gt.2
00h/00h/19h	Steel-str.Gt
00h/40h/19h	Steel Guitar
00h/41h/19h	EX A.Guitar*
00h/42h/19h	EX Ac.Guitar
00h/43h/19h	EX A.Guitar2
00h/44h/19h	Steel+Body
00h/45h/19h	Steel Vox
00h/46h/19h	V Ac.Guitar3
00h/48h/19h	Steel-strGt*
08h/00h/19h	12-str.Gt
08h/40h/19h	12str Guitar
08h/41h/19h	Nylon+Steel
10h/00h/19h	GS Mandolin
10h/40h/19h	Mandolin
10h/41h/19h	Steel Gt.2
00h/00h/1Ah	Jazz Guitar
00h/48h/1Ah	Jazz Guitar*
01h/04h/1Ah	Mellow Gt.
08h/00h/1Ah	GS Hawaiian
08h/40h/1Ah	Hawaiian Gt.
00h/00h/1Bh	Clean Gt.
00h/40h/1Bh	JC E.Guitar
00h/41h/1Bh	Open Hard
00h/42h/1Bh	Mid Tone GTR
00h/48h/1Bh	Clean Gt.*
08h/00h/1Bh	Chorus Gt.
08h/40h/1Bh	Clean Half
00h/00h/1Ch	Muted Gt.
00h/40h/1Ch	Muted Dis.Gt
00h/41h/1Ch	Muted Gt.2
00h/48h/1Ch	Muted Gt.*
08h/00h/1Ch	Funk Gt.
08h/40h/1Ch	Jazz Man

MIDI IMPLEMENTATION

CC0/CC32/PC	Tone Name
08h/48h/1Ch	Funk Gt.*
10h/00h/1Ch	Funk Gt.2
00h/00h/1Dh	Overdrive Gt
00h/41h/1Dh	Guitar Pinch
00h/48h/1Dh	OverdriveGt*
00h/00h/1Eh	GS Dist.Gt
00h/40h/1Eh	DistortionGt
00h/41h/1Eh	Dazed Guitar
00h/42h/1Eh	Rock Rhythm2
00h/48h/1Eh	Dist.Guitar*
08h/00h/1Eh	Feedback Gt.
08h/40h/1Eh	Power Gt.2
08h/41h/1Eh	Power Guitar
08h/42h/1Eh	Rock Rhythm
08h/43h/1Eh	Dist Rtm GTR
08h/44h/1Eh	Feedback Gt2
08h/45h/1Eh	5th Dist.
00h/00h/1Fh	Gt.Harmonics
00h/40h/1Fh	Ac.Gt.Harmnx
00h/48h/1Fh	Gt.Harmo*
08h/00h/1Fh	Gt. Feedback
00h/00h/20h	GS Ac.Bass
00h/40h/20h	Acoustic Bs.
00h/41h/20h	A.Bass+Cymb1
00h/48h/20h	Acoustic Bs*
00h/00h/21h	GS Fing.Bass
00h/40h/21h	Fingered Bs.
00h/41h/21h	Finger Slap
00h/48h/21h	Fingered Bs*
00h/00h/22h	GS Picked Bs
00h/40h/22h	Picked Bs.
00h/41h/22h	Mute PickBs.
00h/48h/22h	Picked Bs.*
00h/00h/23h	Fretless Bs.
00h/40h/23h	Mr.Smooth
00h/48h/23h	Fretless Bs*
00h/00h/24h	Slap Bass
00h/48h/24h	Slap Bass 1*
00h/00h/25h	Slap Bass 2
00h/48h/25h	Slap Bass 2*
00h/00h/26h	Synth Bass 1
00h/40h/26h	Jungle Bass
00h/41h/26h	Hammer
00h/48h/26h	Synth Bass1*
01h/00h/26h	SynthBass101
01h/40h/26h	ResoSH Bass
08h/00h/26h	Synth Bass 3
08h/40h/26h	Clavi Bass
00h/00h/27h	Synth Bass 2
00h/40h/27h	Synth Bass
00h/48h/27h	Synth Bass2*
08h/00h/27h	Synth Bass 4
08h/41h/27h	Modular Bass
08h/42h/27h	Attack Pulse
10h/00h/27h	Rubber Bass
10h/40h/27h	SH101 Bass
10h/41h/27h	WireStr Bass
10h/42h/27h	Sync Bass
10h/48h/27h	Rubber Bass*
00h/00h/28h	GS Violin
00h/40h/28h	Violin
00h/48h/28h	Violin*
08h/00h/28h	Slow Violin
00h/00h/29h	Viola
00h/48h/29h	Viola*
00h/00h/2Ah	GS Cello
00h/40h/2Ah	Cello
00h/48h/2Ah	Cello*
00h/00h/2Bh	Contrabass
00h/48h/2Bh	Contrabass*
00h/00h/2Ch	GS Trem.Str
00h/40h/2Ch	Tremolo Str
00h/41h/2Ch	Suspense Str

CC0/CC32/PC	Tone Name
00h/48h/2Ch	Tremolo Str*
00h/00h/2Dh	PizzicatoStr
00h/40h/2Dh	Mellow Pizz.
00h/48h/2Dh	Pizzicato*
00h/00h/2Eh	GS Harp
00h/40h/2Eh	Harp
00h/41h/2Eh	Yang Qin
00h/42h/2Eh	Harp Strings
00h/48h/2Eh	Harp*
00h/00h/2Fh	Timpani
00h/48h/2Fh	Timpani*
00h/00h/30h	GS Strings
00h/40h/30h	Strings
00h/41h/30h	Velo Strings
00h/42h/30h	Oct Strings
00h/43h/30h	60's Srrings
00h/44h/30h	Strings 2
00h/48h/30h	Strings*
08h/00h/30h	Orchestra
08h/40h/30h	OrchestraBrs
08h/41h/30h	Choir Str
00h/00h/31h	GS Sl.Str
00h/40h/31h	Slow Strings
00h/41h/31h	SlowStrings2
00h/42h/31h	Legato Str
00h/48h/31h	SlowStrings*
09h/04h/31h	Warm Strings
00h/00h/32h	Syn.Strings1
00h/40h/32h	Syn.Slow Str
00h/41h/32h	OB Strings
00h/48h/32h	Syn.Str 1*
08h/00h/32h	Syn.Strings3
00h/00h/33h	Syn.Strings2
00h/40h/33h	JP Saw Str
00h/48h/33h	Syn.Str 2*
00h/00h/34h	Choir Aahs
00h/40h/34h	Rich Choir
00h/42h/34h	Dreamy Choir
00h/48h/34h	Choir Aahs*
20h/00h/34h	Choir
20h/40h/34h	Choir Str
00h/00h/35h	Pop Voice
00h/40h/35h	Jazz Voices
00h/41h/35h	Doos Voice
00h/42h/35h	Thum Voice
00h/43h/35h	Doot Accent
00h/44h/35h	Dat Accent
00h/45h/35h	Bop Accent
00h/46h/35h	Doos & Doot
00h/47h/35h	Dat & Bop
00h/48h/35h	Pop Voice*
00h/00h/36h	SynVox
00h/40h/36h	Choir Oohs
00h/41h/36h	Jazz Scat
00h/43h/36h	Humming
00h/44h/36h	Tenor
00h/45h/36h	Analog Voice
00h/47h/36h	Dow Fall
00h/48h/36h	SynVox*
00h/00h/37h	OrchestraHit
00h/40h/37h	Philly Hit
00h/41h/37h	6th Hit
00h/42h/37h	Euro Hit
00h/43h/37h	Bass Hit
00h/44h/37h	Rave Hit
00h/45h/37h	Stack Hit
00h/48h/37h	Orche.Hit*
00h/00h/38h	GS Trumpet
00h/40h/38h	Trumpet
00h/41h/38h	EX Trumpet
00h/42h/38h	V Trumpet
00h/43h/38h	Tp Shake
00h/48h/38h	Trumpet*

MIDI IMPLEMENTATION

CC0/CC32/PC	Tone Name
01h/40h/38h	EX Tp&Shake*
01h/41h/38h	EX Tp&Shake
01h/42h/38h	Dark Trumpet
01h/43h/38h	Romantic
00h/00h/39h	GS Trombone
00h/40h/39h	TromboneSoft
00h/41h/39h	Bright Tb
00h/48h/39h	Trombone*
01h/00h/39h	Trombone
01h/40h/39h	Trombone
01h/41h/39h	Trombone 2
00h/00h/3Ah	GS Tuba
00h/40h/3Ah	Tuba
00h/48h/3Ah	Tuba*
00h/00h/3Bh	MutedTrumpet
00h/40h/3Bh	MuteTrumpet2
00h/48h/3Bh	M.Trumpet*
00h/00h/3Ch	French Horn
00h/40h/3Ch	Fr.Horn Solo
00h/41h/3Ch	Flugel Horn
00h/48h/3Ch	FrenchHorns*
01h/00h/3Ch	Fr.Horn 2
01h/40h/3Ch	SuperF.Horns
01h/41h/3Ch	OrchestraBrs
00h/00h/3Dh	Brass 1
00h/40h/3Dh	Brass 1
00h/41h/3Dh	Bright Brass
00h/42h/3Dh	Brass ff
00h/43h/3Dh	Brass sfz
00h/48h/3Dh	Brass 1*
08h/00h/3Dh	Brass 2
08h/40h/3Dh	Power Brass
08h/41h/3Dh	BrassSection
08h/42h/3Dh	St. Brass ff
00h/00h/3Eh	Synth Brass1
00h/40h/3Eh	Jump Brass
00h/48h/3Eh	SynthBrass1*
08h/00h/3Eh	Synth Brass3
08h/40h/3Eh	DeepSynBrass
08h/41h/3Eh	Oct SynBrass
10h/00h/3Eh	AnalogBrass1
10h/48h/3Eh	A.Brass 1*
00h/00h/3Fh	Synth Brass2
00h/40h/3Fh	EX Orchestra
00h/41h/3Fh	Soft Brass
00h/48h/3Fh	SynthBrass2*
08h/00h/3Fh	Synth Brass4
10h/00h/3Fh	AnalogBrass2
00h/00h/40h	GS Sop.Sax
00h/40h/40h	Soprano Sax
00h/48h/40h	Soprano Sax*
00h/00h/41h	Alto Sax
00h/40h/41h	AltoSax Soft
00h/41h/41h	EX Alto Sax
00h/42h/41h	Sax Section
00h/48h/41h	Alto Sax*
08h/40h/41h	Grow Sax
08h/42h/41h	AltoSax + Tp
00h/00h/42h	Tenor Sax
00h/40h/42h	Blow Sax
00h/41h/42h	Super Tenor
00h/48h/42h	Tenor Sax*
08h/40h/42h	Tenor Sax f
00h/00h/43h	GS Bari Sax
00h/40h/43h	Baritone Sax
00h/41h/43h	Bari & Tenor
00h/48h/43h	BaritoneSax*
00h/00h/44h	GS Oboe
00h/40h/44h	Oboe
00h/48h/44h	Oboe*
01h/40h/44h	Tune Oboe
00h/00h/45h	GS Eng.Horn
00h/40h/45h	English Horn

CC0/CC32/PC	Tone Name
00h/48h/45h	EnglishHorn*
00h/00h/46h	Bassoon
00h/48h/46h	Bassoon*
00h/00h/47h	Clarinet
00h/40h/47h	Bs Clarinet
00h/48h/47h	Clarinet*
00h/00h/48h	Piccolo
00h/48h/48h	Piccolo*
00h/00h/49h	GS Flute
00h/40h/49h	Flute
00h/48h/49h	Flute*
00h/00h/4Ah	Recorder
00h/48h/4Ah	Recorder*
00h/00h/4Bh	GS Pan Flute
00h/40h/4Bh	Blow Pipe
00h/41h/4Bh	Pan Flute
00h/48h/4Bh	Pan Flute*
00h/00h/4Ch	Bottle Blow
00h/41h/4Ch	BottleBlow2
00h/48h/4Ch	Bottle Blow*
00h/00h/4Dh	Shakuhachi
00h/48h/4Dh	Shakuhachi*
00h/00h/4Eh	Whistle
00h/48h/4Eh	Whistle*
00h/00h/4Fh	Ocarina
00h/48h/4Fh	Ocarina*
00h/00h/50h	Square Wave
00h/40h/50h	Syn.Square
00h/41h/50h	CC Solo
00h/42h/50h	Dual Sqr&Saw
00h/43h/50h	SquareWave2
00h/48h/50h	Square Wave*
01h/00h/50h	Square
01h/40h/50h	FM Lead 1
01h/41h/50h	FM Lead 1
01h/42h/50h	LM Square
08h/00h/50h	Sine Wave
08h/40h/50h	JP8 Square
00h/00h/51h	Saw Wave
00h/40h/51h	Mg Lead
00h/41h/51h	JP SuperSaw
00h/43h/51h	Waspy Synth
00h/48h/51h	Saw Wave*
01h/00h/51h	Saw
01h/40h/51h	P5 Saw Lead
01h/41h/51h	Natural Lead
08h/00h/51h	Doctor Solo
08h/40h/51h	Rhythmic Saw
08h/41h/51h	SequencedSaw
08h/48h/51h	Doctor Solo*
00h/00h/52h	Syn.Calliope
00h/40h/52h	JP8 Pulse
00h/41h/52h	LM PureLead
00h/48h/52h	SynCalliope*
00h/00h/53h	Chiffer Lead
00h/40h/53h	Cheese Saw
00h/48h/53h	ChifferLead*
00h/00h/54h	Charang
00h/40h/54h	Reso Saw
00h/41h/54h	2600 SubOsc
00h/42h/54h	Acid Guitar
00h/48h/54h	Charang*
08h/40h/54h	Wire Lead
00h/00h/55h	Solo Vox
00h/40h/55h	RAVE Vox
00h/48h/55h	Solo Vox*
00h/00h/56h	5th Saw Wave
00h/40h/56h	5th Lead
00h/48h/56h	5th SawWave*
00h/00h/57h	Bass & Lead
00h/40h/57h	FM Lead 2
00h/41h/57h	Delayed Lead
00h/48h/57h	Bass & Lead*

MIDI IMPLEMENTATION

CC0/CC32/PC	Tone Name
02h/04h/57h	Fat & Perky
00h/00h/58h	Fantasia
00h/40h/58h	Fantasia 2
00h/41h/58h	New Age Pad
00h/42h/58h	Chord Syn1
00h/43h/58h	Sugar Key
00h/44h/58h	BriteSawKey
00h/48h/58h	Fantasia*
00h/00h/59h	Warm Pad
00h/40h/59h	Soft Pad
00h/41h/59h	Warm JP Str
00h/42h/59h	Sine Pad
00h/48h/59h	Warm Pad*
00h/00h/5Ah	Polysynth
00h/40h/5Ah	P5 Poly
00h/41h/5Ah	Poly King
00h/42h/5Ah	Octave Stack
00h/43h/5Ah	Happy Synth
00h/48h/5Ah	Polysynth*
00h/00h/5Bh	Space Voice
00h/40h/5Bh	Heaven II
00h/41h/5Bh	Holy Voices
00h/42h/5Bh	Warm SquPad
00h/43h/5Bh	Itopia
00h/48h/5Bh	Space Voice*
00h/00h/5Ch	Bowed Glass
00h/48h/5Ch	Bowed Glass*
00h/00h/5Dh	Metal Pad
00h/40h/5Dh	Tine Pad
00h/41h/5Dh	Panner Pad
00h/48h/5Dh	Metal Pad*
00h/00h/5Eh	Halo Pad
00h/40h/5Eh	JP8 Sqr Pad
00h/41h/5Eh	Vox Sweep
00h/42h/5Eh	JP8 Sqr Pad
00h/48h/5Eh	Halo Pad*
00h/00h/5Fh	Sweep Pad
00h/40h/5Fh	Sweep Pad 2
00h/41h/5Fh	Polar Pad
00h/42h/5Fh	Converge
00h/48h/5Fh	Sweep Pad*
00h/00h/60h	Ice Rain
00h/40h/60h	LFO RAVE
00h/43h/60h	Ice Rain
00h/48h/60h	Ice Rain*
00h/00h/61h	Soundtrack
00h/40h/61h	Ancestral
00h/41h/61h	Prologue
00h/48h/61h	Soundtrack*
00h/00h/62h	Crystal
00h/40h/62h	Vibra Bells
00h/41h/62h	Clear Bells
00h/42h/62h	ChristmasBel
00h/43h/62h	Bell Strings
00h/48h/62h	Crystal*
01h/00h/62h	Syn Mallet
01h/48h/62h	Syn Mallet*
02h/04h/62h	Soft Crystal
09h/04h/62h	Digi Bells
00h/00h/63h	Atmosphere
00h/40h/63h	Harpvox
00h/41h/63h	Nylon Harp
00h/42h/63h	Nylon+Rhodes
00h/43h/63h	HollowReleas
00h/48h/63h	Atmosphere*
00h/00h/64h	Brightness
00h/40h/64h	Org Bells
00h/48h/64h	Brightness*
00h/00h/65h	Goblin
00h/40h/65h	Calculating
00h/41h/65h	Goblinson
00h/42h/65h	50's Sci-Fi
00h/48h/65h	Goblin*

CC0/CC32/PC	Tone Name
00h/00h/66h	Echo Drops
00h/40h/66h	Big Panner
00h/48h/66h	Echo Drops*
01h/00h/66h	Echo Bell
01h/40h/66h	Ai-yai-a
02h/00h/66h	Echo Pan
02h/40h/66h	Echo Pan 2
02h/41h/66h	Water Piano
00h/00h/67h	Star Theme
00h/40h/67h	Rising Osc
00h/48h/67h	Star Theme*
00h/00h/68h	Sitar
00h/48h/68h	Sitar*
01h/00h/68h	Sitar 2
00h/00h/69h	Banjo
00h/48h/69h	Banjo*
00h/00h/6Ah	GS Shamisen
00h/40h/6Ah	Shamisen
00h/48h/6Ah	Shamisen*
00h/00h/6Bh	Koto
00h/48h/6Bh	Koto*
08h/00h/6Bh	Taisho Koto
08h/48h/6Bh	Taisho Koto*
00h/00h/6Ch	Kalimba
00h/48h/6Ch	Kalimba*
00h/00h/6Dh	Bagpipe
00h/48h/6Dh	Bagpipe*
00h/00h/6Eh	Fiddle
00h/48h/6Eh	Fiddle*
00h/00h/6Fh	Shanai
00h/48h/6Fh	Shanai*
00h/00h/70h	Tinkle Bell
00h/48h/70h	Tinkle Bell*
00h/00h/71h	Agogo
00h/48h/71h	Agogo*
00h/00h/72h	Steel Drums
00h/48h/72h	Steel Drums*
00h/00h/73h	Woodblock
00h/48h/73h	Woodblock*
08h/00h/73h	Castanets
00h/00h/74h	Taiko
00h/48h/74h	Taiko*
08h/00h/74h	Concert BD
08h/48h/74h	Concert BD*
00h/00h/75h	Melo. Tom 1
00h/40h/75h	Bodhran
00h/48h/75h	Melo.Tom 1*
08h/00h/75h	Melo. Tom 2
00h/00h/76h	Synth Drum
00h/48h/76h	Synth Drum*
08h/00h/76h	808 Tom
09h/00h/76h	Elec Perc.
00h/00h/77h	Reverse Cym.
00h/48h/77h	ReverseCym.*
00h/00h/78h	Gt.FretNoise
00h/48h/78h	Fret Noise*
01h/00h/78h	Gt.Cut Noise
01h/40h/78h	Wah Brush Gt
02h/00h/78h	String Slap
05h/40h/78h	Bass Slide
06h/40h/78h	Pick Scrape
00h/00h/79h	Breath Noise
00h/48h/79h	BreathNoise*
01h/00h/79h	Fl.Key Click
00h/00h/7Ah	Seashore
00h/48h/7Ah	Seashore*
01h/00h/7Ah	Rain
02h/00h/7Ah	Thunder
02h/40h/7Ah	Thunder Bell
03h/00h/7Ah	Wind
04h/00h/7Ah	Stream
05h/00h/7Ah	Bubble
00h/00h/7Bh	Bird

CC0/CC32/PC	Tone Name
00h/48h/7Bh	Bird*
01h/00h/7Bh	Dog
02h/00h/7Bh	Horse-Gallop
03h/00h/7Bh	Bird 2
04h/40h/7Bh	Cat
00h/00h/7Ch	Telephone 1
00h/48h/7Ch	Telephone 1*
01h/00h/7Ch	Telephone 2
02h/00h/7Ch	DoorCreaking
03h/00h/7Ch	Door
04h/00h/7Ch	Scratch
05h/00h/7Ch	Windchime
05h/40h/7Ch	Bar Chimes
00h/00h/7Dh	Helicopter
00h/48h/7Dh	Helicopter*
01h/00h/7Dh	Car-Engine
02h/00h/7Dh	Car-Stop
03h/00h/7Dh	Car-Pass
04h/00h/7Dh	Car-Crash
05h/00h/7Dh	Siren
06h/00h/7Dh	Train
07h/00h/7Dh	Jetplane
07h/40h/7Dh	Falling Down
08h/00h/7Dh	Starship
09h/00h/7Dh	Burst Noise
00h/00h/7Eh	Applause
00h/48h/7Eh	Applause*
01h/00h/7Eh	Laughing
02h/00h/7Eh	Screaming
03h/00h/7Eh	Punch
04h/00h/7Eh	Heart Beat
05h/00h/7Eh	Footsteps
05h/41h/7Eh	Finger Snap
07h/40h/7Eh	Finger Snap
00h/00h/7Fh	Gun Shot
00h/48h/7Fh	Gun Shot*
01h/00h/7Fh	Machine Gun
02h/00h/7Fh	Lasergun
03h/00h/7Fh	Explosion

●Drum Set

CC0/CC32/ PC#	Drum Set Name
00h/40h/03h	POP
00h/40h/11h	ROCK
00h/40h/2Bh	JAZZ BRUSH
00h/40h/3Fh	VOX DRUM
00h/00h/00h	STANDARD
00h/40h/00h	STANDARD 2
00h/00h/08h	ROOM
00h/40h/08h	ROOM 2
00h/00h/10h	POWER
00h/00h/18h	ELECTRONIC
00h/00h/19h	TR-808
00h/40h/19h	DANCE
00h/00h/20h	JAZZ
00h/00h/28h	BRUSH
00h/40h/28h	BRUSH 2
00h/00h/30h	ORCHESTRA
00h/00h/38h	SOUND EFFECT

* Voice with a "*" symbol appended to their name may not play back satisfactorily on other GS sound generating devices.