Roland

GS

GS/LA SOUND MODULE

CM-500

OWNER'S MANUAL

■ *Before You Begin*

Thank you for purchasing the Roland CM-500 Sound Module. The CM-500 contains a variety of quality GS and LA sounds which can be used to enhance any MIDI music system. In order to realize the full potential of the CM-500, and to ensure years of trouble-free service, please read this manual in its entirety.

■ *Main Features*

◆ The CM-500 contains an LA sound source (identical to that found in the MT-32 and CM-32L), and a GS format sound source, Roland's newly implemented sound-arrangement format.

The GS Format was created so that sound modules would respond in a somewhat uniform manner to incoming MIDI message. Song data written specifically for a GS-compatible sound module should play back in roughly the same way on any other GS-compatible sound module.

◆ The CM-500 is capable of producing up to 56 voices at any one time: 32 LA sounds and 24 GS sounds. With the availability of such a variety of sounds, it is very easy to achieve any number of unique ensemble textures.

◆ The CM-500 also comes equipped with reverb and chorus effects that can further enhance any sound.

◼ *Contents*

■ *Important Notes*

Be sure to use only the adaptor supplied with the unit. Use of any other power adaptor could result in damage, malfunction, or electric shock.

Power Supply

● When making any connections with other devices, always turn off the power to all equipment first; this will help prevent damage or malfunction.

● Do not use this unit on the same power circuit with any device that will generate line noise, such as a motor or variable lighting system.

● The power supply required for this unit is shown on its nameplate. Ensure that the line voltage of your installation meets this requirement.

● Avoid damaging the power cord; do not step on it, place heavy objects on it etc.

● When disconnecting the AC adaptor from the outlet, grasp the plug itself; never pull on the cord.

● If the unit is to remain unused for a long period of time, unplug the power cord.

Placement

● Do not subject the unit to temperature extremes (eg. direct sunlight in an enclosed vehicle). Avoid using or storing the unit in dusty or humid areas or areas that are subject to high vibration levels.

● Using the unit near power amplifiers (or other equipment containing large transformers) may induce hum.

● This unit may interfere with radio and television reception. Do not use this unit in the vicinity of such receivers.

● Do not expose this unit to temperature extremes (eg. direct sunlight in an enclosed vehicle can deform or discolor the unit) or install it near devices that radiate heat.

Maintenance

● For everyday cleaning wipe the unit with a soft, dry cloth (or one that has been slightly dampened with water). To remove stubborn dirt, use a mild neutral detergent. Afterwards, be sure to wipe the unit thoroughly with a soft, dry cloth.

● Never use benzene, thinners, alcohol or solvents of any kind, to avoid the risk of discoloration and/or deformation.

[Additional Precautions]

● Protect the unit from strong impact.

● Do not allow objects or liquids of any kind to penetrate the unit. In the event of such an occurrence, discontinue use immediately. Contact qualified service personnel as soon as possible.

● A small amount of heat will radiate from the unit, and thus should be considered normal.

● Before using the unit in a foreign country, consult with qualified service personnel.

● Should a malfunction occur (or if you suspect there is a problem) discontinue use immediately. Contact qualified service personnel as soon as possible.

● To prevent the risk of electric shock, do not open the unit or its AC adaptor.

1. Part Names

● Front Panel

◆ VOLUME (Volume Control Knob)

This adjusts the overall volume which is the output from the Output Jacks or Headphone Jack. Rotating the knob clockwise will increase the volume, and rotating it counter-clockwise will decrease it.

* The volume balance of the individual Part can be controlled with the MIDI Volume (Control Change) messages.

◆ AUDIO (Audio Signal Indicator Light)

Regardless of where the volume knob is set, this lights to indicate that a signal (above the threshold level) is being output.

Roland CM-500
GS/LA SOUND MODULE
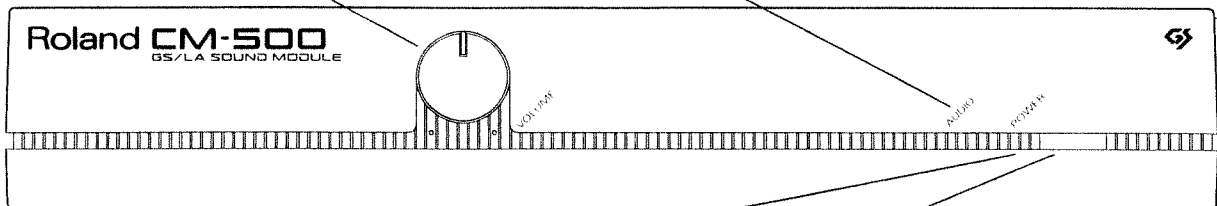
◆ POWER SWITCH

Turns the power on and off.

* This unit is equipped with a circuit protection device. A brief interval after power up is required before the unit will operate.

◆ POWER (Power Indicator Light)

Indicates that the power is on.

● Rear Panel

◆ MODE SELECTOR KNOB

Switches between sound source setups.

Note: The power must be off in order to change sound source modes (refer to page 9, the section on Modes).

◆ PHONES (Headphone Jack)

Connect headphones here. Signals will still be output from the Audio Outs even though headphones are connected.

◆ OUTPUT (Audio Outs)

The CM-500's audio signals are output in stereo (L/R). Mono is also possible by using the L (MONO) jack only.


```
⊕—●—⊖
1000mA
DC IN 9V
USE ROLAND ACB  ACN
ADAPTOR ONLY          THRU      OUT       IN
                      ——————— MIDI ———————
                                            MODE
                                    A  CM-300 + CM-32L
                                    B  CM-64 SIMULATION
                                    C  CM-300
                                    D  CM-500        PHONES        R ——— OUTPUT ——— L
                                                                         (MONO)
                                                                        CM-500
```
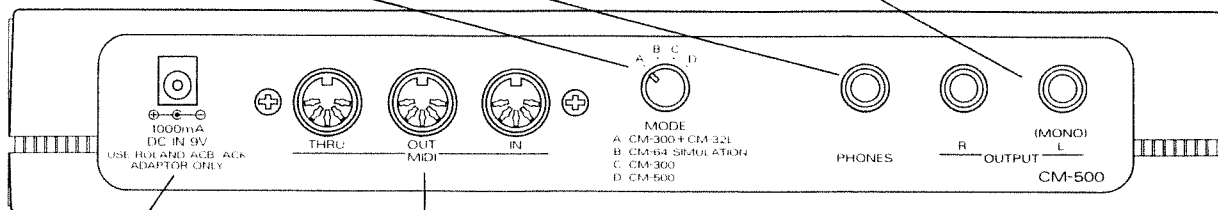
◆ MIDI IN/OUT/THRU (MIDI Connectors)

MIDI data is exchanged with other MIDI devices through these ports. For more information about MIDI, see the explanation on page 22.

◆ DC IN (AC Adaptor Jack)

Connect the AC adaptor to this inlet.

2. Making The Connection

● **MIDI Cable Connections**

Connect your CM-500 to computers and MIDI sequencers using the included MIDI cable.
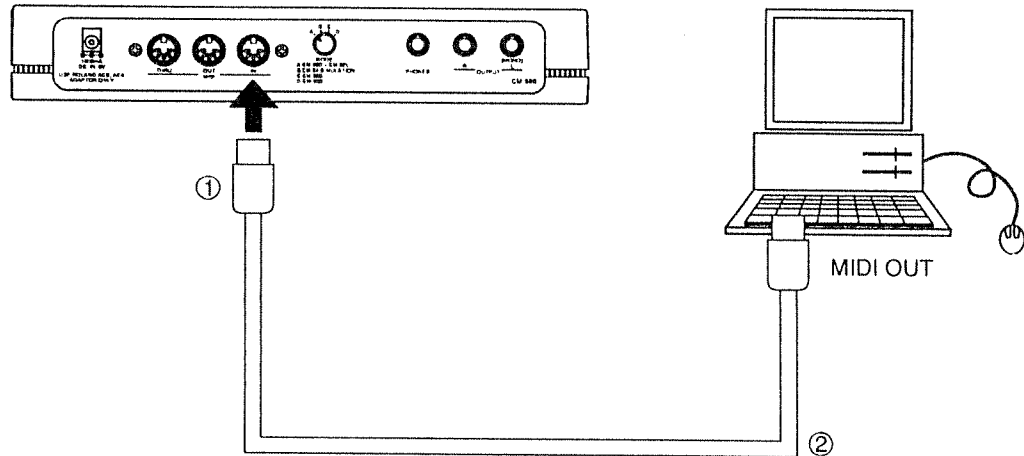
MIDI OUT

① Plug one end of the cable into the MIDI IN port of the CM-500.

② Plug the other end of the cable into the MIDI OUT port of your computer or sequencer.

● **Audio Cable Connections**

Connect keyboard amplifiers, stereos, portable radio/cassette players, etc., to the CM-500's Audio Outs using standard audio cables.

Stereo System

LINE IN, AUX, TAPE IN

INPUT

MA-12C
Monitor Speaker
(amplifire)
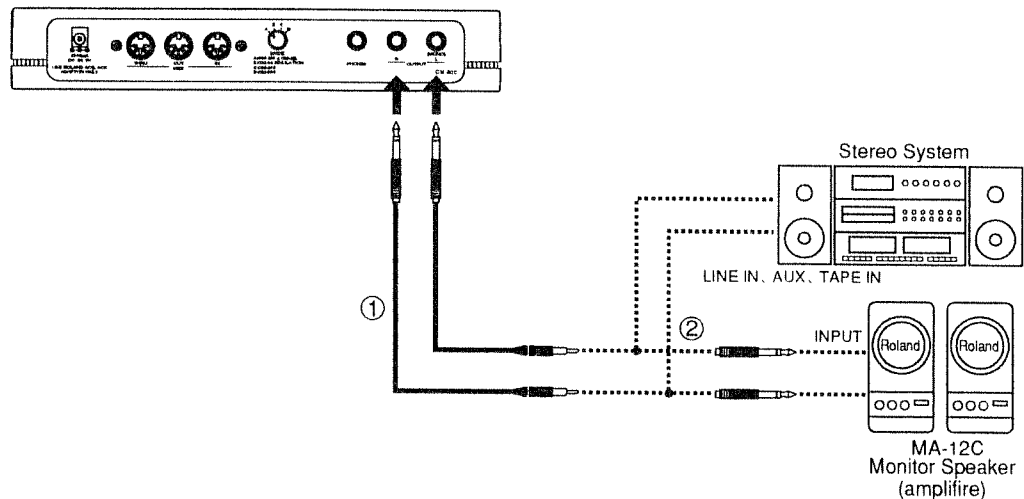
① Plug the cables into the CM-500's Audio Outs.
Connect the quarter-inch plugs to the CM-500's Audio Out jacks.

② Plug the other ends of the cables into the external input jacks (AUX IN or LINE IN) of the audio device you're using. If the audio device inputs use RCA connectors, remove the quarter-inch adaptors from the ends of the cables.

Be sure to match the L and R outputs of the CM-500 with the L and R inputs of the audio device.

Under no circumstances should you connect the cables to the MIC IN or PHONES jack of your audio equipment damage could result to the equipment or speaker systems.

● Using Headphones

Use headphones that have an impedance between 8 and 150 ohms. Connecting headphones will have no effect on the signal output from the CM-500's Audio Outs.
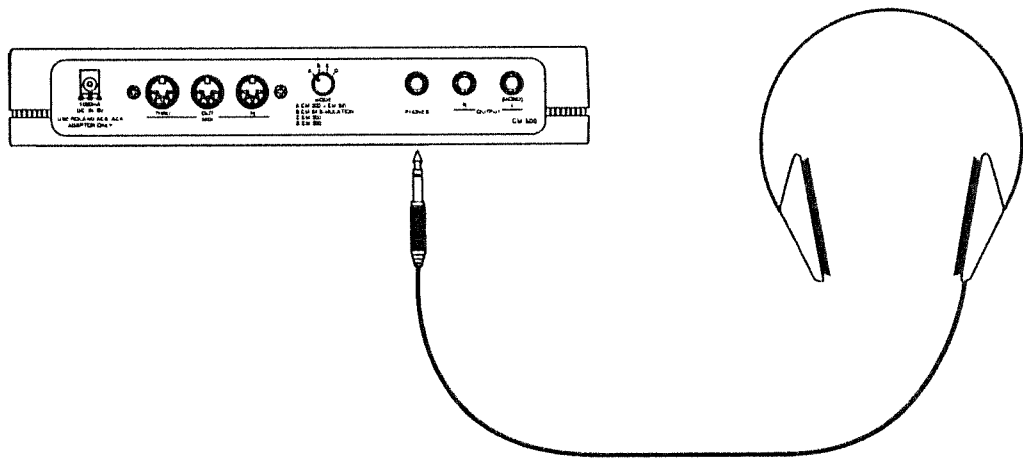
3. Modes

You can select one of four different operating modes for the CM-500, each with a different internal setup. The various modes let you work with a variety of applications and equipment.

(1) Types of Modes

◆ Mode A

Both the GS and LA sound sources will respond to performance data from a keyboard or sequencer (over Part 2 through 10). Therefore, when you use one of these devices, you will get a doubling of the sound. So in Mode A, if you want to use a keyboard or sequencer, you have to first send a Exclusive message to turn off one of the sound sources, and turn on the other.

For example, the Exclusive message to turn the GS sound source on and LA off for Part 5 is

F0 41 10 42 12 40 14 02 10 1A F7
F0 41 10 16 12 10 00 11 10 4F F7

For more information, check the MIDI Implementation.

◆ Mode B

For use with song data written for the CM-32L or CM-64.
The GS sound source will emulate a CM-64 PCM sound module.

◆ Mode C

For use with GS Format song data.
This setting can also be used when the CM-500 is connected to a keyboard.

◆ Mode D

For use when playing the CM-500 with a keyboard.

By the term "GS sound source", we mean the one that responds only to the GS Format. An LA sound source is one like the MT-32 or CM-32L that follows the LA format in carrying out its sound source functions.

(2) Switching Between Modes

You must turn off the CM-500 before switching modes. Rotating the MODE selector knob will have no effect when the power is on.

① Turn the power off.

② Rotate the MODE selector knob to the desired mode.

③ Turn the CM-500 back on.
   The CM-500 will power up in the mode you have selected.

* When you first turn on the CM-500, it takes a moment to set all the defaults for the selected mode before it begins operating normally.

4. Turning On The Power

① Before turning on the CM-500, check the following:

Is the CM-500 correctly connected to all peripheral devices?
Is the amp volume turned down to minimum?
Have you set the Mode Selector to the mode you want to use?

② Press the power switch.

Adjust the volume level on the amp.
Note: Setting the volume too high can damage your speakers. This is because general
audio speakers are not as rugged as those designed for use with instruments and the
higer signal levels they output.

◆ **Turning The Power Off**

Make sure that the amp volume is turned down before turning the CM-500 off.

● **Default Settings (Preset When The CM-500 Is First Turned On)**

Any changes that you make to the settings are in effect only while the CM-500 is on.

◆ **Mode A**

Part Settings

MIDI CH/PART	Tone		Part Volume		Pan		Reverb Send		Chorus Send		Bend Sens.		Voice Reserve	
	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA
1	Piano 1	------	100	---	64	---	40	---	0	--	2	12	2	--
2	Piano 1	Slap Bass 1	100	100	64	64	40	ON	0	--	2	12	2	3
3	Piano 1	Str Sect 1	100	100	64	72	40	ON	0	---	2	12	2	10
4	Piano 1	Brs Sect 1	100	100	64	64	40	ON	0	---	2	12	2	6
5	Piano 1	Sax 1	100	100	64	72	40	ON	0	--	2	12	2	4
6	Piano 1	Ice Rain	100	100	64	38	40	ON	0	---	2	12	2	3
7	Piano 1	Elec Piano1	100	100	64	91	40	ON	0	---	2	12	2	0
8	Piano 1	Bottle Blow	100	100	64	0	40	ON	0	---	2	12	2	0
9	Piano 1	Orche Hit	100	100	64	100	40	ON	0	---	2	12	2	0
10	Standard	Rhythm&SE	100	100	64	---	40	ON	0	---	2	12	6	6
11	Piano 1	------	100	--	64	---	40	--	0	--	2	---	0	---
12	Piano 1	------	100	--	64	---	40	--	0	--	2	---	0	---
13	Piano 1	------	100	--	64	---	40	--	0	--	2	---	0	---
14	Piano 1	------	100	--	64	---	40	---	0	--	2	---	0	---
15	Piano 1	------	100	--	64	---	40	--	0	--	2	---	0	---
16	Piano 1	------	100	--	64	---	40	--	0	--	2	---	0	---

⟪Overall Part Settings⟫

Sound Sorce	Master Volume	Reverb			Chorus			Key Shift
		Type	Level	Time	Type	Depth	Rate	
GS	127	Hall 2	64	64	Chorus 3	64	64	0
LA	100	Room	4	6	----	----	--	0

◆ Mode B

The maximum number of simultaneous PCM voices (maximum polyphony) is limited by the number available on the GS sound source, i.e., 24. This mode recognizes Exclusive message intended for the CM-32L, CM-32P and CM-64, and disregards any Exclusive message pertaining to the GS sound source.

The PCM cards can't be used with the CM-500 since it doesn't actually have a card slot. However the Mode B program numbers 65 to 128 are set for the tones corresponding to the PCM cards.

⟪Part Settings⟫

MIDI CH/PART	Tone		Part Volume		Pan		Reverb Send		Chorus Send		Bend Sens.		Voice Reserve	
	PCM	LA	PCM	LA	PCM	LA	PCM	LA	PCM	LA	PCM	LA	PCM	LA
1	----	------	---	---	--	--	--	--	--	--	--	12	--	--
2	----	Slap Bass 1	---	100	--	64	--	ON	--	--	--	12	--	3
3	----	Str Sect 1	---	100	--	72	--	ON	--	--	--	12	--	10
4	----	Brs Sect 1	---	100	--	64	--	ON	--	--	--	12	--	6
5	----	Sax 1	---	100	--	72	--	ON	--	--	--	12	--	4
6	----	Ice Rain	---	100	--	38	--	ON	--	--	--	12	--	3
7	----	Elec Piano1	---	100	--	91	--	ON	--	--	--	12	--	0
8	----	Bottle Blow	---	100	--	0	--	ON	--	--	--	12	--	0
9	----	Orche Hit	---	100	--	127	--	ON	--	--	--	12	--	0
10	----	Rhythm&SE	---	100	--	--	--	ON	--	--	--	12	--	6
11	FRETLESS 1	------	100	--	64	--	ON	--	--	--	12	--	2	--
12	CHIOR 1	------	100	--	81	--	ON	--	--	--	12	--	6	--
13	A.PIANO 1	------	100	--	64	--	ON	--	--	--	12	--	16	--
14	E.ORGAN 2	------	100	--	99	--	ON	--	--	--	12	--	0	--
15	E.GUITAR 1	------	100	--	27	--	ON	--	--	--	12	--	0	--
16	SOFT TP 1	------	100	--	45	--	ON	--	--	--	12	--	0	--

⟪Overall Part Settings⟫

Sound Sorce	Master Volume	Reverb			Chorus			Key Shift
		Type	Level	Time	Type	Depth	Rate	
PCM	100	Room	4	6	----	----	--	0
LA	100	Room	4	6	----	----	--	0

◆ Mode C

This setting does not use the LA sound source, and any Exclusive messages pertaining
to LA sounds are ignored.

◁ Part Setting ▷

MIDI CH/ PART	Tone		Part Volume		Pan		Reverb Send		Chorus Send		Bend Sens.		Voice Reserve	
	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA
1	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
2	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
3	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
4	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
5	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
6	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
7	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
8	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
9	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
10	Standard	------	100	--	64	--	40	--	0	--	2	--	6	--
11	Piano 1	------	100	--	64	--	40	--	0	--	2	--	0	--
12	Piano 1	------	100	--	64	--	40	--	0	--	2	--	0	--
13	Piano 1	------	100	--	64	--	40	--	0	--	2	--	0	--
14	Piano 1	------	100	--	64	--	40	--	0	--	2	--	0	--
15	Piano 1	------	100	--	64	--	40	--	0	--	2	--	0	--
16	Piano 1	------	100	--	64	--	40	--	0	--	2	--	0	--

◁ Overall Part Settings ▷

Sound Sorce	Master Volume	Reverb			Chorus			Key Shift
		Type	Level	Time	Type	Depth	Rate	
GS	127	Hall 2	64	64	Chorus 3	64	64	0
LA	---	----	--	---	----	----	--	---

◆ Mode D

＜Part Settings＞

MIDI CH/PART	Tone		Part Volume		Pan		Reverb Send		Chorus Send		Bend Sens.		Voice Reserve	
	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA	GS	LA
1	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
2	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
3	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
4	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
5	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
6	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
7	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
8	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
9	Piano 1	------	100	--	64	--	40	--	0	--	2	--	2	--
10	Standard	------	100	--	64	--	40	--	0	--	2	--	6	--
11	------	Slap Bass 1	100	100	64	64	40	ON	0	--	2	2	0	10
12	------	Str Sect 1	100	100	64	72	40	ON	0	--	2	2	0	6
13	------	Brs Sect 1	100	100	64	64	40	ON	0	--	2	2	0	6
14	------	Sax 1	100	100	64	72	40	ON	0	--	2	2	0	4
15	------	Ice Rain	100	100	64	38	40	ON	0	--	2	2	0	4
16	------	Elec Piano1	100	100	64	91	40	ON	0	--	2	2	0	2

＜Overall Part Settings＞

Sound Sorce	Master Volume	Reverb			Chorus			Key Shift
		Type	Level	Time	Type	Depth	Rate	
GS	127	Hall 2	64	64	Chorus 3	64	64	0
LA	127	Room	4	6	----	----	---	0

5. About The GS Format

The primary advantage of the GS Format is that song data written for one GS Format sound source can be reproduced almost exactly on any other GS Format sound source. We'll be explaining more about the GS Format and MIDI later, but even if you're not familiar with these things, it's still possible to use the GS Format sound source to create your own music.

A sound module (or sound source) that can handle GS Format data will have the GS trademark on it. We'll call them "GS sound sources" from now on.

Be sure to use Mode C when playing back song data that has been written for the GS Format.

(1) Parts

The GS sound source can play 16 "parts". Part number 10 is for playing the rhythm instrument. A part is something like an orchestral part; think of it as a group of musicians all playing a particular instrument. The big difference from a regular orchestra is that you are completely free to decide what kind of instrument they will be playing. In addition, you can change that instrument midway through a song (as many times as you want) for every different part. You could think of this group as being made up of incredible multi-instrumentalists who can play any instrument you give them.

There are many different kinds of performance data in MIDI, but probably the most basic is the note message determining which key to play, how hard, for how long, and when to start. Every part has its own MIDI "channel" over which it receives performance data and, unless you reset it for some reason, the channel number is the same as the part number. Each part plays by following the instructions in the performance data on its own channel, and pays no attention to the data in other channels intended for other parts. So thanks to this MIDI channel scheme, you can play each part completely independently of the others, like on multitrack recorder.

(2) Number of Sounds That Can Be Played At The Same Time (Maximum Polyphony)

Just as there are limits to the number of people in an orchestra, there are limits to the number of sounds that can be played at the same time on a GS sound source. If note message is received asking for more notes than are possible, some parts are going to lose their note.

With the GS Format, you can count on a certain minimum number of voices always being available. These should be used for the most important parts in your music (like the melody line) so that they don't accidentally lose their note when some less important part comes in later. If you rank your parts ahead of time in "Part Sounding Priority" order, the GS sound source will know what the most important parts are. Then, if you try to send data for more notes than can be played at one time, the lower priority parts will be the first to lose their note.

Part Sounding Priority is set up as follows:

Part Priority ranking	Part No.
1	10(Drum Set)
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	11
12	12
13	13
14	14
15	15
16	16

(3) How to Change Tones

The basic design of a GS sound source lets you select among a maximum of 16,384 different sounds ("tones") upon command of an external MIDI device (actually, right now there is no sound source that has all of 16,384 different tones).

In conventional MIDI devices, tones are identified by a "Program Change" number between 1 and 128, which means that you have a maximum of only 128 different tones to choose from. This is hardly enough for the wide variety of sounds you would want to have in a library for even the most basic uses.

The GS Format, however, combines the Program Change number with what is called the "Bank Select" numbers* (of which there are 128) in MIDI, greatly increasing the range of selectable tones.
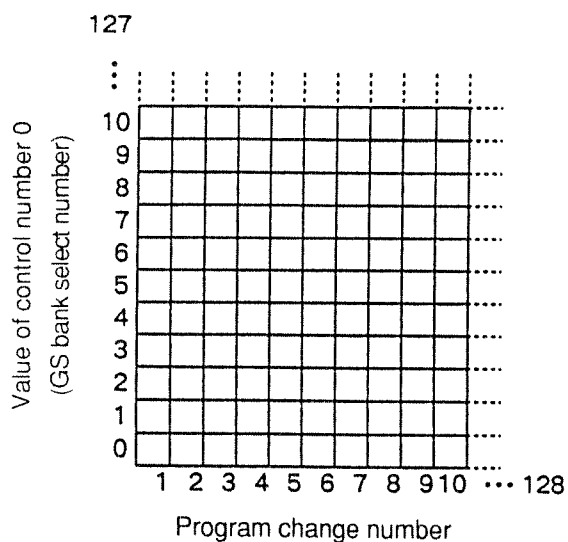
* Tone numbering is a combination of Bank Select and Program Change message. Although Bank Select messages in MIDI standard consist of Control Change message addresses 0 (MSB) and 32 (LSB), in the GS format it was decided that only the number of 0 (GS Bank Select number) would be used. When a tone is to be changed, the GS Bank Select number is sent first, followed by the Program Change message, when this message is received the tone is changed.

(4) Alternate Voicings—No Matter What GS Sound Source You Use, The Song Remains The Same

In the GS Format, tones are organized (roughly by what kind of sound they are) into something called a "tone map". By arranging the tones this way, a song written for one GS sound source will also playback with the same kind of sounds on a different GS sound source.

However, this does not mean that all the spots in the tone map have tones allocated to them; it depends on the sound source. Imagine a situation in which a GS sound source, call it B, is used to play song data that was written for a different GS sound source, A. Suddenly the song data tells B to change to a spot in the tone map that in A was assigned to some neat tone, but where it so happens B has nothing. No sound.

Here is where the GS Format steps in to say "if that particular tone can't make the performance, give us something that is as close as possible".

Let's Meet the Alternate for the Part.
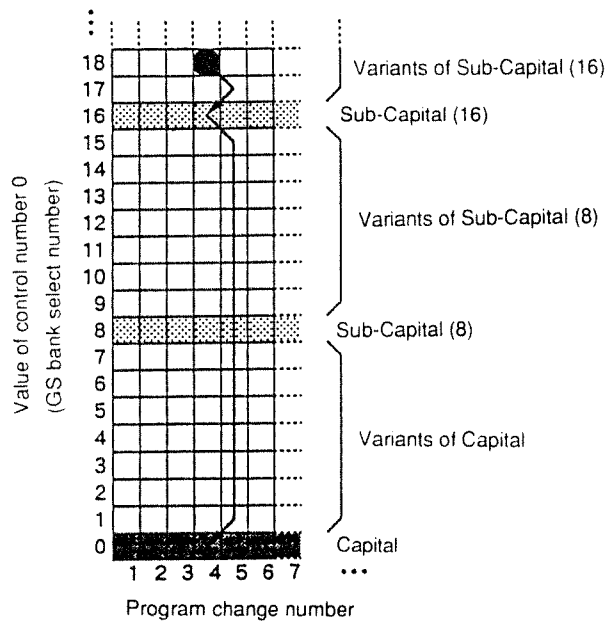
Similar instruments are arranged in the columns of the tone map, and similar kinds of tones are arranged in the horizontal rows. Meanwhile, you'll find the most basic kind of tones are located at GS Bank Select number 0; these are called "Capitals". Whatever the GS sound source, some kind of tone will be assigned to every Capital.

Capitals, similar instruments and similar kinds of tones, can be further subdivided into groups based on "nuance". The representative sounds for this group are found starting at

GS Bank Select number 8, and then at every eighth spot in the map. These are called "Sub-Capitals". Any other sounds are placed on the map above the nuance closest to the Sub-Capital or a Capital as variants of these.

So what happens if we run into the situation described above where tone changing message (GS Bank Select number plus Program Change number) calls for a spot on the tone map that has no tone assigned to it?

For example, let's send GS Bank Select 18/Program Change 4. If there is a tone at 18/4 in the receiving sound module, of course it plays that sound. But if there is no tone assigned there already, the module goes to the next-in-line Sub-Capital at 16/4 and plays using that sound. Or, if there is no tone assigned there either, it moves all the way down to the Capital at 0/4 and plays that sound (remember, all GS sound sources have tones at the Capitals). Using this rule, no matter what tone number gets sent, you will always get something that, like an alternate for a part, at least sounds similar. The problem we had with disappearing tones between the A and B sources is solved.

Check out the diagram below to see how this scheme is related to the GS Bank Select number.
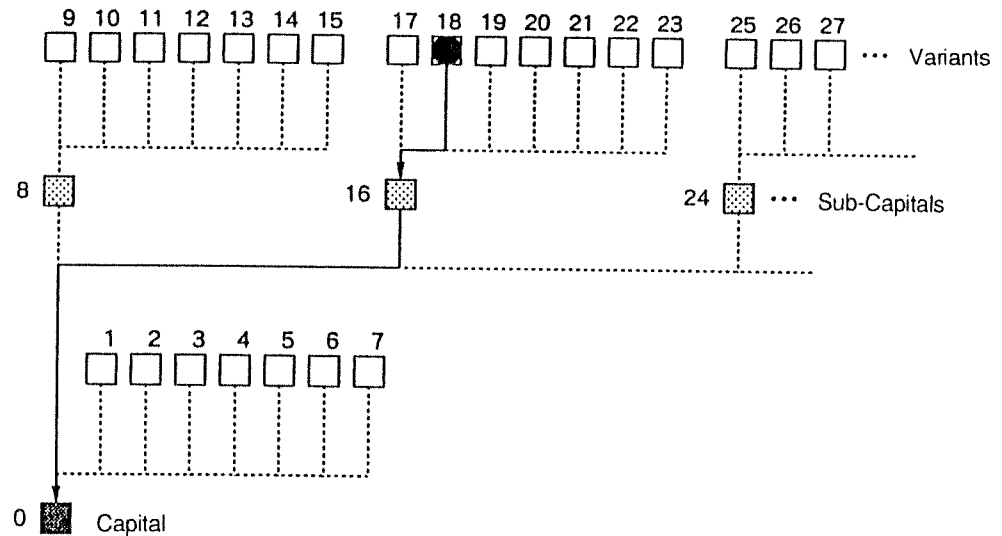
If there is no tone assigned at the indicated location, run down the chart through the Sub-Capitals to the Capitals until you find one that will play. So even if the very same tone is not on the sound source, it will use Alternate Voicing to play the part using a tone with a similar instrument and same kind of sound.

(5) General Use Areas and Special Use Areas

The lower half of the tone map (GS Bank Select numbers 0-63) is a general use area, and the upper half (GS Bank Select numbers 64-127) is a special use area. The special use area is for entering sounds that you concoct yourself, or for special tones on a particular device. A variety of special-effects sounds are also assigned to the general use area, in the range of Program Change numbers from 121 to 128.

Program change number
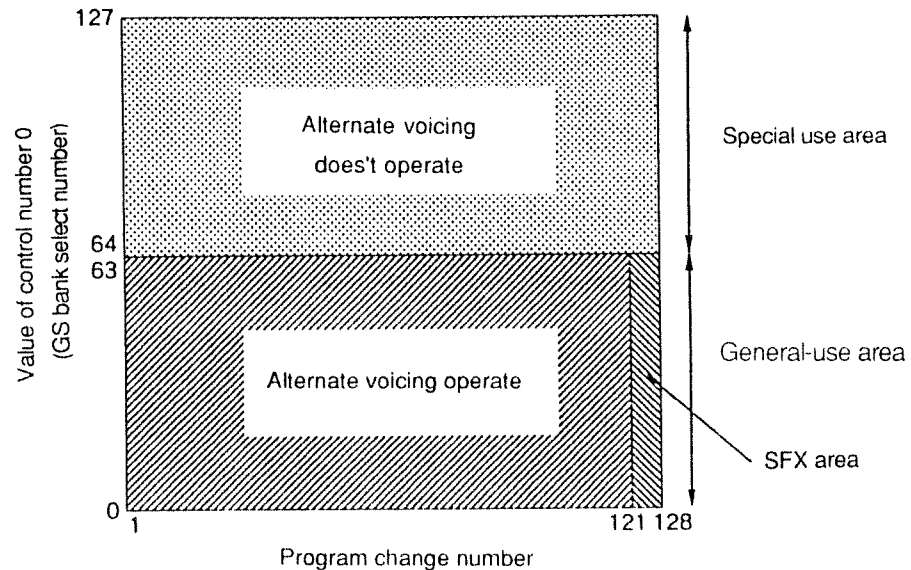
Since the contents of the special use area can be so different from one device to the next, even among GS sound sources, the Alternate Voicing rules we talked about don't apply here. That is, if the indicated tone location happens to be empty, no sound is played.
The GS Format also includes a place in the general use area for special effects sounds (SFX). From one spot to another in the tone map there is an incredible variety of sounds. This means of course that, if we tried to use Alternate Voicing here, we might get a dog barking where we asked for a cat meowing - not at all similar sounds! And so Alternate Voicing doesn't operate here either.

(6) Chorus and Reverb

Every part in a GS sound source can have chorus and reverb effects added to it, and the depth of effects can be controlled in real time using Control Change message*. The Control Change number used for this is standardized in the GS Format, so that no matter what GS sound source you're using, the right kind of effect will turn on or off.

* Control Change 91 controls the depth of Reverb, and 93 controls the depth of Chorus.

(7) A Part for Drums

Part 10 is for playing drums. In the drum part, you use the tones of a drum set.
Drum sets are not like ordinary tones in that a different sound is assigned to each key.
That is, no matter what key you press in a violin tone, you get a violin sound; it may be
a different pitch but it's still a violin sound. However, each key in a drum set tone plays
a different instrumental sound: kick, snare, hi-hat, etc. Since percussion instruments
don't generally carry the melody and so have little variation in pitch, we can handle them
all on just one channel.

Usual parts	● Select from the 16,384 (128 x 128) different tones. ● Every key sounds the same tone.
Drum part	● Select from the 128 different drum sets. ● A different sound is assigned to each key.
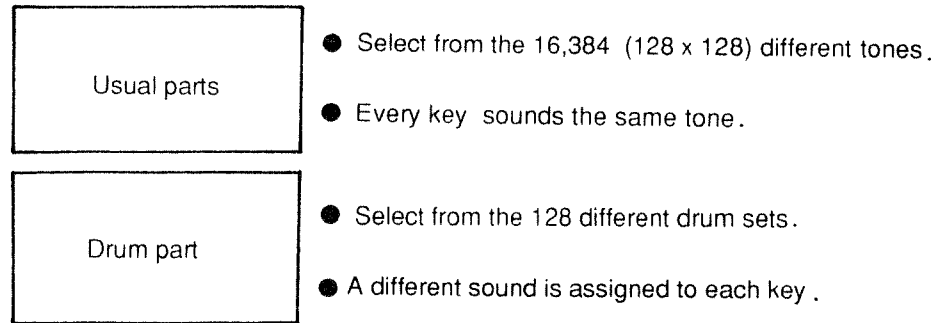
Roland drum machines and percussion sound modules all send and receive MIDI data on
MIDI channel 10 as a standard.   Likewise, GS sound sources power up with MIDI channel
10 as the default channel for drum parts.

(8) Changing Between Drum Sets

The GS Format has been designed to allow changing between 128 different drum sets for
playing drum (actually, there are no modules yet that have 128 different drum sets).
Drum sets can be changed using program change numbers.

In the GS Format, drum sets are ranked by Program Change numbers roughly the same
way as in tone maps.   In addition, the kind of sound assigned to a particular key has also
been standardized.   With the sounds arranged this way, a song will play back pretty much
the same every time, no matter what GS sound source you're using.

Drum set

1 2 3 4 5 6 7 ··· 128
Program change number
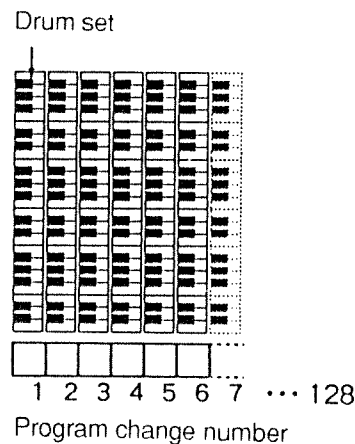
6. Parts and Voices

(1) Relationship Between The Number of Voices and Parts

There are 56 tone-generating circuits, called oscillators or voices, in the CM-500. That means 56 notes are available at any one time; 24 from the GS sound source and 32 from the LA sound source.

But since there are tones that use two or more voices, the actual number of notes that you can play at any one time is going to be less than that. Which means, for tones that require exactly two voices, you can play a maximum of 12 notes from the GS, and 16 from the LA sound source. And when it comes to rhythm parts, the number of voices depends on what rhythm sounds are being played at any one instant, so the total number of voices used will vary widely from one moment to the next.

It is the total number of voices in all parts which is important, so you could conceivably use all the available voices in just one part if you wanted. That means one part could use up to 24 voices from the GS sound source and 32 from the LA sound source. Check with the Tone Table (page 28) or Drum Set Table (page 35) to find out exactly how many voices are used by each tone.

(2) What Happens When You Try To Play Too Many Notes

If you try to play more than 24 voices from the GS sound source or 32 voices from the LA sound source, some parts are going to lose their voice; and if these are important parts like the melody, things are going to sound funny. To prevent the occurrence of such a situation, the CM-500 provides the Part Sounding Priority and Voice Reserve functions.

◆ Assign A Higher Priority To The Most Important Parts···Part Sounding Priority

If you try to play more than 24 GS voices at once, the new notes will be played by taking away voices from notes that are already playing the ones which are lowest on the GS Format's Part Sounding Priority numerical ranking system.

The CM-500's LA sound source, on the other hand, uses a system called Last Note Priority, in which the voices are taken from the notes which have been playing the longest.

◆ Make Sure The Most Important Parts Have The Voices They Need ··· Voice Reserve

The Voice Reserve function guarantees each part a certain number of voices in advance. For example, Part 10 in a GS sound source is assigned a Voice Reserve of 6, meaning that, even if the 24-voice limit is exceeded, Part 10 is assured of getting 6 of the remaining voices. In other words, if Part 10 uses 6 voices or less, there is no way that voices can be "stolen" from it, regardless of how Part Sounding Priority is set.

So when writing a song, give some thought to what the most important parts are. But keep in mind that the Voice Reserve for each part may be different in the different modes. Check the table showing the default settings for each part in the "Modes" section (page 9).

■ *Problems? Please Check A Few Things First*

If the CM-500 is not working as expected, go through this checklist first; the trouble may be something quite simple.   If you can't solve the problem, however, contact your dealer or nearest Roland Service Station.

◆ No Sound
  * Are all connected devices turned on?
  * Are all devices connected properly?
  * If there is an input selector on your audio device, is it set for the AUX IN or LINE IN that you're plugged into?
  * Is the volume turned up on the audio device?
  * Is there a volume setting on any software you might be using?   Is it turned down or set to zero?

◆ Sounds Don't Sound Right
  * Have you changed MIDI cable connections?   If the connections are changed in the middle of play-back, it can cause parts to play with the wrong sounds.
  * Is the Mode set for the sound source you intended to use?

■ *Brock Diagram*
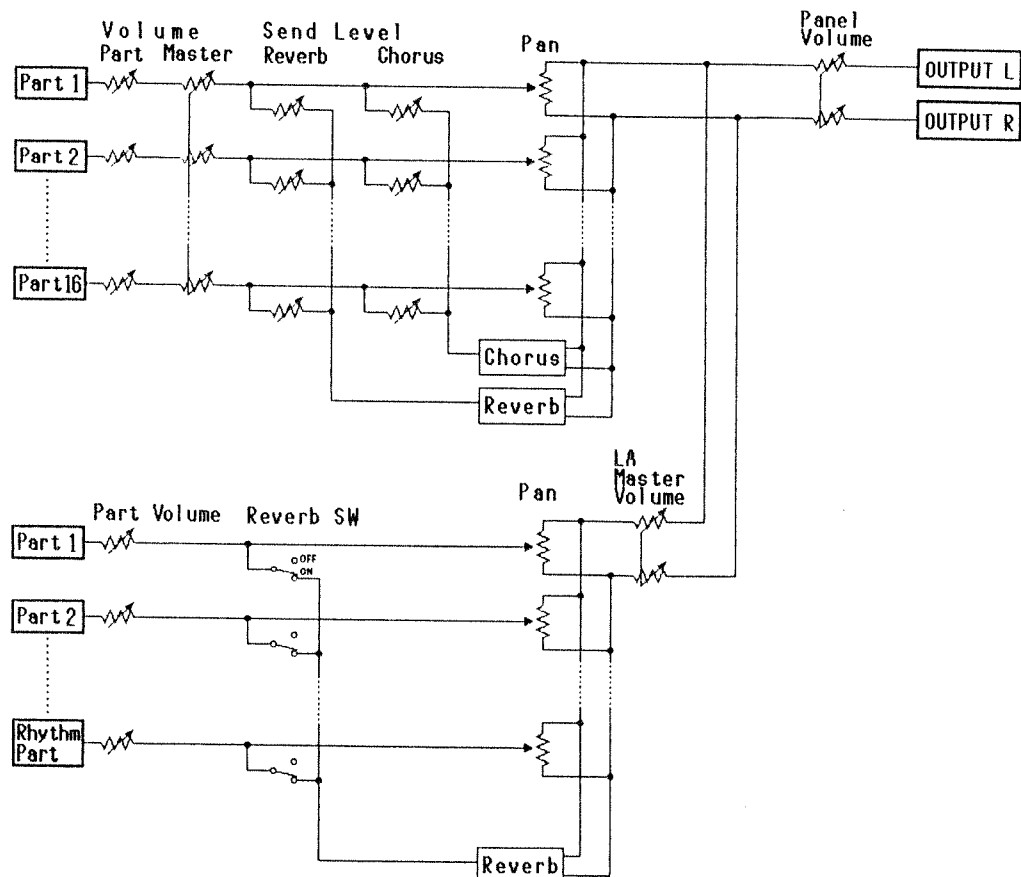
■ *About MIDI*

MIDI stands for Musical Instrument Digital Interface, a world-wide standard for exchanging performance data among computers and electronic musical instruments. An instrument conforming to the MIDI standard, no matter what kind or who made it, can send and receive performance data. This MIDI data is not music itself, but rather a way of handling a variety of digitally-encoded messages telling the instrument what to do.

● MIDI data Exchange

MIDI data exchange is not that difficult to understand.

◆ MIDI Connections

MIDI data exchange is acheived through three connectors. MIDI cables are used to connect these connectors in whatever arrangement you need for a particular job.
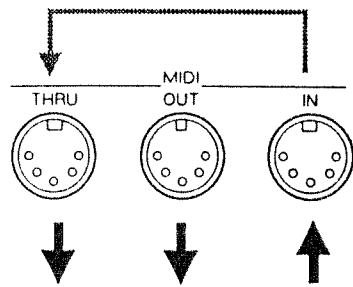
MIDI IN: MIDI data is received from other devices.
MIDI OUT: Data is sent to other devices.
MIDI THRU: The data sent to MIDI IN is sent back out, unchanged.

* You can use the MIDI THRU connector to "daisy chain" several MIDI devices together so that they all receive the same MIDI data stream. However, four or five devices connected this way is about the limit. Time delays and signal degradation increase with the addition of more devices, causing "glitches" and data transmission errors.

◆ MIDI Channels

Data for a number of different MIDI devices can be sent over the same MIDI cable. This is the result of the MIDI Channel concept.

A MIDI Channel is a lot like a TV Channel. As you switch channels, you see completely different programs; but this information is only received when the channel on your TV is set to the same channel that the TV station is broadcasting on.

Television signals of many broadcast stations pass through the cable from the antenna.

Only the program of the selected channel will be seen.
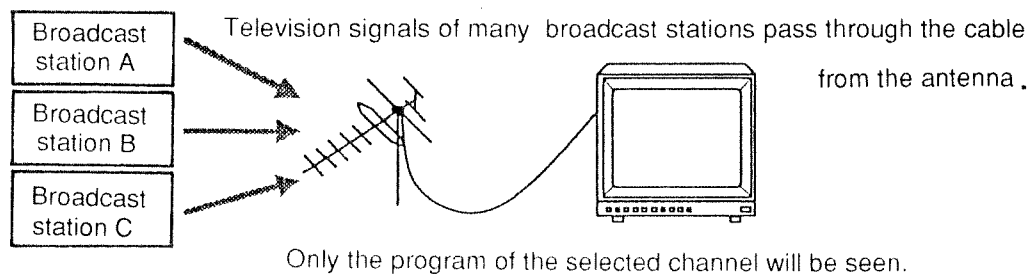
MIDI has channels numbered 1-16, and MIDI data on any one channel is sent to all instruments set to receive on that same channel. For example, playing a keyboard with the MIDI channel set like the following will play only sound source B.

MIDI OUT   MIDI IN   MIDI THRU

Receive channel 2

○ ○ ○   Sound module A   ▭▭▭ ▯ ○

Transmit channel 1   Receive channel 1   ▼ MIDI IN

○ ○ ○   Sound module B   ▭▭▭ ▯ ○
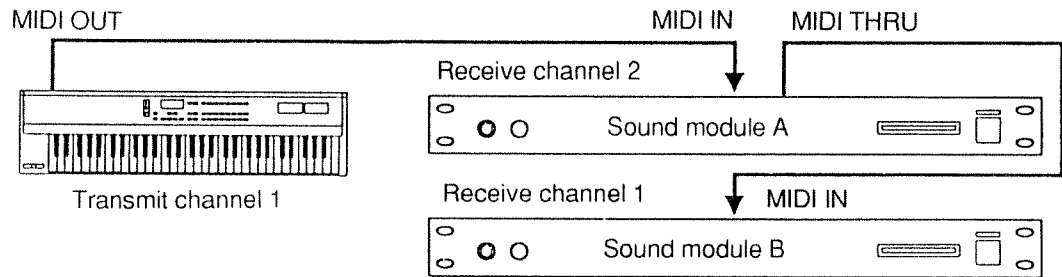
● Important Operating Information

Each part on the CM-500 is capable of receiving the following kinds of MIDI data:

Note: [GS] indicates that data only affects the GS sound source; [LA] indicates LA sound source only. No mark indicates that the data can be read by either sound source.

The MIDI data is displayed in decimal/hexadecimal form. Please read your manual to find out which is used with your MIDI device.

<div align="center">

64 / 40H

↑   ↑

Decimal Format   Hexadecimal Format (the H is part of the number)

</div>

◆ Note Message

Note message is used to transmit data describing a keyboard performance. It contains the following kinds of information:

Note Number: Indicates where the key is on the keyboard.

Note on: Indicates the key has been pressed.

Note off: Indicates that the key has been released.

Velocity: Indicates the force (velocity) with which the key is pressed.

Note Number uses integers from 0 to 127 to indicate the position of a key, with Middle C (C4) being 60. In drum parts, a note number has been assigned to each of the various rhythm and effect sounds.

◆ Pitch Bend Message

This is used to transmit data about the operation of the pitch bend wheel or lever usually found on synthesizers. Pitch benders are used to change the pitch of a note.

◆ Aftertouch Message [GS]

This is used to transmit aftertouch data, that is, finger pressure on a key after it has been played. Aftertouch adds expressiveness to a performance. There are two kinds: channel aftertouch and polyphonic aftertouch.

Channel aftertouch data affects all Tones on the same MIDI channel in the same way, no matter what key is pressed. Polyphonic aftertouch is specific to the key (note number) which is being played in a given channel.

23

◆ Program Change Message

This transmits data about switching Tones.

[LA] A Program Change number alone will switch the Tone.

[GS] A Tone is switched by a combination of Program Change number and a value of Control Change number 0/00H and 32/20H.

◆ Control Change Message

This transmits data about vibrato, hold, volume, pan, and other features that allow more expressiveness to be added to performances. Each kind of expression is measured in terms of a control number between 0/00H and 127/7FH. However, not all MIDI devices are capable of vibrato, or panning, etc.; so it depends on the device whether or not it can respond to these control numbers (and performance expressions).

[GS] Bank Select (Control Numbers 0/00H and 32/20H)

Bank Select and Program Change numbers have been combined to give you a wider range of Tones from which to choose. The Bank Select number lets you switch between various banks of Tones, and the Program Change number selects the Tone itself. If you send Bank Select message and don't follow up with a Program Change number, nothing will happen. This is a problem for some MIDI sequencers that send identical-step (timing) Control Change message. Message is sent from smallest to largest Control numbers, so that Program Change is sent before Bank Select. If you have this kind of sequencer, find out how to advance Bank Select so that it is sent before the Program Change number.

Modulation (Control Number 1/01H)

This adjusts vibrato depth. The effect this will have in terms of actual pitch variation will vary, depending on the Tone selected.

[GS] Portamento Time (Control Number 5/05H)

This adjusts the speed of the Portamento effect.

Data Entry (Control Number 6/06H and 38/26H)

Use this to set parameter values selected by RPN or NRPN.

Volume (Control Number 7/07H)

This adjusts the mix volume for each part.

The actual volume level output to your audio device is determined by a combination of the Volume (Control Change 7/07H), Expression (Control Change 11/0BH) and Master Volume (Exclusive Massage) settings, plus the setting of the VOLUME knob.

Pan (Control Number 10/0AH)

This adjusts the stereo position of the output (the apparent location of the sound between the left and right speakers).

For the LA sound source, the pan adjustment is broken down into 15 increments (sometimes 8, depending on the Tone). For the GS sound source, pan is continuously variable.

Mode B for the GS Sound Source
Mode A and B for the LA sound source

Posision	Left	Right
Pan	127 ←——→ 0	
Value	7FH	00H

Mode A, C and D for the GS Sound Source
Mode D for the LA sound source

Position	Left	Right
Pan	0 ←——→ 127	
Value	00H	7FH

Expression (Control Number 11/0BH)

This adjusts the mix volume for each part.

The actual volume level that goes to your audio device is determined by a combination of Volume (Control Change 7/07H), Expression (Control Change 11/0BH) and Master Volume (Exclusive Message) settings, plus the setting of the VOLUME knob.

Hold 1 (Control Number 64/40H)

This sustains a note, similar to the action of a piano damper pedal.

GS Portamento (Control Number 65/41H)

This turns the Portamento effect on and off.

GS Sostenuto (Control Number 66/42H)

This turns the Chord Hold feature on and off.

GS Soft (Control Number 67/43H)

This applies the Soft Pedal effect.

GS Legato Control (Control Number 84/54H)

This applies the same kind of effect as Portamento, but to each note number individually.

GS Effect 1 Depth (Control Number 91/5BH)

This adjusts reverb parameters individually for each part.

GS Effect 3 Depth (Control Number 93/5DH)

This adjusts chorus parameters individually for each part.

NRPN LSB, MSB (Control Number 98/62H, 99/63H)

These control sound source parameters. After identifying the parameters you want to change with NRPN MSB and NRPN LSB, use data entry to set the values.

* Check the MIDI Implementation for a list of the Parameters that you can control in this manner.

RPN LSB, MSB (Control Number 100/64H, 101/65H)

These control sound source parameters. After identifying the parameters you want to change with RPN MSB and RPN LSB, use data entry to set the values.

* Check the MIDI Implementation for a list of the Parameters that you can control in this manner.

All Note Off (Control Number 120/78H)

Sends a Note Off command to all voices.

Reset All Controllers (Control Number 121/79H)

If this message is received, it resets all controllers to match the values given in the following table.

Controller		Setting
	Pitch Bend	±0 (midpoint)
GS	Polyphonic Key Pressure	0 (minimum)
GS	Channel Pressure	0 (minimum)
	Modulation	0 (minimum)
	Expression	127 (maximum)
	Hold 1	0 (off)
GS	Portamento	0 (off)
GS	Soft	0 (off)
GS	Sostenuto	0 (off)
GS	RPN	No settings in this state
GS	NRPN	No settings in this state

● An Example Of Using MIDI Controllers

◆ Controlling Pitch Bend Range Using RPN

The Pitch Bend Range of each part can be modified using the RPN (Register Parameter Number) for that part. To effect this in an external MIDI device, the following MIDI data must be sent to it (in this order):

① RPN MSB (Control Number 100/64H) 0/00H
② RPN LSB (Control Number 101/65H) 0/00H
③ Data Entry (Control Change 6/06H) vv

Steps 1 and 2 select Pitch Bend Sensitivity as the parameter to be changed by the data entry in Step 3. vv then is the value of the Pitch Bend Range you want to set, and it can be changed in semitone intervals all the way up to two octaves (0/00H to 24/18H).

Example: Set the Part 5 (MIDI Channel 5) Pitch Bend Range to a full octave (12 semitones; a parameter value of 12).

	MIDI ch	Control Number	Data	Actual MIDI Data
① RPN MSB	5	100/64H	0/00H	B4H, 64H, 00H
② RPN LSB	5	101/65H	0/00H	B4H, 65H, 00H
③ Data Entry	5	6/06H	12/0CH	B4H, 06H, 0CH

* As was mentioned, the data has to be sent to external MIDI devices in the specified order. This is a problem for some MIDI sequencers that send identical-step (timing) Control Change message. Message is sent from smallest to largest Control numbers, so that Data Entry is sent before LSB and MSB. If you have this kind of sequencer, check your manual to find out how to advance RPN MSB, LSB, etc., so that the data is sent in the correct order.

TONE TABLE (GS SOUND SOURCE)

	PC #	CCO #	Tone name	V	Recommended sound range
Piano	1	0	Piano 1	1	A0 (21) — C8 (108)
	2	0	Piano 2	1	
	3	0	Piano 3	1	
	4	0	Honky-tonk	2	
	5	0	E. Piano 1	1	E1 (28) — G7 (103)
		8	Detuned EP 1	2	
	6	0	E. Piano 2	1	
		8	Detuned EP 2	2	
	7	0	Harpsichord	1	F2 (41) — F6 (89)
		8	Coupled Hps.	2	
	8	0	Clav.	1	C2 (36) — C7 (96)
Chromatic Percussion	9	0	Celesta	1	C4 (60) — C8 (108)
	10	0	Glockenspiel	1	C5 (72) — C8 (108)
	11	0	Music Box	1	C4 (60) — C6 (84)
	12	0	Vibraphone	1	F3 (53) — F6 (89)
	13	0	Marimba	1	C3 (48) — C6 (84)
	14	0	Xylophone	1	F4 (65) — C7 (96)
	15	0	Tubular-bell	1	C4 (60) — F5 (77)
		8	Church Bell	1	
	16	0	Santur	1	C4 (60) — C6 (84)
Organ	17	0	Organ 1	1	C2 (36) — C7 (96)
		8	Detuned Or. 1	2	
	18	0	Organ 2	1	
		8	Detuned Or. 2	2	
	19	0	Organ 3	2	
	20	0	Church Org. 1	1	A0 (21) — C8 (108)
		8	Church Org. 2	2	
	21	0	Reed Organ	1	C2 (36) — C7 (96)
	22	0	Accordion Fr	2	F3 (53) — F6 (89)
		8	Accordion It	2	
	23	0	Harmonica	1	C4 (60) — C6 (84)
	24	0	Bandneon	2	F3 (53) — F6 (89)

	PC #	CCO #	Tone name	V	Recommended sound range
Guitar	25	0	Nylon-str. Gt.	1	E2 (40) — C6 (84)
		8	Ukulele	1	A3 (57) — B5 (83)
	26	0	Steel-str. Gt.	1	E2 (40) — C6 (84)
		8	12-str. Gt.	2	
		16	Mandolin	1	G3 (55) — E6 (88)
	27	0	Jazz Gt.	1	E2 (40) — D6 (86)
		8	Hawaiian Gt.	1	
	28	0	Clean Gt.	1	
		8	Chorus Gt.	2	
	29	0	Muted Gt.	1	
		8	Funk Gt.	1	
	30	0	Overdrive Gt.	1	
	31	0	Distortion Gt.	1	
		8	Feedback Gt.	2	
	32	0	Gt. Harmonics	1	
		8	Gt. Feedback	1	
Bass	33	0	Acoustic Bs.	1	E1 (28) — G3 (55)
	34	0	Fingered Bs.	1	
	35	0	Picked Bs.	1	
	36	0	Fretless Bs.	1	
	37	0	Slap Bass 1	1	
	38	0	Slap Bass 2	1	
	39	0	Synth Bass 1	1	
		8	Synth Bass 3	1	
	40	0	Synth Bass 2	2	
		8	Synth Bass 4	2	

PC #   : Program number
CCO #   : Value of control number 0
                  (GS bank select number)
V   : Number of voices
Recommended
sound range   : The recommended sound range does not
                  indicate the limit of sound production. The
                  actual playable range extends beyond the
                  recommended sound range.

	PC #	CCO #	Tone name	V	Recommended sound range
Strings/orchestra	41	0	Violin	1	G3 (55) — C7 (96)
	42	0	Viola	1	G3 (48) — C6 (84)
	43	0	Cello	1	C2 (36) — C5 (72)
	44	0	Contrabass	1	E1 (28) — G3 (55)
	45	0	Tremolo Str	1	E1 (28) — C7 (96)
	46	0	PizzicatoStr	1	
	47	0	Harp	1	B0 (23) — G7 (103)
	48	0	Timpani	1	C2 (36) — A3 (57)
Ensemble	49	0	Strings	1	E1 (28) — C7 (96)
	49	8	Orchestra	2	C1 (24) — C7 (96)
	50	0	Slow Strings	1	E1 (28) — C7 (96)
	51	0	Syn. Strings1	1	C2 (36) — C7 (96)
	51	8	Syn. Strings3	2	C1 (24) — C7 (96)
	52	0	Syn. Strings2	2	C2 (36) — C7 (96)
	53	0	Choir Aahs	1	C3 (48) — G5 (79)
	54	0	Voice Oohs	1	
	55	0	SynVox	1	C3 (48) — C6 (84)
	56	0	OrchestraHit	2	C3 (48) — C5 (72)
Brass	57	0	Trumpet	1	A # 3 (58) — A # 6 (94)
	58	0	Trombone	1	A # 1 (34) — D # 5 (75)
	59	0	Tuba	1	F1 (29) — G3 (55)
	60	0	MutedTrumpet	1	A # 3 (58) — A # 5 (82)
	61	0	French Horn	2	F2 (41) — F5 (77)
	62	0	Brass 1	1	C2 (36) — C7 (96)
	62	8	Brass 2	2	
	63	0	Synth Brass1	2	
	63	8	Synth Brass3	2	
	64	0	Synth Brass2	2	
	64	8	Synth Brass4	1	

	PC #	CCO #	Tone name	V	Recommended sound range
Reed	65	0	Soprano Sax	1	F # 3 (54) — D # 6 (87)
	66	0	Alto Sax	1	C # 3 (49) — G # 5 (80)
	67	0	Tenor Sax	1	F # 2 (42) — D # 5 (75)
	68	0	Baritone Sax	1	C # 2 (37) — G # 4 (68)
	69	0	Oboe	1	A # 3 (58) — G6 (91)
	70	0	English Horn	1	E3 (52) — A5 (81)
	71	0	Bassoon	1	A # 1 (34) — C5 (72)
	72	0	Clarinet	1	D3 (50) — G6 (91)
Pipe	73	0	Piccolo	1	D5 (74) — C8 (108)
	74	0	Flute	1	C4 (60) — C7 (96)
	75	0	Recorder	1	
	76	0	Pan Flute	1	
	77	0	Bottle Blow	2	
	78	0	Shakuhachi	2	
	79	0	Whistle	1	
	80	0	Ocarina	1	
Synth lead	81	0	Square Wave	2	
	81	8	Sine Wave	1	
	82	0	Saw Wave	2	
	83	0	Syn. Calliope	2	
	84	0	Chiffer Lead	2	
	85	0	Charang	2	
	86	0	Solo Vox	2	
	87	0	5th Saw Wave	2	
	88	0	Bass & Lead	2	
Synth pad etc.	89	0	Fantasia	2	
	90	0	Warm Pad	1	
	91	0	Polysynth	2	
	92	0	Space Voice	1	
	93	0	Bowed Glass	2	
	94	0	Metal Pad	2	
	95	0	Halo Pad	2	
	96	0	Sweep Pad	1	

PC # : Program number

CCO # : Value of control number 0 (GS bank select number)

V : Number of voices

Recommended sound range : The recommended sound range does not indicate the limit of sound production. The actual playable range extends beyond the recommended sound range.

	PC #	CCO #	Tone name		V
Synth SFX	97	0	Ice Rain		2
	98	0	Soundtrack		2
	99	0	Crystal		2
	100	0	Atmosphere		2
	101	0	Brightness		2
	102	0	Goblin		2
	103	0	Echo Drops		1
	104	0	Star Theme		2
Ethnic	105	0	Sitar		1
	106	0	Banjo		1
	107	0	Shamisen		1
	108	0	Koto		1
		8	Taisho Koto		2
	109	0	Kalimba		1
	110	0	Bag Pipe		1
	111	0	Fiddle		1
	112	0	Shannai		1
Percussive	113	0	Tinkle Bell		1
	114	0	Agogo		1
	115	0	Steel Drums		1
	116	0	Woodblock	∗	1
		8	Castanets	∗	1
	117	0	Taiko	∗	1
		8	Concert BD	∗	1
	118	0	Melo Tom 1	∗	1
		8	Melo Tom 2	∗	1
	119	0	Synth Drum	∗	1
		8	808 Tom	∗	1
	120	0	Reverse Cym.	∗	2

PC #   : Program number
CCO # : Value of control number 0
         (GS bank select number)
V   : Number of voices
∗   : All tones marked by an ∗ have an unreliable
         pitch. Please use a key around C4 (Key # 60).
         The unmarked tones use temperament and pitch
         of A4 (Key # 59) is 440Hz.

	PC #	CCO #	Tone name		V
SFX	121	0	Gt. FretNoise	∗	1
		1	Gt. Cut Noise	∗	1
		2	String Slap	∗	1
	122	0	Breath Noise		2
		1	Fl. Key Click	∗	1
	123	0	Seashore	∗	1
		1	Rain	∗	2
		2	Thunder	∗	1
		3	Wind	∗	1
		4	Stream	∗	2
		5	Bubble	∗	2
	124	0	Bird	∗	2
		1	Dog	∗	1
		2	Horse-Gallop	∗	1
	125	0	Telephone 1	∗	1
		1	Telephone 2	∗	1
		2	Door Creaking	∗	1
		3	Door	∗	1
		4	Scratch	∗	1
		5	Windchime	∗	2
	126	0	Helicopter	∗	1
		1	Car-Engine	∗	1
		2	Car-Stop	∗	1
		3	Car-Pass	∗	1
		4	Car-Crash	∗	2
		5	Siren	∗	1
		6	Train	∗	1
		7	Jetplane	∗	2
		8	Starship	∗	2
		9	Burst Noise	∗	2
	127	0	Applause	∗	2
		1	Laughing	∗	1
		2	Screaming	∗	1
		3	Punch	∗	1
		4	Heart Beat	∗	1
		5	Footsteps	∗	1
	128	0	Gun Shot	∗	1
		1	Machine Gun	∗	1
		2	Lasergun	∗	1
		3	Explosion	∗	2

● CC0 # : 126

PC #	Tone name	V
1	A. Piano 1	2
2	A. Piano 2	2
3	A. Piano 3	2
4	A. Piano 4	2
5	A. Piano 5	1
6	A. Piano 7	1
7	A. Piano 9	1
8	E. Piano 1	2
9	E. Piano 3	2
10	E. Piano 5	2
11	A. Guitar 1	1
12	A. Guitar 3	2
13	A. Guitar 4	2
14	E. Guitar 1	1
15	E. Guitar 2	1
16	Slap 3	1
17	Slap 4	2
18	Slap 5	1
19	Slap 6	1
20	Slap 9	1
21	Slap 10	2
22	Slap 11	1
23	Slap 12	1
24	Fingered 1	1
25	Fingered 2	2
26	Picked 1	1
27	Picked 2	2
28	Fretless 1	1
29	AC Bass 1	2
30	Choir 1	1
31	Choir 2	1
32	Choir 3	2

PC #	Tone name	V
33	Choir 4	2
34	Strings 1	1
35	Strings 2	1
36	Strings 3	2
37	Strings 4	2
38	E. Organ 2	2
39	E. Organ 4	2
40	E. Organ 6	2
41	E. Organ 8	2
42	E. Organ 9	2
43	E. Organ 10	2
44	E. Organ 11	2
45	E. Organ 12	2
46	E. Organ 13	2
47	Soft TP 1	1
48	Soft TP 3	1
49	TP/TRB 1	1
50	TP/TRB 2	1
51	TP/TRB 3	1
52	TP/TRB 4	1
53	TP/TRB 5	2
54	TP/TRB 6	2
55	Sax 1	1
56	Sax 2	1
57	Sax 3	1
58	Sax 5	2
59	Brass 1	1
60	Brass 2	1
61	Brass 3	2
62	Brass 4	2
63	Brass 5	2
64	Orche Hit	1

CC0 # : Value of control number 0
(GS bank select number)
PC # : Program number
V : Number of voices

❊ 126 of control number 0 is set to the same sound arrangement of the CM-32P (Roland PCM Sound Module).
But the setting of the pitch bend range, modulation depth, etc., are different from that of CM-32P. Pan
directions are reversed from an actual CM-32P, so to rectify this, reverse the L/R connections of the Audio
Output jacks.
❊ If exclusive messages of the CM-32P are received by the GS sound source, the settings of the latter will not
be changed.

● CC0 # : 127

PC #	Tone name	V	PC #	Tone name	V	PC #	Tone name	V	PC #	Tone name	V
1	Acou Piano 1	1	33	Fantasy	2	65	Acou Bass 1	1	97	Brs Sect 2	2
2	Acou Piano 2	1	34	Harmo Pan	2	66	Acou Bass 2	1	98	Vibe 1	1
3	Acou Piano 3	1	35	Chorale	1	67	Elec Bass 1	1	99	Vibe 2	1
4	Elec Piano 1	1	36	Glasses	2	68	Elec Bass 2	1	100	Syn Mallet	1
5	Elec Piano 2	1	37	Soundtrack	2	69	Slap Bass 1	1	101	Windbell	2
6	Elec Piano 3	1	38	Atmosphere	2	70	Slap Bass 2	1	102	Glock	1
7	Elec Piano 4	1	39	Warm Bell	2	71	Fretless 1	1	103	Tube Bell	1
8	Honkytonk	2	40	Funny Vox	1	72	Fretless 2	1	104	Xylophone	1
9	Elec Org 1	1	41	Echo Bell	2	73	Flute 1	1	105	Marimba	1
10	Elec Org 2	2	42	Ice Rain	2	74	Flute 2	1	106	Koto	1
11	Elec Org 3	1	43	Oboe 2001	2	75	Piccolo 1	1	107	Sho	2
12	Elec Org 4	1	44	Echo Pan	2	76	Piccolo 2	2	108	Shakuhachi	2
13	Pipe Org 1	2	45	Doctor Solo	2	77	Recorder	1	109	Whistle 1	2
14	Pipe Org 2	2	46	Schooldaze	1	78	Pan Pipes	1	110	Whistle 2	1
15	Pipe Org 3	2	47	Bellsinger	1	79	Sax 1	1	111	Bottleblow	2
16	Accordion	2	48	Square Wave	2	80	Sax 2	1	112	Breathpipe	1
17	Harpsi 1	1	49	Str Sect 1	1	81	Sax 3	1	113	Timpani	1
18	Harpsi 2	2	50	Str Sect 2	1	82	Sax 4	1	114	Melodic Tom	1
19	Harpsi 3	1	51	Str Sect 3	1	83	Clarinet 1	1	115	Deep Snare	1
20	Clavi 1	1	52	Pizzicato	1	84	Clarinet 2	1	116	Elec Perc 1	1
21	Clavi 2	1	53	Violin 1	1	85	Oboe	1	117	Elec Perc 2	1
22	Clavi 3	1	54	Violin 2	1	86	Engl Horn	1	118	Taiko	1
23	Celesta 1	1	55	Cello 1	1	87	Bassoon	1	119	Taiko Rim	1
24	Celesta 2	1	56	Cello 2	1	88	Harmonica	1	120	Cymbal	1
25	Syn Brass 1	2	57	Contrabass	1	89	Trumpet 1	1	121	Castanets	1
26	Syn Brass 2	2	58	Harp 1	1	90	Trumpet 2	1	122	Triangle	1
27	Syn Brass 3	2	59	Harp 2	1	91	Trombone 1	2	123	Orche Hit	1
28	Syn Brass 4	2	60	Guitar 1	1	92	Trombone 2	2	124	Telephone	1
29	Syn Bass 1	1	61	Guitar 2	1	93	Fr Horn 1	2	125	Bird Tweet	1
30	Syn Bass 2	2	62	Elec Gtr 1	1	94	Fr Horn 2	2	126	One Note Jam	1
31	Syn Bass 3	2	63	Elec Gtr 2	1	95	Tuba	1	127	Water Bells	2
32	Syn Bass 4	1	64	Sitar	2	96	Brs Sect 1	1	128	Jungle Tune	2

CC0 #   : Value of control number 0
        (GS bank select number)
PC #   : Program number
V   : Number of voices

⁘ 127 of control number 0 is set to the same sound arrangement of the MT-32 (Roland Multi Timbre Sound
Module). But the setting of the pitch bend range, modulation depth, etc., are different from that of MT-32.
Pan directions are reversed from an actual MT-32, so to rectify this, reverse the L/R connections of the Audio
Output jacks.

⁘ If exclusive messages of the MT-32 are received by the GS sound source, the settings of the latter will not
be changed.

● MODE B

PC #	Tone name	V	PC #	Tone name	V	PC #	Tone name	V	PC #	Tone name	V
1	A. Piano 1	2	33	Choir 4	2	65	Harpsichord	1	97	Timpani	1
2	A. Piano 2	2	34	Strings 1	1	66	Coupled Hps.	2	98	Jazz Gt.	1
3	A. Piano 3	2	35	Strings 2	1	67	Church Org. 1	1	99	Hawaiian Gt.	1
4	A. Piano 4	2	36	Strings 3	2	68	Church Org. 2	2	100	Mutet Gt.	1
5	A. Piano 5	1	37	Strings 4	2	69	Tinkle Bell	1	101	Chorus Gt.	2
6	A. Piano 7	1	38	E. Organ 2	2	70	Steel Drums	1	102	Overdrive Gt	1
7	A. Piano 9	1	39	E. Organ 4	2	71	Celesta	1	103	Distortion Gt	1
8	E. Piano 1	2	40	E. Organ 6	2	72	Sitar	1	104	Feedback Gt.	2
9	E. Piano 3	2	41	E. Organ 8	2	73	Santur	1	105	Gt. Harmonics	1
10	E. Piano 5	2	42	E. Organ 9	2	74	Koto	1	106	Fantasia	2
11	A. Guitar 1	1	43	E. Organ 10	2	75	Pan Flute	1	107	Space Voice	1
12	A. Guitar 3	2	44	E. Organ 11	2	76	Piano 3	1	108	Solo Vox	2
13	A. Guitar 4	2	45	E. Organ 12	2	77	Clav.	1	109	Metal Pad	2
14	E. Guitar 1	2	46	E. Organ 13	2	78	Violin 1	1	110	Synth Brass1	2
15	E. Guitar 2	1	47	Soft TP 1	1	79	Violin 2	1	111	Synth.Strings1	1
16	Slap 3	1	48	Soft TP 3	1	80	Cello 1	1	112	Synth.Strings2	2
17	Slap 4	2	49	TP/TRB 1	1	81	Cello 2	1	113	E.Piano 2	1
18	Slap 5	1	50	TP/TRB 2	1	82	Contrabass	1	114	Detuned EP 2	2
19	Slap 6	2	51	TP/TRB 3	1	83	Pizzicato	1	115	Syn Vox	1
20	Slap 9	1	52	TP/TRB 4	1	84	Harp	1	116	Synth Bass 1	1
21	Slap 10	2	53	TP/TRB 5	2	85	Oboe 1	1	117	Synth Bass 2	2
22	Slap 11	1	54	TP/TRB 6	2	86	Oboe 2	1	118	Synth Bass 3	1
23	Slap 12	1	55	Sax 1	1	87	Bassoon 1	1	119	Synth Bass 4	2
24	Fingered 1	1	56	Sax 2	1	88	Bassoon 2	1	120	Synth Brass 2	2
25	Fingered 2	2	57	Sax 3	1	89	Clarinet 1	1	121	Organ 3	2
26	Picked 1	1	58	Sax 5	2	90	Clarinet 2	1	122	Alto sax	1
27	Picked 2	2	59	Brass 1	1	91	Clarinet 3	1	123	Tenor sax	1
28	Fretless 1	1	60	Brass 2	1	92	Fr. Horn 1	2	124	Baritone sax	1
29	AC. Bass 1	2	61	Brass 3	2	93	Fr. Horn 2	2	125	Trombone	1
30	Choir 1	1	62	Brass 4	2	94	Fr. Horn 3	2	126	Melo Tom	1
31	Choir 2	1	63	Brass 5	2	95	Tuba 1	1	127	Synth Drum	1
32	Choir 3	2	64	Orche Hit	1	96	Tuba 2	1	128	808 Tom	1

PC # : Program number
V   : Number of voices

33

■TONE TABLE (LA SOUND SOURCE)

PC #	Tone name	V	PC #	Tone name	V	PC #	Tone name	V	PC #	Tone name	V
1	Acou Piano 1	4	33	Fantasy	3	65	Acou Bass 1	2	97	Brs Sect 2	3
2	Acou Piano 2	2	34	Harmo Pan	3	66	Acou Bass 2	1	98	Vibe 1	3
3	Acou Piano 3	1	35	Chorale	3	67	Elec Bass 1	2	99	Vibe 2	2
4	Elec Piano 1	3	36	Glasses	2	68	Elec Bass 2	1	100	Syn Mallet	1
5	Elec Piano 2	2	37	Soundtrack	4	69	Slap Bass 1	3	101	Windbell	3
6	Elec Piano 3	2	38	Atmosphere	4	70	Slap Bass 2	2	102	Glock	2
7	Elec Piano 4	1	39	Warm Bell	4	71	Fretless 1	4	103	Tube Bell	4
8	Honkytonk	3	40	Funny Vox	1	72	Fretless 2	2	104	Xylophone	1
9	Elec Org 1	3	41	Echo Bell	3	73	Flute 1	4	105	Marimba	3
10	Elec Org 2	3	42	Ice Rain	3	74	Flute 2	2	106	Koto	2
11	Elec Org 3	2	43	Oboe 2001	2	75	Piccolo 1	3	107	Sho	4
12	Elec Org 4	2	44	Echo Pan	2	76	Piccolo 2	2	108	Shakuhachi	4
13	Pipe Org 1	3	45	Doctor Solo	2	77	Recorder	2	109	Whistle 1	2
14	Pipe Org 2	3	46	Schooldaze	2	78	Pan Pipes	3	110	Whistle 2	1
15	Pipe Org 3	2	47	Bellsinger	1	79	Sax 1	4	111	Bottleblow	4
16	Accordion	2	48	Square Wave	2	80	Sax 2	3	112	Breathpipe	3
17	Harpsi 1	4	49	Str Sect 1	4	81	Sax 3	2	113	Timpani	2
18	Harpsi 2	3	50	Str Sect 2	3	82	Sax 4	1	114	Melodic Tom	1
19	Harpsi 3	1	51	Str Sect 3	2	83	Clarinet 1	3	115	Deep Snare	2
20	Clavi 1	3	52	Pizzicato	3	84	Clarinet 2	2	116	Elec Perc 1	2
21	Clavi 2	2	53	Violin 1	3	85	Oboe	2	117	Elec Perc 2	2
22	Clavi 3	1	54	Violin 2	2	86	Engl Horn	2	118	Taiko	3
23	Celesta 1	4	55	Cello 1	3	87	Bassoon	2	119	Taiko Rim	1
24	Celesta 2	2	56	Cello 2	2	88	Harmonica	2	120	Cymbal	2
25	Syn Brass 1	2	57	Contrabass	2	89	Trumpet 1	3	121	Castanets	2
26	Syn Brass 2	3	58	Harp 1	3	90	Trumpet 2	2	122	Triangle	2
27	Syn Brass 3	2	59	Harp 2	2	91	Trombone 1	3	123	Orche Hit	4
28	Syn Brass 4	2	60	Guitar 1	2	92	Trombone 2	2	124	Telephone	1
29	Syn Bass 1	2	61	Guitar 2	2	93	Fr Horn 1	3	125	Bird Tweet	1
30	Syn Bass 2	2	62	Elec Gtr 1	4	94	Fr Horn 2	2	126	One Note Jam	4
31	Syn Bass 3	2	63	Elec Gtr 2	3	95	Tuba	2	127	Water Bells	3
32	Syn Bass 4	1	64	Sitar	4	96	Brs Sect 1	4	128	Jungle Tune	4

PC # : Program number

V : Number of voices

34

■DRUM SET TABLE (GS SOUND SOURCE)

Note number	PC#1:STANDARD Set / PC#33:JAZZ Set	PC#9:ROOM Set	PC#17:POWER Set	PC#25: ELECTRONIC Set	PC#26:TR-808 Set	PC#41: BRUSH Set	PC#49:ORCHESTRA Set
27	High Q						Closed Hi-Hat [EXC1]
28	Slap						Pedal Hi-Hat [EXC1]
29	Scratch Push						Open Hi-Hat [EXC1]
30	Scratch Pull						Hide Cymbal
31	Sticks						
32	Square Click						
33	Metronome Click						
34	Metronome Bell						
35	Kick Drum 2						Concert BD 2
36	Kick Drum 1		MONDO Kick	Elec BD	808 Bass Drum		Concert BD 1
37	Side Stick				808 Rim Shot		
38	Snare Drum 1		Gated SD	Elec SD	808 Snare Drum	Brush Tap	Concert SD
39	Hand Clap					Brush Slap	Castanets
40	Snare Drum 2			Gated SD		Brush Swirl	Concert SD
41	Low Tom 2	Room Low Tom 2	Room Low Tom 2	Elec Low Tom 2	808 Low Tom 2		Timpani F
42	Closed Hi – hat [EXC1]				808 CHH [EXC1]		Timpani F#
43	Low Tom 1	Room Low Tom 1	Room Low Tom 1	Elec Low Tom 1	808 Low Tom 1		Timpani G
44	Pedal Hi – hat [EXC1]				808 CHH [EXC1]		Timpani G#
45	Mid Tom 2	Room Mid Tom 2	Room Mid Tom 2	Elec Mid Tom 2	808 Mid Tom 2		Timpani A
46	Open Hi – hat [EXC1]				808 OHH [EXC1]		Timpani A#
47	Mid Tom 1	Room Mid Tom 1	Room Mid Tom 1	Elec Mid Tom 1	808 Mid Tom 1		Timpani B
48	High Tom 2	Room Hi Tom 2	Room Hi Tom 2	Elec Hi Tom 2	808 Hi Tom 2		Timpani c
49	Crash Cymbal 1				808 Cymbal		Timpani c#
50	High Tom 1	Room Hi Tom 1	Room Hi Tom 1	Elec Hi Tom 1	808 Hi Tom 1		Timpani d
51	Ride Cymbal 1						Timpani d#
52	Chinese Cymbal			Reverse Cymbal ★			Timpani e
53	Ride Bell						Timpani f
54	Tambourine						
55	Splash Cymbal						
56	Cowbell				808 Cowbell		
57	Crash Cymbal 2						Concert Cymbal 2
58	Vibra – slap						
59	Ride Cymbal 2						Concert Cymbal 1
60	High Bongo						
61	Low Bongo						
62	Mute High Conga				808 High Conga		
63	Open High Conga				808 Mid Conga		
64	Low Conga				808 Low Conga		
65	High Timbale						
66	Low Timbale						
67	High Agogo						
68	Low Agogo						
69	Cabasa						
70	Maracas				808 Maracas		
71	Short Hi Whistle [EXC2]						
72	Long Low Whistle [EXC2]						
73	Short Guiro [EXC3]						
74	Long Guiro [EXC3]						
75	Claves				808 Claves		
76	High Wood Block						
77	Low Wood Block						
78	Mute Cuica [EXC4]						
79	Open Cuica [EXC4]						
80	Mute Triangle [EXC5]						
81	Open Triangle [EXC5]						
82	Shaker						
83	Jingle Bell						
84	Belltree						
85	Castanets						
86	Mute Surdo [EXC6]						
87	Open Surdo [EXC6]						
88	– – – – –						Applause ★

PC # : Program number

★ : Tones which are created by using two voices.
(All other tones are created by one voice.)

Blank : Same as the percussion sound of "STANDARD"

– – – – : No sound

[EXC] : Percussion sound of the same number will not be heard at the same time.

●SFX set (Program number 57)

Note number	PC#57:SFX Set	
39	High Q	
40	Slap	
41	Scratch Push	
42	Scratch Pull	
43	Sticks	
44	Square Click	
45	Metronome Click	
46	Metronome Bell	
47	Guitar sliding finger	
48	Guitar cutting noise (down)	
49	Guitar cutting noise (up)	
50	String slap of double bass	
51	Fl. Key Click	
52	Laughing	
53	Screaming	
54	Punch	
55	Heart Beat	
56	Footsteps1	
57	Footsteps2	
58	Applause	★
59	Door Creaking	
60	Door	
61	Scratch	
62	Windchime	★
63	Car-Engine	
64	Car-Stop	
65	Car-Pass	
66	Car-Crash	★
67	Siren	
68	Train	
69	Jetplane	★
70	Helicopter	
71	Starship	★
72	Gun Shot	
73	Machine Gun	
74	Lasergun	
75	Explosion	★
76	Dog	
77	Horse-Gallop	
78	Birds	★
79	Rain	★
80	Thunder	
81	Wind	
82	Seashore	
83	Stream	★
84	Bubble	★

★ : Tones which are created by using two voices.
(All other tones are created by one voice.)

– – – – : No sound

[EXC] : Percussion sounds of the same number cannot be heard at the same time.

※ The CM-64/32L set is the MT-32 drum set with SFX sounds added to it.

●CM-64/32L set (Program number 128)

Note number	PC#128:CM-64/32L Set	
34	– – – –	
35	Acoustic Bass Drum	
36	Acoustic Bass Drum	
37	Rim Shot	
38	Acoustic Snare Drum	
39	Hand Clap	
40	Electronic Snare Drum	
41	Acoustic Low Tom	
42	Closed High Hat [EXC1]	
43	Acoustic Low Tom	
44	Open High Hat 2	
45	Acoustic Middle Tom	
46	Open High Hat 1 [EXC1]	
47	Acoustic Middle Tom	
48	Acoustic High Tom	
49	Crash Cymbal	
50	Acoustic High Tom	
51	Ride Cymbal	
52	– – – –	
53	– – – –	
54	Tambourine	
55	– – – –	
56	Cowbell	
57	– – – –	
58	– – – –	
59	– – – –	
60	High Bongo	
61	Low Bongo	
62	Mute High Conga	
63	High Conga	
64	Low Conga	
65	High Timbale	
66	Low Timbale	
67	High Agogo	
68	Low Agogo	
69	Cabasa	
70	Maracas	
71	Short Whistle	
72	Long Whistle	
73	Quijada	
74	– – – –	
75	Claves	
76	Laughing	
77	Screaming	
78	Punch	
79	Heartbeat	
80	Footsteps 1	
81	Footsteps 2	
82	Applause	★
83	Creaking	
84	Door	
85	Scratch	
86	Windchime	★
87	Engine	
88	Car-Stop	
89	Car-Pass	
90	Crash	★
91	Siren	
92	Train	
93	Jet	★
94	Helicopter	
95	Starship	★
96	Pistol	
97	Machine Gun	
98	Lasergun	
99	Explosion	★
100	Dog	
101	Horse-Gallop	
102	Birds	★
103	Rain	★
104	Thunder	
105	Wind	
106	Waves	
107	Stream	★
108	Bubble	★

■DRUM TABLE (LA SOUND SOURCE)

Note number	Tone name	V
34	– – – – –	
35	Acoustic Bass Drum	1
36	Acoustic Bass Drum	1
37	Rim Shot	1
38	Acoustic Snare Drum	1
39	Hand Clap	1
40	Electronic Snare Drum	1
41	Acoustic Low Tom	1
42	Closed High Hat	1
43	Acoustic Low Tom	1
44	Open High Hat 2	2
45	Acoustic Middle Tom	1
46	Open High Hat 1	2
47	Acoustic Middle Tom	1
48	Acoustic High Tom	1
49	Crash Cymbal	2
50	Acoustic High Tom	1
51	Ride Cymbal	1
52	– – – – –	
53	– – – – –	
54	Tambourine	1
55	– – – – –	
56	Cowbell	1
57	– – – – –	
58	– – – – –	
59	– – – – –	
60	High Bongo	1
61	Low Bongo	1
62	Mute High Conga	1
63	High Conga	1
64	Low Conga	1
65	High Timbale	1
66	Low Timbale	1
67	High Agogo	1
68	Low Agogo	1
69	Cabasa	1
70	Maracas	1
71	Short Whistle	2
72	Long Whistle	2
73	Quijada	3
74	– – – – –	
75	Claves	1
76	Laughing	1
77	Screaming	1
78	Punch	1
79	Heartbeat	1
80	Footsteps 1	1
81	Footsteps 2	1
82	Applause	3
83	Creaking	1
84	Door	1
85	Scratch	4
86	Windchime	2
87	Engine	2
88	Car-Stop	1
89	Car-Pass	4
90	Crash	4
91	Siren	2
92	Train	2
93	Jet	4
94	Helicopter	4
95	Starship	4
96	Pistol	2
97	Machine Gun	2
98	Lasergun	2
99	Explosion	4
100	Dog	1
101	Horse	2
102	Birds	4
103	Rain	4
104	Thunder	3
105	Wind	3
106	Wave	4
107	Stream	4
108	Bubble	3

V : Number of voices   – – – – – : No sound

Roland Exclusive Messages

1. Data Format for Exclusive Messages

Roland's MIDI implementation uses the following data format for all exclusive messages (type IV) :

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
CMD	Command ID
[BODY]	Main data
F7H	End of exclusive

MIDI status : F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufacturer-ID immediately after F0H (MIDI version1.0).

Manufacturer-ID : 41H

The Manufacturer-ID identifies the manufacturer of a MIDI instrument that triggers an exclusive message. Value 41H represents Roland's Manufacturer-ID.

Device-ID : DEV

The Device-ID contains a unique value that identifies the individual device in the multiple implementation of MIDI instruments. It is usually set to 00H – 0FH, a value smaller by one than that of a basic channel, but value 00H – 1FH may be used for a device with multiple basic channels.

Model-ID : MDL

The Model-ID contains a value that uniquely identifies one model from another. Different models, however, may share an identical Model-ID if they handle similar data.

The Model-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Model-IDs, each representing a unique model :

        01H
        02H
        03H
        00H, 01H
        00H, 02H
        00H, 00H, 01H

Command-ID : CMD

The Command-ID indicates the function of an exclusive message. The Command-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Command-IDs, each representing a unique function :

        01H
        02H
        03H
        00H, 01H
        00H, 02H
        00H, 00H, 01H

Main data : BODY

This field contains a message to be exchanged across an interface. The exact data size and contents will vary with the Model-ID and Command-ID.

2. Address-mapped Data Transfer

Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory-resident records–waveform and tone data, switch status, and parameters, for example–to specific locations in a machine-dependent address space, thereby allowing access to data residing at the address a message specifies.

Address-mapped data transfer is therefore independent of models and data categories. This technique allows use of two different transfer procedures : one-way transfer and handshake transfer.

One-way transfer procedure (See Section 3 for details.)

This procedure is suited for the transfer of a small amount of data. It sends out an exclusive message completely independent of a receiving device status.

Connection Diagram
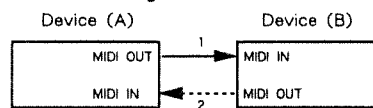
Connection at point 2 is essential for "Request data" procedures. (See Section 3.)

Handshake-transfer procedure (See Section 4 for details.)

This procedure initiates a predetermined transfer sequence (handshaking) across the interface before data transfer takes place. Handshaking ensures that reliability and transfer speed are high enough to handle a large amount of data.

Connection Diagram
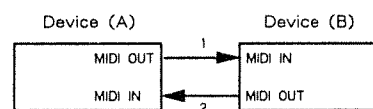
Connection at points 1 and 2 is essential.

Notes on the above two procedures

* There are separate Command-IDs for different transfer procedures.
* Devices A and B cannot exchange data unless they use the same transfer procedure, share identical Device-ID and Model ID, and are ready for communication.

3. One-way Transfer Procedure

This procedure sends out data all the way until it stops and is used when the messages are so short that answerbacks need not be checked.
For long messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts intervals of at least 20 milliseconds in between.

Types of Messages

Message	Command ID
Request data 1	RQ1 (11H)
Data set 1	DT1 (12H)

Request data #1 : RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface.
It contains data for the address and size that specify designation and length, respectively, of data required.
On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.
If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will send out nothing.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
11H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ssH	Size MSB
⋮	⋮
	LSB
sum	Check sum
F7H	End of exclusive

* The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.
* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
* The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Data set 1 : DT1 (12H)

This message corresponds to the actual data transfer process.
Because every byte in the data is assigned a unique address, a DT1 message can convey the starting address of one or more data as well as a series of data formatted in an address-dependent order.

The MIDI standards inhibit non-real time messages from interrupting an exclusive one. This fact is inconvenient for the devices that support a "soft-through" mechanism.
To maintain compatibility with such devices, Roland has limited the DT1 to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
12H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

* A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.
* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
* The number of bytes comprising address data varies from one Model-ID to another.
* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Example of Message Transactions

● Device A sending data to Device B
Transfer of a DT1 message is all that takes place.

```
 ┌──────────┐                    ┌──────────┐
 │Device (A)│                    │Device (B)│
 └──────────┘                    └──────────┘

[Data set 1]  ─────────────────────▶
            * More than 20m sec time internal.

[Data set 1]  ─────────────────────▶
                        ⋮
[Data set 1]  ─────────────────────▶
```
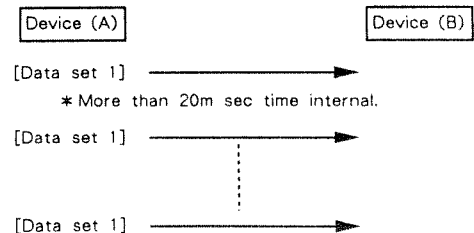
● Device B requesting data from Device A
Device B sends an RQ1 message to Device A.
Checking the message, Device A sends a DT1
message back to Device B.

Device (A)		Device (B)

[Data set 1] ◄——————————[Request data]

[Data set 1] ——————————►

* More than 20m sec time internal.

[Data set 1] ——————————►

[Data set 1] ——————————►
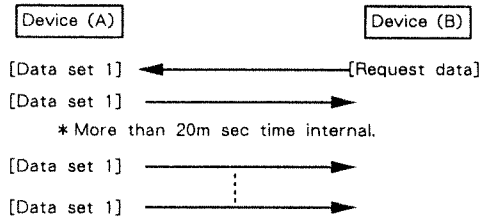
4. Handshake Transfer Procedure

Handshaking is an interactive process where two devices
exchange error checking signals before a message transaction
takes place, thereby increasing data reliability. Unlike one-
way transfer that inserts a pause between message
transactions, handshake transfer allows much speedier
transactions because data transfer starts once the receiving
device returns a ready signal.

When it comes to handling large amounts of data--sampler
waveforms and synthesizer tones over the entire range,
for example--across a MIDI interface, handshaking transfer
is more efficient than one-way transfer.

Types of Messages

Message	Command ID
Want to send data	WSD (40H)
Request data	RQD (41H)
Data set	DAT (42H)
Acknowledge	ACK (43H)
End of data	EOD (45H)
Communication error	ERR (4EH)
Rejection	RJC (4FH)

Want to send data : WSD (40H)

This message is sent out when data must be sent to a
device at the other end of the interface. It contains data
for the address and size that specify designation and length,
respectively, of the data to be sent.

On receiving a WSD message, the remote device checks
its memory for the specified data address and size which
will satisfy the request. If it finds them and is ready for
communication, the device will return an "Acknowledge
(ACK)" message.

Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
40H	Command ID
aaH	Address MSB
:	:
	LSB
ssH	Size MSB
:	:
	LSB
sum	Check sum
F7H	End of exclusive

* The size of the data to be sent does not indicate the
number of bytes that make up a "Data set (DAT)"
message, but represents the address fields where the
data should reside.

* Some models are subject to limitations in data format
used for a single transaction. Requested data, for
example, may have a limit in length or must be divided
into predetermined address fields before it is exchanged
across the interface.

* The same number of bytes comprises address and size
data, which, however, vary with the Model-ID.

* The error checking process uses a checksum that
provides a bit pattern where the least significant 7 bits
are zero when values for an address, size, and that
checksum are summed.

Request data : RQD (41H)

This message is sent out when there is a need to acquire
data from a device at the other end of the interface.
It contains data for the address and size that specify
designation and length, respectively, of data required.

On receiving an RQD message, the remote device checks
its memory for the data address and size which satisfy
the request.
If it finds them and is ready for communication, the device
will transmit a "Data set (DAT)" message, which contains
the requested data. Otherwise, it will return a "Rejection
(RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
41H	Command ID
aaH	Address MSB
:	:
	LSB
ssH	Size MSB
:	:
	LSB
sum	Check sum
F7H	End of exclusive

* The size of the requested data does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the requested data resides.

* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.

* The same number of bytes comprises address and size data, which, however, vary with the Model-ID.

* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Data set : DAT (42H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, the message can convey the starting address of one or more data as well as a series of data formatted in an address-dependent order.

Although the MIDI standards inhibit non-real time messages from interrupting an exclusive one, some devices support a "soft-through" mechanism for such interrupts. To maintain compatibility with such devices, Roland has limited the DAT to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
42H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

* A DAT message is capable of providing only the valid data among those specified by an RQD or WSD message.

* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.

* The number of bytes comprising address data varies from one model ID to another.

* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Acknowledge : ACK (43H)

This message is sent out when no error was detected on reception of a WSD, DAT, "End of data (EOD)", or some other message and a requested setup or action is complete. Unless it receives an ACK message, the device at the other end will not proceed to the next operation.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
43H	Command ID
F7H	End of exclusive

End of data : EOD (45H)

This message is sent out to inform a remote device of the end of a message. Communication, however, will not come to an end unless the remote device returns an ACK message even though an EOD message was transmitted.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
45H	Command ID
F7H	End of exclusive

Communications error : ERR (4EH)

This message warns the remote device of a communications fault encountered during message transmission due, for example, to a checksum error. An ERR message may be replaced with a "Rejection (RJC)" one, which terminates the current message transaction in midstream.

When it receives an ERR message, the sending device may either attempt to send out the last message a second time or terminate communication by sending out an RJC message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
4EH	Command ID
F7H	End of exclusive

#Rejection : RJC (4FH)

This message is sent out when there is a need to terminate communication by overriding the current message. An RJC message will be triggered when :

● a WSD or RQD message has specified an illegal data address or size.
● the device is not ready for communication.
● an illegal number of addresses or data has been detected.

● data transfer has been terminated by an operator.
● a communications error has occurred.

An ERR message may be sent out by a device on either side of the interface. Communication must be terminated immediately when either side triggers an ERR message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
4FH	Command ID
F7H	End of exclusive

#Example of Message Transactions

● Data transfer from device (A) to device (B).

```
Device (A)                          Device (B)

[Want to send data] ──────────────►
                    ◄────────────── [Acknowledge]
[Data set]          ──────────────►
                    ◄────────────── [Acknowledge]
[Data set]          ──────────────►
                    ◄────────────── [Acknowledge]
                          ⋮
[End of data]       ──────────────►
                    ◄────────────── [Acknowledge]
```

● Device (A) requests and receives data from device (B).

```
Device (A)                          Device (B)

[Request data]      ──────────────►
                    ◄────────────── [Data set]
[Acknowledge]       ──────────────►
                    ◄────────────── [Data set]
[Acknowledge]       ──────────────►
                          ⋮
                    ◄────────────── [End of data]
[Acknowledge]       ──────────────►
```

● Error occurs while device (A) is receiving data from device (B).

1) Data transfer from device (A) to device (B).

```
Device (A)                          Device (B)

                    ◄────────────── [Data set]
[Acknowledge]       ──────────────►
(Error) ×           ◄────────────── [Data set]
[Communication error] ─────────────►
                    ◄────────────── [Data set]
                                    (the same data
[Acknowledge]       ──────────────►  as above)
```

2) Device (B) rejects the data re-transmitied, and quits data transfer.

```
Device (A)                          Device (B)

                    ◄────────────── [Data set]
[Acknowledge]       ──────────────►
(Error) ×           ◄────────────── [Data set]
[Communication error] ─────────────►
(Quit)              ◄────────────── [Rejection]
```

3) Device (A) immediately quits data transfer.

```
Device (A)                          Device (B)

                    ◄────────────── [Data set]
[Acknowledge]       ──────────────►
(Error) ×           ◄────────────── [Data set]
[Rejection]         ──────────────►  (Quit)
```

● CONTENTS MIDI Implementation

Mode	1	2	3	4	5	6	7	8
A			○	○	–	○	○	–
B		common	–	○	○	–	○	○
C			○	–	–	○	–	–
D			○	○	–	○	○	–

for example :
As you see the MIDI Implementation of Mode A.
Refer to section 1,2,3,4,6 and 7.

1.TRANSMITED DATA

■ System Realtime Message

● Active sensing

status
FEH

* Transmit at about 250 milli-seconds interval.

■ System Exclusive Message

F0H : System exclusive
F7H : EOX (End of exclusive)

* Refer to section 3 and Roland Exclusive Messages.

2.RECEIVED DATA

■ Channel voice message

● NOTE OFF

status	second	third
8nH	kkH	vvH

or

status	second	third
9nH	kkH	00H

n = MIDI Channel number   : 0H – FH   (1 – 16)
kk = Note number   : 00H – 7FH   (0 – 127)
vv = Velocity   : 00H – 7FH   (0 – 127)

* On the GS sound source, these messages are ignored when "RX.
NOTE MESSAGE = OFF".
* On the drum part of GS sound source, these messages are ignored
when "RX.NOTE OFF = OFF"at each instrument.
* Velocity is ignored.

● NOTE ON

status	second	third
9nH	kkH	vvH

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

* On the GS sound source, this message is ignored when "RX.NOTE
MESSAGE = OFF".
* On the drum part of GS sound source, this message is ignored
when "RX.NOTE ON = OFF"at each instrument.

● POLYPHONIC KEY PRESSURE

status	second	third
AnH	kkH	vvH

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

* This message is recognized only by the GS sound source.
* This message is ignored when "RX.POLY PRESSURE (PAf) =
OFF".

● CONTROL CHANGE

* This message is ignored when "RX.CONTROL CHANGE = OFF".

○ BANK SELECT

status	second	third
BnH	00H	mmH
BnH	20H	llH

n = MIDI channel number   : 0H – FH   (1 – 16)
mm,ll = Bank number   : 00 00H – 7F 7FH   (1 – 16384)

* This message is recognized only by the GS sound source when
the unit is in mode A,C or D.
* "Bank select"is suspended until receiving "Program change".
* llH is ignored.(value = 00H)

○ MODULATION

status	second	third
BnH	01H	vvH

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

* On the GS sound source, this message is ignored when "RX.
MODULATION = OFF".
* Default setting is pitch modulation.

○ PORTAMENTO TIME

status	second	third
BnH	05H	vvH

n = MIDI channel number   : 0H – FH   (1 – 16)
vv = Portamento time   : 00H – 7FH   (0 – 127)

* This message is recognized only by the GS sound source when
the unit is in mode A,C or D.

○ DATA ENTRY

status	second	third
BnH	06H	mmH
BnH	26H	llH

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

○ VOLUME

status	second	third
BnH	07H	vvH

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

＊You can adjust the volume of specified channel (part). The maximum volume is determined by EXPRESSION and MASTER VOLUME message.
＊On the GS sound source, this message is ignored when "RX. VOLUME = OFF".

○ PANPOT

status	second	third
BnH	0AH	vvH

n = MIDI channel number   : 0H – FH (1 – 16)
vv = Panpot   : 00H – 40H – 7FH
                                     (0 – 64 – 127)

＊Orientation of sound is as follows.
  < GS sound source ; Modes A,C and D >
  < LA sound source ; Mode D >
  0 = LEFT, 64 = CENTER, 127 = RIGHT

  < GS sound source ; Mode B >
  < LA sound source ; Mode A and B >
  0 = RIGHT, 64 = CENTER, 127 = LEFT

＊On the GS sound source, this message is ignored when "RX. PANPOT = OFF".

○ EXPRESSION

status	second	third
BnH	0BH	vvH

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

＊You can adjust the volume of specified channel (part). The maximum volume is determined by VOLUME and MASTER VOLUME message.
＊On the GS sound source, this message is ignored when "RX. EXPRESSION = OFF".

○ HOLD1

status	second	third
BnH	40H	vvH

n = MIDI channel number   : 0H – FH (1 – 16)
vv = control value   : 00H – 3FH (0 – 63) < OFF >
                             40H – 7FH (64 – 127) < ON >

＊On the GS sound source, this message is ignored when "RX.HOLD1 = OFF".

○ PORTAMENTO

status	second	third
BnH	41H	vvH

n = MIDI channel number   : 0H – FH (1 – 16)
vv = control value   : 00H – 3FH (0 – 63) < OFF >
                             40H – 7FH (64 – 127) < ON >

＊This message is recognized only by the GS sound source when the unit is in mode A,C or D.
＊On the GS sound source, this message is ignored when "RX. PORTAMENTO = OFF".
＊In poly mode, you cannot specify the portamento source pitch. If you wish to specify the source pitch, you may use LGC (Legato Control).

○ SOSTENUTO

status	second	third
BnH	42H	vvH

n = MIDI channel number   : 0H – FH (1 – 16)
vv = control value   : 00H – 3FH (0 – 63) < OFF >
                             40H – 7FH (64 – 127) < ON >

＊This message is recognized by the GS sound source when the unit is in mode A,C or D.
＊On the GS sound source, this message is ignored when "RX. SOSTENUTE = OFF".

○ SOFT

status	second	third
BnH	43H	vvH

n = MIDI channel number   : 0H – FH (1 – 16)
vv = control value   : 00H – 3FH (0 – 63) < OFF >
                             40H – 7FH (64 – 127) < ON >

＊This message is recognized by the GS sound source when the unit is in mode A,C and D.
＊On the GS sound source, this message is ignored when "RX.SOFT = OFF".

○ LGC (Legato Control)

status	second	third
BnH	54H	kkH

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

＊This message is recognized by the GS sound source when the unit is in mode A,C or D.
＊When a note on is just come after LGC logically, the voice is tuned 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 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 (1 – 16)
vv = reverb send depth   : 00H – 7FH (0 – 127)

＊This message is recognized by the GS sound source when the unit is in mode A,C or D.

○ EFFECT3 DEPTH (chorus send depth)

status	second	third
BnH	5DH	vvH

n = MIDI channel number   : 0H – FH (1 – 16)
vv = chorus send depth   : 00H – 7FH (0 – 127)

＊This message is recognized by the GS sound source when the unit is in mode A,C or D.

○NRPN MSB/LSB

status	second	third
BnH	63H	mmH
BnH	62H	llH

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

* This message is recognized only by the GS sound source.
* This message is ignored when "RX.NRPN = OFF".(default : OFF)

** NRPN **
NRPN (Non Registerd Parameter Number) is an expanded message of the control change.
Each function of NRPN is described by manufacture.
You can change the value of several CM‑500 parameters.
Set first NRPN MSB/LSB before send data entry.

CM‑500 can receive parameters as shown below ;

NRPN MSB LSB	DATA ENTRY MSB LSB	description
01H 08H	mmH 11H	VIBRATE RATE mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 09H	mmH 11H	VIBRATE DEPTH mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 0AH	mmH 11H	VIBRATE DELAY mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 20H	mmH 11H	TVF CUTOFF FREQUENCY mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 21H	mmH 11H	TVF RESONANCE mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 63H	mmH 11H	TVF&TVA ENV. ATTACK TIME mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 64H	mmH 11H	TVF&TVA ENV. DECAY TIME mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
01H 66H	mmH 11H	TVF&TVA ENV. RELEASE TIME mm = 0EH ‑ 40H ‑ 72H (‑50 ‑ 0 ‑ +50) 11 = ignored
18H rrH	mmH 11H	PITCH COARSE OF DRUM TONE rr = key number of drum tone mm = 00H ‑ 40H ‑ 7FH (‑64 ‑ 0 ‑ +63 semitone) 11 = ignored
1AH rrH	mmH 11H	TVA LEVEL OF DRUM TONE rr = key number of drum tone mm = 00H ‑ 7FH <zero ‑ maximum> 11 = ignored
1CH rrH	mmH 11H	PANPOT OF DRUM TONE rr = key number of drum tone mm = 00H , 01H ‑ 40H ‑ 7FH <Random , Left ‑ Center ‑ Right> 11 = ignored
1DH rrH	mmH 11H	REVERB SEND DEPTH OF DRUM TONE rr = key number of drum tone mm = 00H ‑ 7FH <zero ‑ maximum> 11 = ignored
1EH rrH	mmH 11H	CHORUS SEND DEPTH OF DRUM TONE rr = key number of drum tone mm = 00H ‑ 7FH <zero ‑ maximum> 11 = ignored

○RPN MSB/LSB

status	second	third
BnH	65H	mmH
BnH	64H	llH

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

*On the LA sound source when the unit is in mode A,B or D, you can control only PITCH BEND SENSITIVITY.
*On the GS sound source, this message is ignored when "RX.RPN = OFF".

** 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.

CM‑500 can receive Pitch bend sensitivity (RPN # 0), Master fine turning (RPN # 1), Master coarse tuning (RPN # 2) and RPN reset (RPN # 16383).

RPN MSB LSB	DATA ENTRY MSB LSB	description
00H 00H	mmH 11H	PITCH BEND SENSITIVITY mm = 00H ‑ 18H (0 ‑ 24 semitone) 11 = ignored
00H 01H	mmH 11H	MASTER FINE TUNING mm,11 = 00H,00H ‑ 40H,00H ‑ 7FH,7FH (‑8192x100/8192 ‑ 0 ‑ +8191x100/8192 cent)
00H 02H	mmH 11H	MASTER COARSE TUNING mm = 28H ‑ 40H ‑ 58H (‑24 ‑ 0 ‑ +24 semitone) 11 = ignored
7FH 7FH	mmH 11H	RPN RESET Return to no specified parameter of RPN and NRPN. Current setting value is no change. mm,11 = ignored

●PROGRAM CHANGE

status	second
CnH	ppH

n = MIDI channel number : 0H ‑ FH (1 ‑ 16)
pp = program number : 00H ‑ 7FH (1 ‑ 128)

*On the GS sound source, this message is ignored when "RX. PROGRAM CHANGE = OFF".

●CHANNEL PRESSURE

status	second
DnH	vvH

n = MIDI channel number : 0H ‑ FH (1 ‑ 16)
vv = value : 00H ‑ 7FH (0 ‑ 127)

*This message is recognized by the GS sound source when mode A,C or D.
*On the GS sound source, this message is ignored when "RX.CH PRESSURE = OFF".

●PITCH BEND

status	second	third
EnH	llH	mmH

n = MIDI channel number : 0H – FH (1 – 16)
mm,ll = value : 00H,00H – 40H,00H – 7FH,7FH
(–8192 – 0 – +8191)

*On the GS sound source, this message is ignored when "RX.PITCH BEND = OFF".

■CHANNEL MODE MESSAGE

●ALL SOUNDS OFF

status	second	third
BnH	78H	00H

n = MIDI CHANNEL NUMBER : 0H – FH (1 – 16)

* This message is recognized only by the GS sound source.
*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 (1 – 16)

*When "RESET ALL CONTROLLERS" is received, controller value of specified channel return to default at power on.
*1 : This message is recognized only by the GS sound source (except mode B).

controller	value
PITCH BEND CHANGE	±0 (center)
*1 POLYPHONIC KEY PRESSURE	0 (minimum)
*1 CHANNEL PRESSURE	0 (minimum)
MODULATION	0 (minimum)
EXPRESSION	127 (maximum)
HOLD1	0 (off)
*1 PORTAMENTO	0 (off)
*1 SOFT	0 (off)
*1 SOSTENUTO	0 (off)
*1 RPN	No specified parameter, value is no change
*1 NRPN	No specified parameter, value is no change

●ALL NOTES OFF

status	second	third
BnH	7BH	00H

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

*When "ALL NOTES OFF" is received, all on states turn to off in the specified channel.
However, sound renains when hold1 and/or sostenuto is on.

●OMNI OFF

status	second	third
BnH	7CH	00H

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

*OMNI ON is only recognized as "ALL NOTES OFF".
Mode doesn't change, still OMNI OFF.

●MONO

status	second	third
BnH	7EH	mmH

n = MIDI channel number : 0H – FH (1 – 16)
mm = number of MONO : 00H – 10H (0 – 16)

*On the GS sound source, MONO is recognized as "ALL SOUNDS OFF".
And the specified channel turns to Mode 4 (m = 1), even if mmH is not equal to 1 (mmH is ignored).

●POLY

status	second	third
BnH	7FH	mmH

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

*POLY is recognized as "ALL SOUNDS OFF".
And the specified channel turns to Mode 3.

■SYSTEM REALTIME MESSAGE

●ACTIVE SENSING

status
FEH

*Having received "ACTIVE SENSING", CM – 500 expects the interval of any data occur up to 300ms.
On GS sound source, if the interval is over 420ms, GS sound source does "ALL SOUNDS OFF","ALL NOTES OFF"and "RESET ALL CONTROLLERS"and turns on normal operation (will not check interval time).
On LA sound source, if the interval is over 300ms, LA sound source does "RESET ALL CONTROLLERS"turns on normal operation (will not check interval time).

■SYSTEM EXCLUSIVE MESSAGE

F0H : system exclusive message
F7H : EOX (end of exclusive)

* Refer to section 3 and Roland Exclusive Messages.

3. EXCLUSIVE COMMUNICATIONS

(GS sound source ; Mode A,C and D)

The GS sound source can transmit and receive the patch parameters using system exclusive message.
Model ID is 42H and device ID is 10H.

■ONE WAY COMMUNICATION

●REQUEST DATA 1   RQ1 (11H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
10H	device ID
42H	model ID (GS format)
11H	command ID (RQ1)
aaH	address MSB
bbH	address
ccH	address LSB
ssH	size MSB
ttH	size
uuH	size LSB
sum	checksum
F7H	EOX (end of exclusive)

●DATA SET 1   DT1 (12H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
10H	device ID
42H	model ID (GS format)
12H	cmmand ID (DT1)
aaH	address MSB
bbH	address
ccH	address MSB
ddH	data MSB
:	:
ddH	data LSB
sum	checksum
F7H	EOX (end of exclusive)

4. EXCLUSIVE COMMUNICATIONS

(LA sound source ; mode A,B and D)

The LA sound source can transmit and receive the patch parameters using system exclusive message.
Model ID is 16H.
In a system where more than one MIDI channel is assigned to the LA sound source, unit # may be set to the LA sound source instead of device ID of a basic channel.
Whether to use MIDI channels 1 thru 16 and unit # 17 as device ID.
Note that the actual device ID is the number 1 less MIDI channel number or unit #.

MIDI ch	1	2	•••	9	10	11	•••	16	unit#
deviceID	00H	01H	•••	08H	09H	0AH	•••	0FH	10H

■ONE WAY COMMUNICATION

●REQUEST DATA 1   RQ1 (11H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID (LA sound source)
11H	command ID (RQ1)
aaH	address MSB
bbH	address
ccH	address LSB
ssH	size MSB
ttH	size
uuH	size LSB
sum	checksum
F7H	EOX (end of exclusive)

●DATA SET 1   DT1 (12H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID (LA sound source)
12H	command ID (DT1)
aaH	address MSB
bbH	address
ccH	address LSB
ddH	data MSB
•••	:
ddH	data LSB
sum	checksum
F7H	EOX (end of exclusive)

■HANDSHAKING COMMUNICATION

●WANT TO SEND DATA   WSD (40H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID (LA sound source)
40H	command ID (WSD)
aaH	address MSB
bbH	address
ccH	address LSB
ssH	size MSB
ttH	size
uuH	size LSB
sum	checksum
F7H	EOX (end of exclusive)

●DATA REQUEST   RQD (41H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID (LA sound source)
41H	command ID (RQD)
aaH	address MSB
bbH	address
ccH	address LSB
ssH	size MSB
ttH	size
uuH	size LSB
sum	checksum
F7H	EOX (end of exclusive)

● DATA SET   DAT (42H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID (LA sound source)
42H	command ID (DAT)
aaH	address MSB
bbH	address
ccH	address LSB
ddH	data MSB
...	:
ddH	data LSB
sum	checksum
F7H	EOX (end of exclusive)

● Acknowledge   ACK (43H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID(LA sound source)
43H	command ID(ACK)
F7H	EOX (end of exclusive)

● End of data   EOD (45H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID(LA sound source)
45H	command ID(EOD)
F7H	EOX (end of exclusive)

● Communication error   ERR (4EH)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID(LA sound source)
4EH	command ID(ERR)
F7H	EOX (end of exclusive)

● Rejection   RJC (4FH)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
DVH	device ID
16H	model ID(LA sound source)
4FH	command ID(RJC)
F7H	EOX (end of exclusive)

* Address and Address size must cover the memory location where data exist.

5.EXCLUSIVE COMMUNICATIONS
(GS sound source ; Mode B)

This mode recognizes part of exclusive messages of the CM – 32P and CM – 64 (PCM sound source).
This mode is ignored exclusive messages of GS sound source as mode A,C and D.
Model ID is 16H.
Device ID is 10H.

■ ONE WAY COMMUNICATION
● DATA SET 1   DT1 (12H)

byte	description
F0H	exclusive status
41H	manufacture's ID (Roland)
10H	device ID
16H	model ID
12H	command ID (DT1)
aaH	address MSB
bbH	address
ccH	address LSB
ddH	data MSB
...	:
ddH	data LSB
sum	checksum
F7H	EOX (end of exclusive)

6.PARAMETER ADDRESS MAP
(GS sound source ; Mode A,C and D)

* The address and size are described with 7 – bit Hexadecimal. This means that the next 00 00 7F is 00 01 00.

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 ADDRESS MAP

There are two types of the GS sound source exclusive message. One is an individual parameter communication, another is a bulk dump communication.

Coarse address map of the exclusive communication is shown below ;

● INDIVIDUAL

address	block	sub block	notes
40 00 00	SYSTEM PARAMETERS		*6-1
40 01 00	PATCH PARAMETERS	PATCH COMMMON	*6-2
40 10 00		PATCH BLOCK 0	
:		:	
40 1F 00		PATCH BLOCK F	
40 20 00		PATCH BLOCK 0	
:		:	
40 2F 00		PATCH BLOCK F	
41 00 00	DRUM SETUP PARAMETERS		*6-3

●BULK DUMP

address	block	sub block	notes
48 00 00	SYSTEM PARAMETERS		*6-4
48 00 10	PATCH PARAMETERS	PATCH COMMON	*6-5
48 01 10		PATCH BLOCK 0	
:		:	
48 1B 30		PATCH BLOCK F	
49 00 00	DRUM SETUP PARAMETERS		*6-6

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

●6 - 1 SYSTEM PARAMETERS

address	data	description
40 00 00	0018 - 0400 - 07E8	MASTER TUNE
		(-100.0 - 0 - +100.0 cent)
		*use nibblized data :
		00 00 01 08H - 00 04 00 00H
		- 00 07 0E 08H
		*size 00 00 04H
40 00 04	00 - 7F	MASTER VOLUME (0 - 127)
40 00 05	28 - 40 - 58	MASTER KEY-SHIFT
		(-24 - 0 - +24 semitones)
40 00 06	00 - 40 - 7F	MASTER PAN<Left - Center - Right>
40 00 7F	00, 7F	*RESET 00H = GS reset

*RESET
00H (GS reset) :System reset and set all internal parameters to the default settings.
In Mode D, system reset and set all internal parameter to the defaults of Mode D.

MASTER TUNE

tune(Hz)	data(H)
436	00 03 06 02
437	00 03 08 0A
438	00 03 0B 01
439	00 03 0D 09
440	00 04 00 00
441	00 04 02 07
442	00 04 04 0F
443	00 04 07 06
444	00 04 09 0D
445	00 04 0C 04

for example :
As you set 442Hz for master tune, you should send the message as follow.

F0 41 10 42 12 40 00 00 00 04 04 0F 29 F7
                └address └data   └ checksum

for example :
As you set 100 (64H) for master volume you should send the message as follow.

F0 41 10 42 12 40 00 04 64 58 F7
                └ address | └ checksum
                          └ data

*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bit are zero when values for an address, size and that checksum are summed.

●PATCH PARAMETERS

6 - 2 - 1 PATCH COMMMON

address	data	description
	00 - 18	VOICE RESERVE (0 - 24)
40 01 10		Part 10(Drums)
40 01 11#		Part 1
40 01 12#		Part 2
40 01 13#		Part 3
40 01 14#		Part 4
40 01 15#		Part 5
40 01 16#		Part 6
40 01 17#		Part 7
40 01 18#		Part 8
40 01 19#		Part 9
40 01 1A#		Part 11
:		:
40 01 1F#		Part 16
40 01 30	00 - 07	REVERB MACRO 00 : Room 1
		01 : Room 2
		02 : Room 3
		03 : Hall 1
		04 : Hall 2
		05 : Plate
		06 : Delay
		07 : Panning Delay
40 01 31	00 - 07	REVERB CHARACTER
40 01 32	00 - 07	REVERB PRE-LPF
40 01 33	00 - 7F	REVERB LEVEL
40 01 34	00 - 7F	REVERB TIME
40 01 35	00 - 7F	REVERB DELAY FEEDBACK
40 01 36	00 - 7F	REVERB SEND LEVEL TO CHORUS
40 01 38	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 (Feedback)
40 01 39	00 - 07	CHORUS PRE-LPF
40 01 3A	00 - 7F	CHORUS LEVEL
40 01 3B	00 - 7F	CHORUS FEEDBACK
40 01 3C	00 - 7F	CHORUS DELAY
40 01 3D	00 - 7F	CHORUS RATE
40 01 3E	00 - 7F	CHORUS DEPTH
40 01 3F	00 - 7F	CHORUS SEND LEVEL TO REVERB

*All voice reserves must be sent as a package of 16 parts.
The total number of voice reserves for parts must be 24 or less.

6 - 2 - 2 PATCH BLOCK

*n = part number   : 0,1 - 9,A - F
                         (part10, part1 - 9, part11 - 16)
*x = MIDI channel number : 0 - F (1 - 16)

address	data	description
40 1n 00	00 - 7F	TONE NUMBER bank select
40 1n 01#	00 - 7F	program change
40 1n 02	00 - 0F,10	RX.CHANNEL (00:1 - 0F:16, 10:OFF)
		(00:OFF, 01:ON)
40 1n 03	00, 01	RX.PITCH BEND default = 01
40 1n 04	00, 01	RX.CH PRESSURE(CAf) 01
40 1n 05	00, 01	RX.PROGRAM CHANGE 01
40 1n 06	00, 01	RX.CONTROL CHANGE 01
40 1n 07	00, 01	RX.POLY PRESSURE(PAf) 01
40 1n 08	00, 01	RX.NOTE MESSAGE 01
40 1n 09	00, 01	RX.RPN 01
40 1n 0A	00, 01	RX.NRPN 00
40 1n 0B	00, 01	RX.MODURATION 01
40 1n 0C	00, 01	RX.VOLUME 01
40 1n 0D	00, 01	RX.PANPOT 01
40 1n 0E	00, 01	RX.EXPRESSION 01
40 1n 0F	00, 01	RX.HOLD1 01
40 1n 10	00, 01	RX.PORTAMENTO 01
40 1n 11	00, 01	RX.SOSTENUTO 01
40 1n 12	00, 01	RX.SOFT 01

Address	Value	Description
40 1n 13	00, 01	MONO/POLY MODE (00:MONO, 01:POLY) default = 01
40 1n 14	00, 01, 02	ASSIGN MODE 00 = Single (default at n= 0) 01 = Limited-multi (default at n≠0) 02 = Full-multi
40 1n 15	00, 01, 02	USE FOR RHYTHM PART 00 = off (default at n≠0) 01 = map1 (default at n= 0) 02 = map2
40 1n 16	28 - 40 - 58	PITCH KEY SHIFT (-24 - 0 - +24 semitone)
40 1n 17	08 - 40 - 78	PITCH OFFSET FINE (-12.0 - 0 - +12.0 Hz) use nibblized data : 00 08H - 04 00H - 0F 08H *size 00 00 02H
40 1n 19	00 - 7F	PART LEVEL
40 1n 1A	00 - 7F	VELOCITY SENSE DEPTH
40 1n 1B	00 - 7F	VELOCITY SENSE OFFSET
40 1n 1C	00, 01-40-7F	PART PANPOT (Random, Left-Center-Right)
40 1n 1D	00 - 7F	KEY RANGE LOW (C-1 - G9)
40 1n 1E	00 - 7F	KEY RANGE HIGH (C-1 - G9)
40 1n 1F	00 - 7F	CC1 CONTROLLER NUMBER
40 1n 20	00 - 7F	CC2 CONTROLLER NUMBER
40 1n 21	00 - 7F	CHORUS SEND DEPTH
40 1n 22	00 - 7F	REVERB SEND DEPTH
40 1n 30	0E - 40 - 72	VIBRATE RATE (-50 - 0 - +50)
40 1n 31	0E - 40 - 72	VIBRATE DEPTH (-50 - 0 - +50)
40 1n 32	0E - 40 - 72	TVF CUTOFF FREQUENCY (-50 - 0 - +50)
40 1n 33	0E - 40 - 72	TVF RESONANCE (-50 - 0 - +50)
40 1n 34	0E - 40 - 72	TVF&TVA ENV.ATTACK TIME (-50 - 0 - +50)
40 1n 35	0E - 40 - 72	TVF&TVA ENV.DECAY TIME (-50 - 0 - +50)
40 1n 36	0E - 40 - 72	TVF&TVA ENV.RELEASE TIME (-50 - 0 - +50)
40 1n 37	0E - 40 - 72	VIBRATE DELAY (-50 - 0 - +50)
40 1n 40 : 40 1n 4B	00 - 40 - 7F	SCALE TUNING C, C#, D, D#, E, F, F#, G, G#, A, A#, B (-64 - 0 - +63 cent) *size 00 00 0CH
40 2n 00	28 - 40 - 58	MOD PITCH CONTROL (-24 - 0 - +24 semitone)
40 2n 01	00 - 40 - 7F	MOD TVF CUTOFF CONTROL (-9600 - 0 - +9600 cent)
40 2n 02	00 - 40 - 7F	MOD AMPLITUDE CONTROL (-100.0 - 0 - +100.0 %)
40 2n 03	00 - 40 - 7F	MOD LFO1 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 04	00 - 7F	MOD LFO1 PITCH DEPTH (0 - 600 cent)
40 2n 05	00 - 7F	MOD LFO1 TVF DEPTH (0 - 2400 cent)
40 2n 06	00 - 7F	MOD LFO1 TVA DEPTH (0 - 100.0 %)
40 2n 07	00 - 40 - 7F	MOD LFO2 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 08	00 - 7F	MOD LFO2 PITCH DEPTH (0 - 600 cent)
40 2n 09	00 - 7F	MOD LFO2 TVF DEPTH (0 - 2400 cent)
40 2n 0A	00 - 7F	MOD LFO2 TVA DEPTH (0 - 100.0 %)
40 2n 10	40 - 58	BEND PITCH CONTROL (0 - 24 semitone)
40 2n 11	00 - 40 - 7F	BEND TVF CUTOFF CONTROL (-9600 - 0 - +9600 cent)
40 2n 12	00 - 40 - 7F	BEND AMPLITUDE CONTROL (-100.0 - 0 - +100.0 %)
40 2n 13	00 - 40 - 7F	BEND LFO1 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 14	00 - 7F	BEND LFO1 PITCH DEPTH (0 - 600 cent)
40 2n 15	00 - 7F	BEND LFO1 TVF DEPTH (0 - 2400 cent)
40 2n 16	00 - 7F	BEND LFO1 TVA DEPTH (0 - 100.0 %)
40 2n 17	00 - 40 - 7F	BEND LFO2 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 18	00 - 7F	BEND LFO2 PITCH DEPTH (0 - 600 cent)
40 2n 19	00 - 7F	BEND LFO2 TVF DEPTH (0 - 2400 cent)
40 2n 1A	00 - 7F	BEND LFO2 TVA DEPTH (0 - 100.0 %)
40 2n 20	28 - 40 - 58	CAf PITCH CONTROL (-24 - 0 - +24 semitone)
40 2n 21	00 - 40 - 7F	CAf TVF CUTOFF CONTROL (-9600 - 0 - +9600 cent)
40 2n 22	00 - 40 - 7F	CAf AMPLITUDE CONTROL (-100.0 - 0 - +100.0 %)
40 2n 23	00 - 40 - 7F	CAf LFO1 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 24	00 - 7F	CAf LFO1 PITCH DEPTH (0 - 600 cent)
40 2n 25	00 - 7F	CAf LFO1 TVF DEPTH (0 - 2400 cent)
40 2n 26	00 - 7F	CAf LFO1 TVA DEPTH (0 - 100.0 %)
40 2n 27	00 - 40 - 7F	CAf LFO2 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 28	00 - 7F	CAf LFO2 PITCH DEPTH (0 - 600 cent)
40 2n 29	00 - 7F	CAf LFO2 TVF DEPTH (0 - 2400 cent)
40 2n 2A	00 - 7F	CAf LFO2 TVA DEPTH (0 - 100.0 %)
40 2n 30	28 - 40 - 58	PAf PITCH CONTROL (-24 - 0 - +24 semitone)
40 2n 31	00 - 40 - 7F	PAf TVF CUTOFF CONTROL (-9600 - 0 - +9600 cent)
40 2n 32	00 - 40 - 7F	PAf AMPLITUDE CONTROL (-100.0 - 0 - +100.0 %)
40 2n 33	00 - 40 - 7F	PAf LFO1 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 34	00 - 7F	PAf LFO1 PITCH DEPTH (0 - 600 cent)
40 2n 35	00 - 7F	PAf LFO1 TVF DEPTH (0 - 2400 cent)
40 2n 36	00 - 7F	PAf LFO1 TVA DEPTH (0 - 100.0 %)
40 2n 37	00 - 40 - 7F	PAf LFO2 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 38	00 - 7F	PAf LFO2 PITCH DEPTH (0 - 600 cent)
40 2n 39	00 - 7F	PAf LFO2 TVF DEPTH (0 - 2400 cent)
40 2n 3A	00 - 7F	PAf LFO2 TVA DEPTH (0 - 100.0 %)
40 2n 40	28 - 40 - 58	CC1 PITCH CONTROL (-24 - 0 - +24 semitone)
40 2n 41	00 - 40 - 7F	CC1 TVF CUTOFF CONTROL (-9600 - 0 - +9600 cent)
40 2n 42	00 - 40 - 7F	CC1 AMPLITUDE CONTROL (-100.0 - 0 - +100.0 %)
40 2n 43	00 - 40 - 7F	CC1 LFO1 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 44	00 - 7F	CC1 LFO1 PITCH DEPTH (0 - 600 cent)
40 2n 45	00 - 7F	CC1 LFO1 TVF DEPTH (0 - 2400 cent)
40 2n 46	00 - 7F	CC1 LFO1 TVA DEPTH (0 - 100.0 %)
40 2n 47	00 - 40 - 7F	CC1 LFO2 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 48	00 - 7F	CC1 LFO2 PITCH DEPTH (0 - 600 cent)
40 2n 49	00 - 7F	CC1 LFO2 TVF DEPTH (0 - 2400 cent)
40 2n 4A	00 - 7F	CC1 LFO2 TVA DEPTH (0 - 100.0 %)
40 2n 50	28 - 40 - 58	CC2 PITCH CONTROL (-24 - 0 - +24 semitone)
40 2n 51	00 - 40 - 7F	CC2 TVF CUTOFF CONTROL (-9600 - 0 - +9600 cent)
40 2n 52	00 - 40 - 7F	CC2 AMPLITUDE CONTROL (-100.0 - 0 - +100.0 %)
40 2n 53	00 - 40 - 7F	CC2 LFO1 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 54	00 - 7F	CC2 LFO1 PITCH DEPTH (0 - 600 cent)
40 2n 55	00 - 7F	CC2 LFO1 TVF DEPTH (0 - 2400 cent)
40 2n 56	00 - 7F	CC2 LFO1 TVA DEPTH (0 - 100.0 %)
40 2n 57	00 - 40 - 7F	CC2 LFO2 RATE CONTROL (-10.0 - 0 - +10.0 Hz)
40 2n 58	00 - 7F	CC2 LFO2 PITCH DEPTH (0 - 600 cent)
40 2n 59	00 - 7F	CC2 LFO2 TVF DEPTH (0 - 2400 cent)
40 2n 5A	00 - 7F	CC2 LFO2 TVA DEPTH (0 - 100.0 %)

●DRUM SETUP PARAMETER

```
* m = map number              : 0H - 1H
                                (0 = map1, 1 = map2)
* rr = drums part key number  : 00H - 7FH (0 - 127)
```

address	data	description
41 m0 00 : 41 m0 0B	20 - 7F	DRUMS MAP NAME (12 ASCII character) |*SIZE 00 00 0CH
41 m1 rr	00 - 7F	PLAY KEY NUMBER pitch coarse
41 m2 rr	00 - 7F	LEVEL
41 m3 rr	00 - 7F	ASSIGN GROUP NUMBER (0, 1 - 127)
41 m4 rr	00,01-40-7F	PANPOT ⟨random,Left-Center-Right⟩
41 m5 rr	00 - 7F	REVERB DEPTH multiplicand of the part reverb depth
41 m6 rr	00 - 7F	CHORUS DEPTH multiplicand of the part chorus depth
41 m7 rr	00 - 01	RX.NOTE OFF (OFF / ON)
41 m8 rr	00 - 01	RX.NOTE ON (OFF / ON)

●BULK DUMP

1 - packet = 128 byte (MIDI)

ALL

address	size	description
48 00 00	00 1D 10	ALL (30 packets)

SYSTEM PARAMETER

address	size	description
48 00 00	00 00 10	SYSTEM PARAMETER (1 packet)

PATCH COMMON

address	size	description
48 00 10	00 01 00	PATCH COMMON (1 packet)

PATCH PART

address	size	description
48 01 10	00 01 60	PATCH BLOCK 0 (2 packets)
48 02 70	00 01 60	PATCH BLOCK 1 (2 packets)
48 04 50	00 01 60	PATCH BLOCK 2 (2 packets)
48 06 30	00 01 60	PATCH BLOCK 3 (2 packets)
48 08 10	00 01 60	PATCH BLOCK 4 (2 packets)
48 09 70	00 01 60	PATCH BLOCK 5 (2 packets)
48 0B 50	00 01 60	PATCH BLOCK 6 (2 packets)
48 0D 30	00 01 60	PATCH BLOCK 7 (2 packets)
48 0F 10	00 01 60	PATCH BLOCK 8 (2 packets)
48 10 70	00 01 60	PATCH BLOCK 9 (2 packets)
48 12 50	00 01 60	PATCH BLOCK A (2 packets)
48 14 30	00 01 60	PATCH BLOCK B (2 packets)
48 16 10	00 01 60	PATCH BLOCK C (2 packets)
48 17 70	00 01 60	PATCH BLOCK D (2 packets)
48 19 50	00 01 60	PATCH BLOCK E (2 packets)
48 1B 30	00 01 60	PATCH BLOCK F (2 packets)

DRUM MAP PARAMETER
```
* m = map number (0, 1)
```

address	size	description	
49 m0 00	00 02 00	PLAY KEY NUMBER	(2 packets)
49 m2 00	00 02 00	LEVEL	(2 packets)
49 m4 00	00 02 00	ASSIGN GROUP NUMBER	(2 packets)
49 m6 00	00 02 00	PANPOT	(2 packets)
49 m8 00	00 02 00	REVERB DEPTH	(2 packets)
49 mA 00	00 02 00	CHORUS DEPTH	(2 packets)
49 mC 00	00 02 00	RX.NOTE ON/OFF	(2 packets)
49 mE 00	00 00 18	DRUM MAP NAME	(1 packet)

7.PARAMETER ADDRESS MAP

(LA sound source ; mode A,B and D)

*The address and size are described with 7 - bit Hexadecimal.
 This means that the next 00 00 7F is 00 01 00.

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 ADDRESS MAP

Coarse address map of the exclusive communication is shown below ;

address	block	sub block	note
02 00 00	Timbre Temp. (basic ch)	Common Voice 1 : Voice 4	*7-1
03 00 00	Patch Temp. (unit#)	Part 1 : Part 8 Rhythm Part	*7-2
03 01 10	Rhythm Setup Temp. (unit#)	note# 24 note# 25 : note# 107 note# 108	*7-3
04 00 00	Timbre Temp. (unit#)	Part 1 : Part 8	*7-1
05 00 00	Patch Memory	# 1 : # 128	*7-4
08 00 00	Timbre Memory	# 1 : # 64	*7-1
10 00 00	System Area		*7-5
40 00 00	Write Request		*7-6
7F xx xx	All Parameters Reset		*7-7

●Temporary area
(Accessible on each basic channel)

address	description
02 00 00	Timbre Temporary Area (Part 1 - 8)

●Whole part (Accessible on unit #)

address	description
	Patch Temporary Area
03 00 00	part 1
03 00 10	part 2
:	:
03 00 70	part 8
03 01 00	rhythm part

```
+-----------+------------------------------------+
| 03 01 10  | Rhythm Setup Temporary Area        |
+-----------+------------------------------------+
|           | Timbre Temporary Area              |
|           |------------------------------------|
| 04 00 00  | part 1                             |
| 04 01 76  | part 2                             |
| 04 03 6C  | part 3                             |
| 04 05 62  | part 4                             |
| 04 07 58  | part 5                             |
| 04 09 4E  | part 6                             |
| 04 0B 44  | part 7                             |
| 04 0D 3A  | part 8                             |
+-----------+------------------------------------+
|           | Patch Memory                       |
|           |------------------------------------|
| 05 00 00  | #  1                               |
| 05 00 08  | #  2                               |
|    :      | :                                  |
| 05 07 70  | #127                               |
| 05 07 78  | #128                               |
+-----------+------------------------------------+
|           | Timbre Memory                      |
|           |------------------------------------|
| 08 00 00  | #  1                               |
| 08 02 00  | #  2                               |
|    :      | :                                  |
| 08 7C 00  | # 63                               |
| 08 7E 00  | # 64                               |
+-----------+------------------------------------+
| 10 00 00  | System area                        |
+-----------+------------------------------------+
| 40 00 00  | Write Request                      |
+-----------+------------------------------------+
| 7F xx xx  | All Parameter Reset                |
+-----------+------------------------------------+
```

● 7 - 1 Timbre Temporary Area / Timbre Memory

```
+--------------------------------------------------+
| offset    | description                          |
| address   |                                      |
|-----------|--------------------------------------|
| 00 00 00  | Common parameter                     |
| 00 00 0E  | Voice parameter(Voice #1)            |
| 00 00 48  | Voice parameter(Voice #2)            |
| 00 01 02  | Voice parameter(Voice #3)            |
| 00 01 3C  | Voice parameter(Voice #4)            |
+--------------------------------------------------+
```

7 - 1 - 1 Common parameter

```
+---------------------------------------------------------+
| offset    | data    | description                       |
| address   |         |                                   |
|-----------|---------|-----------------------------------|
| 00 00 00  | 20 - 7F | Timbre name(10 ASCII characters)  |
|    :      |         | *size 00 00 0AH                   |
| 00 00 09  |         |                                   |
|-----------|---------|-----------------------------------|
| 00 00 0A  | 00 - 0C | Structure of Voice #1&2 (1 - 13)  |
| 00 00 0B  | 00 - 0C | Structure of Voice #3&4 (1 - 13)  |
|-----------|---------|-----------------------------------|
| 00 00 0C  | 00 - 0F | Voice mute (1 - 15)               |
|-----------|---------|-----------------------------------|
| 00 00 0D  | 00 , 01 | ENV mode(00:Normal,01:No sustain) |
|-----------|---------|-----------------------------------|
| Total size          | 00 00 0EH                         |
+---------------------------------------------------------+
```

Voice mute

```
+------------------------+  +------------------------+
| Voice # | 1 | 2 | 3 | 4 |  | Voice # | 1 | 2 | 3 | 4 |
|---------|---|---|---|---|  |---------|---|---|---|---|
| D | 00  | 0 | 0 | 0 | 0 |  | D | 08  | 1 | 0 | 0 | 0 |
| A | 01  | 0 | 0 | 0 | 1 |  | A | 09  | 1 | 0 | 0 | 1 |
| T | 02  | 0 | 0 | 1 | 0 |  | T | 0A  | 1 | 0 | 1 | 0 |
| A | 03  | 0 | 0 | 1 | 1 |  | A | 0B  | 1 | 0 | 1 | 1 |
|(H)| 04  | 0 | 1 | 0 | 0 |  |(H)| 0C  | 1 | 1 | 0 | 0 |
|   | 05  | 0 | 1 | 0 | 1 |  |   | 0D  | 1 | 1 | 0 | 1 |
|   | 06  | 0 | 1 | 1 | 0 |  |   | 0E  | 1 | 1 | 1 | 0 |
|   | 07  | 0 | 1 | 1 | 1 |  |   | 0F  | 1 | 1 | 1 | 1 |
+------------------------+  +------------------------+
```

0 : mute, 1 : on

7 - 1 - 2 Voice parameter

```
+----------------------------------------------------------------+
| offset    | data      | description                            |
| address   |           |                                        |
|-----------|-----------|----------------------------------------|
| 00 00 00  | 00 - 60   | WG PITCH COARSE (C1 - C9)              |
| 00 00 01  | 00 - 32 - 64 | WG PITCH FINE (-50 - 0 - +50)       |
| 00 00 02  | 00 - 10   | WG PITCH KEYFOLLOW                      |
|           |           |   (-1,-1/2,-1/4,0,1/8,1/4,3/8,1/2,     |
|           |           |    5/8,3/4,7/8,1,5/4,3/2,s1,s2)        |
| 00 00 03  | 00 , 01   | WG PITCH BEND SW (00:OFF,01:ON)        |
| 00 00 04  | 00 - 03   | WG WAVEFORM/PCM BANK                    |
|           |           |        (SQU/1,SAW/1,SQU/2,SAW/2)       |
| 00 00 05  | 00 - 7F   | WG PCM WAVE# (1 - 128)                 |
| 00 00 06  | 00 - 60   | WG PULSE WIDTH (0 - 100)               |
| 00 00 07  | 00 - 07 - 0D | WG PW VELO SENS (-7 - +7)           |
|-----------|-----------|----------------------------------------|
| 00 00 08  | 00 - 0A   | P-ENV DEPTH (0 - 10)                   |
| 00 00 09  | 00 - 03   | P-ENV VELO SENS (0 - 3)                |
| 00 00 0A  | 00 - 04   | P-ENV TIME KEYF (0 - 4)                |
| 00 00 0B  | 00 - 64   | P-ENV TIME 1 (0 - 100)                 |
| 00 00 0C  | 00 - 64   | P-ENV TIME 2 (0 - 100)                 |
| 00 00 0D  | 00 - 64   | P-ENV TIME 3 (0 - 100)                 |
| 00 00 0E  | 00 - 64   | P-ENV TIME 4 (0 - 100)                 |
| 00 00 0F  | 00 - 32 - 64 | P-ENV LEVEL 0 (-50 - 0 - +50)       |
| 00 00 10  | 00 - 32 - 64 | P-ENV LEVEL 1 (-50 - 0 - +50)       |
| 00 00 11  | 00 - 32 - 64 | P-ENV LEVEL 2 (-50 - 0 - +50)       |
| 00 00 12  | 00 - 32 - 64 | P-ENV SUSTAIN LEVEL(-50 -0 - +50)   |
| 00 00 13  | 00 - 32 - 64 | P-ENV END LEVEL (-50 - 0 - +50)     |
|-----------|-----------|----------------------------------------|
| 00 00 14  | 00 - 64   | P-LFO RATE (0 - 100)                   |
| 00 00 15  | 00 - 64   | P-LFO DEPTH (0 - 100)                  |
| 00 00 16  | 00 - 64   | P-LFO MOD SENS (0 - 100)               |
|-----------|-----------|----------------------------------------|
| 00 00 17  | 00 - 64   | TVF CUTOFF FREQ (0 - 100)              |
| 00 00 18  | 00 - 1E   | TVF RESONANCE (0 - 30)                 |
| 00 00 19  | 00 - 0E   | TVF KEYFOLLOW                          |
|           |           |   (-1,-1/2,-1/4,0,1/8,1/4,3/8,         |
|           |           |    1/2,5/8,3/4,7/8,1,5/4,3/2,2)        |
| 00 00 1A  | 00 - 7F   | TVF BIAS POINT/DIR                     |
|           |           |        (<1A - <7C,>1A - >7C)           |
| 00 00 1B  | 00 - 07 - 0E | TVF BIAS LEVEL (-7 - +7)            |
|-----------|-----------|----------------------------------------|
| 00 00 1C  | -------   | dummy(ignored)                         |
| 00 00 1D  | 00 - 64   | TVF ENV VELO SENS (0 - 100)            |
| 00 00 1E  | 00 - 04   | TVF ENV DEPTH KEYF (0 - 4)             |
| 00 00 1F  | 00 - 04   | TVF ENV TIME KEYF (0 - 4)              |
| 00 00 20  | 00 - 64   | TVF ENV TIME 1 (0 - 100)               |
| 00 00 21  | 00 - 64   | TVF ENV TIME 2 (0 - 100)               |
| 00 00 22  | 00 - 64   | TVF ENV TIME 3 (0 - 100)               |
| 00 00 23  | 00 - 64   | TVF ENV TIME 4 (0 - 100)               |
| 00 00 24  | 00 - 64   | TVF ENV TIME 5 (0 - 100)               |
| 00 00 25  | 00 - 64   | TVF ENV LEVEL 1 (0 - 100)              |
| 00 00 26  | 00 - 64   | TVF ENV LEVEL 2 (0 - 100)              |
| 00 00 27  | 00 - 64   | TVF ENV LEVEL 3 (0 - 100)              |
| 00 00 28  | 00 - 64   | TVF ENV SUSTAIN LEVEL (0 - 100)        |
|-----------|-----------|----------------------------------------|
| 00 00 29  | 00 - 64   | TVA LEVEL (0 - 100)                    |
| 00 00 2A  | 00 - 32 - 64 | TVA VELO SENS (-50 - 0 - +50)       |
| 00 00 2B  | 00 - 7F   | TVA BIAS POINT 1                       |
|           |           |        (<1A - <7C,>1A - >7C)           |
| 00 00 2C  | 00 - 0C   | TVA BIAS LEVEL 1 (0 - 12)              |
| 00 00 2D  | 00 - 7F   | TVA BIAS POINT 2                       |
|           |           |        (<1A - <7C,>1A - >7C)           |
| 00 00 2E  | 00 - 0C   | TVA BIAS LEVEL 2 (0 - 12)              |
|-----------|-----------|----------------------------------------|
| 00 00 2F  | 00 - 04   | TVA ENV TIME KEYF (0 - 4)              |
| 00 00 30  | 00 - 04   | TVA ENV TIME V-FOLLOW (0 - 4)          |
| 00 00 31  | 00 - 64   | TVA ENV TIME 1 (0 - 100)               |
| 00 00 32  | 00 - 64   | TVA ENV TIME 2 (0 - 100)               |
| 00 00 33  | 00 - 64   | TVA ENV TIME 3 (0 - 100)               |
| 00 00 34  | 00 - 64   | TVA ENV TIME 4 (0 - 100)               |
| 00 00 35  | 00 - 64   | TVA ENV TIME 5 (0 - 100)               |
| 00 00 36  | 00 - 64   | TVA ENV LEVEL 1 (0 - 100)              |
| 00 00 37  | 00 - 64   | TVA ENV LEVEL 2 (0 - 100)              |
| 00 00 38  | 00 - 64   | TVA ENV LEVEL 3 (0 - 100)              |
| 00 00 39  | 00 - 64   | TVA ENV SUSTAIN LEVEL (0 - 100)        |
|-----------|-----------|----------------------------------------|
| Total size            | 00 00 3AH                          |
+----------------------------------------------------------------+
```

for example :
As you obtain part 2 tone data from temporary area, you should
send the message as follow.

```
F0 41 10 16 11  04 01 76  00 01 76  0E F7
                --------  --------  --
                └address  └size     └ checksum
```

52

●7-2 Patch temporary area

Patch temporary area (part 1 - 8)

offset address	data	description
00 00 00	00 - 03	TIMBRE GROUP (a, b, i, r)
00 00 01	00 - 3F	TIMBRE NUMBER (1 - 64)
00 00 02	00 - 18 - 30	KEY SHIFT (-24 - 0 - +24)
00 00 03	00 - 32 - 64	FINE TUNE (-50 - +50)
00 00 04	00 - 18	BEND RANGE (0 - 24)
00 00 05	00 - 03	ASSIGN MODE (POLY 1, POLY 2, POLY 3, POLY 4)
00 00 06	00 - 01	REVERB SWITCH (00:OFF, 01:ON)
00 00 07	---------	dummy (ignored)
00 00 08	00 - 64	OUTPUT LEVEL (0 - 100)
00 00 09	00 - 0E	PANPOT (R - L)
00 00 0A	---------	dummy (ignored)
:	:	
00 00 0F	---------	dummy (ignored)
Total size	00 00 10H	

Patch temporary area (rhythm part)

offset address	data	description
00 00 00	---------	dummy (ignored)
00 00 01	---------	dummy (ignored)
00 00 02	---------	dummy (ignored)
00 00 03	00 - 32 - 64	FINE TUNE (-50 - +50)
00 00 04	---------	dummy (ignored)
00 00 05	00 - 03	ASSIGN MODE (POLY 1, POLY 2, POLY 3, POLY 4)
00 00 06	---------	dummy (ignored)
00 00 07	---------	dummy (ignored)
00 00 08	00 - 64	OUTPUT LEVEL (0 - 100)
00 00 09	---------	dummy (ignored)
00 00 0A	---------	dummy (ignored)
:	:	
00 00 0F	---------	dummy (ignored)
Total size	00 00 10H	

●7-3 Rhythm part setup area

address	
03 01 10	Rhythm Setup (for Key# 24)
03 01 14	Rhythm Setup (for Key# 25)
03 01 18	Rhythm Setup (for Key# 26)
03 01 1C	Rhythm Setup (for Key# 27)
03 01 20	Rhythm Setup (for Key# 28)
:	
03 03 5C	Rhythm Setup (for Key# 107)
03 03 60	Rhythm Setup (for Key# 108)

Rhythm setup (for each Key #)

offset address	data	discription
00 00 00	00 - 7F	TIMBRE (i01 - i64, r01 - r64)
00 00 01	00 - 64	OUTPUT LEVEL (0 - 100)
00 00 02	00 - 0E	PANPOT (R -L)
00 00 03	00, 01	REVERB SWITCH (00:OFF, 01:ON)
Total size	00 00 04H	

Patch memory

offset address	data	discription
00 00 00	00 - 03	TIMBRE GROUP(00:a, 01:b, 02:i, 03:r)
00 00 01	00 - 3F	TIMBRE NUMBER (0 - 63)
00 00 02	00 - 18 - 30	KEY SHIFT (-24 - 0 - +24)
00 00 03	00 - 32 - 64	FINE TUNE (-50 - 0 - +50)
00 00 04	00 - 18	BEND RANGE (0 - 24)
00 00 05	00 - 03	ASSIGN MODE (POLY 1, POLY 2, POLY 3, POLY 4)
00 00 06	00, 01	REVERB SWITCH (00:OFF, 01:ON)
00 00 07	---------	dummy (ignored)
Total size	00 00 08H	

●7-5 System area

The total number of voice reserves for 9 parts must be 32 or less.
All voice reserves must be sent as a package of 9 parts.

offset address	data	discription
00 00 00	00 - 7F	MASTER TUNE (427.5Hz - 452.7Hz)＊
00 00 01	00 - 03	REVERB MODE (Room, Hall, Plate, Tap delay)
00 00 02	00 - 07	REVERB TIME (1 - 8)
00 00 03	00 - 07	REVERB LEVEL (0 - 7)
		VOICE RESERVE
00 00 04	00 - 20	Part 1 (0 - 32)
00 00 05	00 - 20	Part 2 (0 - 32)
00 00 06	00 - 20	Part 3 (0 - 32)
00 00 07	00 - 20	Part 4 (0 - 32)
00 00 08	00 - 20	Part 5 (0 - 32)
00 00 09	00 - 20	Part 6 (0 - 32)
00 00 0A	00 - 20	Part 7 (0 - 32)
00 00 0B	00 - 20	Part 8 (0 - 32)
00 00 0C	00 - 20	RHYTHM Part (0 - 32)
		MIDI channel
00 00 0D	00 - 10	Part 1 (1 - 16, OFF)
00 00 0E	00 - 10	Part 2 (1 - 16, OFF)
00 00 0F	00 - 10	Part 3 (1 - 16, OFF)
00 00 10	00 - 10	Part 4 (1 - 16, OFF)
00 00 11	00 - 10	Part 5 (1 - 16, OFF)
00 00 12	00 - 10	Part 6 (1 - 16, OFF)
00 00 13	00 - 10	Part 7 (1 - 16, OFF)
00 00 14	00 - 10	Part 8 (1 - 16, OFF)
00 00 15	00 - 10	Rhythm Part (1 - 16, OFF)
00 00 16	00 - 64	MASTER VOLUME (0 - 100)
Total size	00 00 17H	

MASTER TUNE

tune(Hz)	data(H)
436	2C
437	31
438	36
439	3B
440	40
441	45
442	4A
443	4F
444	54
445	59

for example :
As you set voice reserve of each part as follows, you should send
the message as follow.

```
        part 1 --- 8      part 3 thru 8 --- 0
        part 2 --- 10     rhythm part   --- 8
```

```
F0 41 10 16 12  10 00 04  08 0A 00 00 00 00 00 00 08  52  F7
                --------  --------------------------  --
                 └address  └data                     └ checksum
```

●7 - 6 Write Request

This message simulates the write switch of the LA sound source.
That is, the LA sound source writes data of each part in the
temporary area into internal memory.
(Memory must be specified by two bytes address.)

The LA sound source will inform back of the writing result.
No data in this area can be brought outside world by the use
of RQ1 and RQD.

address	data	discription	
		Timbre Write	
40 00 00	00 - 3F	Part 1 (1 - 64)	
40 00 01	00	Internal (0)	
40 00 02	00 - 3F	Part 2 (1 -64)	
40 00 03	00	Internal (0)	
:	:	:	
40 00 0E	00 - 3F	Part 8 (1 -64)	
40 00 0F	00	Internal (0)	
		Patch Write	
40 01 00	00 - 7F	Part 1 1-128	
40 01 01	00	Internal (0)	
40 01 02	00 - 7F	Part 2 1-128	
40 01 03	00	Internal (0)	
:	:	:	
40 01 0E	00 - 7F	Part 8 1-128	
40 01 0F	00	Internal (0)	
40 10 00	00 - 03	Result 0 : Function Completed	
		1 : Incorrect Mode	
		2 : Incorrect Mode	
		3 : Incorrect Mode	

for example :
As you write data of part 3 in the temporary area into #76, you
should send the message as follow.

```
F0 41 10 16 12  40 01 04  4B 00  70  F7
                --------  -----  --
                 └address  └data  └ checksum
```

●7 - 7 All Parameters Reset

address	data	discription	
7F dd ee	ff	All Parameter Reset	
		dd, ee, ff are any values	

Tone temporary, Patch temporary, System and Patch memory area
will be initialized by sending data to this address.
And set each of the following controls as follows.

controller	setting
Pitch Bend	±0(center)
Hold 1	0(off)
Modulation	0(minimum)
Expression	127(maximum)

And turns off all notes that have been turned on.
No data in this area can be brought outside world through MIDI
exclusive message such as RQ1 and RQD.

8.PARAMETER ADDRESS MAP

(GS sound source ; mode B)

*The address and size are described with 7 - bit Hexadecimal.
 This means that the next 00 00 7F is 00 01 00.

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 ADDRESS MAP

Coarse address map of the exclusive communication is shown below ;

●Patch temporary area

start address	data	description
	00, 01	REVERB SWITCH (00:OFF, 01:ON)
50 00 08		Part 1
50 00 1D		Part 2
50 00 32		Part 3
50 00 47		Part 4
50 00 5C		Part 5
50 00 71		Part 6

for example :
As you set off for reverb switch, you should send the message
as follow.

```
F0 41 10 16 12  50 00 08  00   28  F7
                --------  --   --
                 └address  └data └checksum
```

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●System area

```
+----------------------------------------------------------+
| start    | data    | description                         |
| address  |         |                                     |
|----------+---------+-------------------------------------|
| 52 00 00 | 00 - 7F | MASTER TUNE (426.0Hz - 458.4Hz)     |
|----------+---------+-------------------------------------|
| 52 00 01 | 00 - 03 | REVERB MODE (Room,Hall,Plate,       |
|          |         |                        Tap delay)   |
| 52 00 02 | 00 - 07 | REVERB TIME (1 - 8)                 |
| 52 00 03 | 00 - 07 | REVERB LEVEL (0 - 7)                |
|----------+---------+-------------------------------------|
|          | 00 - 1F | VOICE RESERVE (0 - 31)              |
|          |         |-------------------------------------|
| 52 00 04 |         | Part 1                              |
| 52 00 05 |         | Part 2                              |
| 52 00 06 |         | Part 3                              |
| 52 00 07 |         | Part 4                              |
| 52 00 08 |         | Part 5                              |
| 52 00 09 |         | Part 6                              |
|----------+---------+-------------------------------------|
|          | 00 - 10 | MIDI channel (1 - 16, OFF)          |
|          |         |-------------------------------------|
| 52 00 0A |         | Part 1                              |
| 52 00 0B |         | Part 2                              |
| 52 00 0C |         | Part 3                              |
| 52 00 0D |         | Part 4                              |
| 52 00 0E |         | Part 5                              |
| 52 00 0F |         | Part 6                              |
|----------+---------+-------------------------------------|
| 52 00 10 | 00 - 64 | MASTER VOLUME (0 - 100)             |
|----------+---------+-------------------------------------|
| Total size         | 00 00 11H                           |
+----------------------------------------------------------+
```

MASTER TUNE

```
+---------------------+
| tune(Hz) | data(H)  |
|----------+----------|
|    436   |   28     |
|    437   |   2C     |
|    438   |   30     |
|    439   |   34     |
|    440   |   38     |
|    441   |   3C     |
|    442   |   40     |
|    443   |   44     |
|    444   |   48     |
|    445   |   4C     |
+---------------------+
```

for example :
As you set 50 (32H) for master volume you should send the message as follow.

```
F0 41 10 16 12  52 00 10  32    6C F7
                --------  --    --
                └address └data └checksum
```

●All Parameters Reset

```
+-----------------------------------------------------------+
| address  | data    | discription                          |
|----------+---------+--------------------------------------|
| 7F dd ee | ff      | All Parameter Reset                  |
|          |         | dd,ee,ff are any values              |
+-----------------------------------------------------------+
```

Tone temporary, Patch temporary, System and Patch memory area will be initialized by sending data to this address.
And set each of the following controls as follows.

```
+-------------------------------+
| controller | setting          |
|------------+------------------|
| Pitch Bend | ±0(center)       |
| Hold 1     |  0(off)          |
| Modulation |  0(minimum)      |
| Expression |  127(maximum)    |
+-------------------------------+
```

●Checksum of Exclusive Message

There is a Checksum in front of End of Exclusive.
Checksum check of Exclusive Message.
Checksum results from address and data (or size).

◆How to calculate Checksum◆
(There is an "H" indication end of hexadecimal.)

Checksum is a value of address (aaH + ddH + ssH) and data (ddH + aaH + ttH + ...) (or size) reduced from xx 00H.

xx 00H - (aaH + ddH + ssH + ddH + aaH + ttH +....) = yy ??H
         ----------------   ------------------------   ---
           └address   └data   ↑
                                      This value is a checksum.

*xx and yy are any value.
xx 00H is not a negative value if values of address and data (or size) are reduced from it.

for example 1 :
How to calculate Checksum as you send the follow Exclusive Message.

```
                                            ①status
F0 41 10 16 12 52 00 10  32     ?? F7       ②manufacture's ID
-- -- -- -- -- --------  --     -- --        ③device ID
① ② ③ ④ ⑤  └address └data |   ⑥           ④model ID
                              |              ⑤command ID
                              └checksum      ⑥End of exclusive
```

values of address and data add up
              52H + 00H + 10H + 32H = 01 14H

       *NOTE ! *
       The address and size are described with 7 - bit Hexadecimal.
       This means that the next 00 00 7F is not 00 00 80.
       The next 00 00 7F is 00 01 00.

       ●Sample of calculation

       ·00 7FH + 00 01H = 01 00H
       ·00 09H + 00 01H = 00 0AH
       ·02 00H - 01 00H = 01 00H

reduce from xx 00H ...
              xx 00H - 01 14H = yy 6CH

therefore Checksum value is 6CH .

for example 2 :
How to calculate Checksum as you send the follow Exclusive Message.

```
                                            ①status
F0 41 10 16 11 04 01 76  00 01 76  ?? F7(EOX) ②manufacture's ID
-- -- -- -- -- --------  --------  -- --        ③device ID
① ② ③ ④ ⑤  └address └size    |   ⑥        ④model ID
                              |              ⑤command ID
                              └checksum      ⑥End of exclusive
```

yy ??H = xx 00H - (04H + 01H + 76H + 00H + 01 + 76H)
        = xx 00H - 01 72H

    ??H = 0EH

therefore, Checksum value is 0EH .

■ *Specifications*

[GS Sound Source] GS Compatible

Number of Parts : 16
Maximum Polyphony : 24 (Voices)
Effects : Reverb/Delay
Chorus

[LA Sound source]

Number of Parts : 9
Maximum Polyphony : 32 (voices)
Effects : Reverb

[Others]

Connectors : MIDI IN/OUT/THRU
Audio Outs (L, R)
Headphone Jack
Power Supply : 9 V DC (AC Adaptor)
Current Draw : 1000 mA (1A)
External Dimensions : 284(W) x 255(D) x 48(H) mm
11-3/16(W) × 10-1/16(D) × 1-15/16(H) inches
Weight : 1.75 kg
3 lbs 14 oz
Accessories : AC Adaptor
MIDI Cable (1)
Audio Cables (2)
Owner's Manual

* In the interest of product improvement, the specifications of this unit are subject to change without prior notice.

Function ···		Transmitted	Recognized	Remarks
Basic Channel	Default	×	*1	
	Changed	×	1 – 16 each	
Mode	Default	×	Mode 3	
	Messages	×		
	Altered	*********		
Note Number		×	0 – 127	
	True Voice	*********	12 – 108	
Velocity	Note ON	×	○	
	Note OFF	×	×	
After Touch	Key's	×	×	
	Ch's	×	×	
Pitch Bend		×	○	
Control Change	1	×	○	Modulation
	6	×	○	Data entry
	7	×	○	Volume
	10	×	○	Panpot
	11	×	○	Expression
	64	×	○	Hold 1
	100, 101	×	○	RPN LSB,MSB
	121	×	○	Reset all controllers
Prog Change		×	○	
	True #	*********	0 – 127	
System Exclusive		○	○	
System Common	Song Pos	×	×	
	Song Sel	×	×	
	Tune	×	×	
System Real Time	Clock	×	×	
	Commands	×	×	
Aux Messages	Local ON/OFF	×	×	
	All Notes OFF	×	○ (123 – 127)	
	Active Sense	×	○	
	Reset	×	×	
Notes		*1 Mode A and B (LA sound source) : 2 – 10		
		Mode D (LA sound source),Mode B (GS sound source) : 11 – 16		

Mode 1 : OMNI ON, POLY   Mode 2 : OMNI ON, MONO   ○ : Yes

Mode 3 : OMNI OFF, POLY   Mode 4 : OMNI OFF, MONO   × : No

GS/LA SOUND MODULE (GS SOUND SOURCE ; Mode A, C and D)   Date : Sep. 25 1991

Model CM-500   MIDI Implementation Chart   Version : 1.00

	Function ···	Transmitted	Recognized	Remarks
Basic Channel	Default	×	* 1	
	Changed	×	1 – 16 each	
Mode	Default	×	Mode 3	
	Messages	×	Mode 3, 4 (m = 1)	* 2
	Altered	* * * * * * * *		
Note Number		×	0 – 127	
	True Voice	* * * * * * * *	0 – 127	
Velocity	Note ON	×	○	
	Note OFF	×	×	
After Touch	Key's	×	* 3	
	Ch's	×	* 3	
Pitch Bend		×	* 3	Resolution : 12 bit
Control Change	0,32	×	○／× *4	Bank select
	1	×	○／× *3	Modulation
	5	×	○／× *4	Portamento time
	6,38	×	○／× *4	Data entry
	7	×	○／× *3	Volume
	10	×	○／× *3	Panpot
	11	×	○／× *3	Expression
	64	×	○／× *3	Hold 1
	65	×	○／× *3	Portamento
	66	×	○／× *3	Sostenuto
	67	×	○／× *3	Soft
	84	×	○／× *4	LGC
	91	×	○／× *4 (Reverb)	Effect 1 · depth
	93	×	○／× *4 (Chorus)	Effect 3 · depth
	98,99	×	○／× *3	NRPN LSB、MSB
	100, 101	×	○／× *3	RPN LSB,MSB
	120	×	○	All sounds off
	121	×	○	Reset all controllers
Prog Change		×	○／× *3	
	True #	* * * * * * * *	0 – 127	
System Exclusive		○	○	
System Common	Song Pos	×	×	
	Song Sel	×	×	
	Tune	×	×	
System Real Time	Clock	×	×	
	Commands	×	×	
Aux Messages	Local ON／OFF	×	×	
	All Notes OFF	×	○ (123 – 127)	
	Active Sense	○	○	
	Reset	×	×	
Notes	* 1 Mode A and C : 1 – 16, Mode D : 1 – 10 * 2 Recognized as m = 1 even if m ≠ 1.(m : number of MONO) * 3 ○× can be selectable. * 4 ○× can be selectable, only using the receive switch of control change (all).			

Mode 1 : OMNI ON, POLY   Mode 2 : OMNI ON, MONO   ○ : Yes
Mode 3 : OMNI OFF, POLY   Mode 4 : OMNI OFF, MONO   × : No

Information

●When you need repair service, call your local Roland Service Station or the authorized Roland distributor in your country as shown below.

U. S. A.
Roland Corp US
7200 Dominion Circle
Los Angeles, CA. 90040 - 3647
U. S. A.
☎ (213)685 - 5141

CANADA
Roland Canada Music Ltd.
(Head Office)
5480 Parkwood
Richmond B. C., V6V 2M4
CANADA
☎ (604)270 - 6626

Roland Canada Music Ltd.
9425 Transcanadienne
Service Rd. N.,
St Laurent, Quebec H4S 1V3
CANADA
☎ (514)335 - 2009

Roland Canada Music Ltd.
346 Watline Avenue,
Mississauga, Ontario L4Z 1X2
CANADA
☎ (416)890 - 6488

AUSTRALIA
Roland Corporation
(Australia)Pty. Ltd.
(Head Office)
38 Campbell Avenue
Dee Why West. NSW 2099
AUSTRALIA
☎ (02)982 - 8266

Roland Corporation
(Australia)Pty. Ltd.
(Melbourne Office)
50 Garden Street
South Yarra, Victoria 3141
AUSTRALIA
☎ (03)241 - 1254

NEW ZEALAND
Roland Corporation (NZ)Ltd.
97 Mt. Eden Road, Mt. Eden,
Auckland 3
NEW ZEALAND
☎ (09)3098 - 715

UNITED KINGDOM
Roland(UK)Ltd.
Rye Close
Ancells Business Park
Fleet
Hampshire GU13 8UY
UNITED KINGDOM
☎ 0252 - 816181

GERMANY
Roland Elektronische
Musikinstrumente
Handelsgesellschaft mbH.
Oststrasse 96,
2000 Norderstedt
GERMANY
☎ 040/52 60 090

**BELGIUM／HOLLAND／
LUXEMBOURG**
Roland Benelux N. V.
Houtstraat 1
B - 2260 Oevel - Westerlo
BELGIUM
☎ (0032)14 - 575811

DENMARK
Roland Scandinavia as
Langebrogade 6
Box 1937
DK - 1023 Copenhagen K.
DENMARK
☎ 31 - 95 31 11

SWEDEN
Roland Scandinavia as
DanvikCenter 28 A, 2 tr.
S - 131 30 Nacka,
SWEDEN
☎ 08 - 702 00 20

NORWAY
Roland Scandinavia
Avd. Norge
Lilleakerveien 2
Postboks 95 Lilleaker
N - 0216 Oslo 2
NORWAY
☎ 02 - 73 00 74

FINLAND
Fazer Musik Inc.
Länsituulentie
POB 169
SF - 02101 Espoo
FINLAND
☎ 0 - 43 50 11

ITALY
Roland Italy S. p. A.
Viale delle Industrie 8
20020 ARESE MILANO
ITALY
☎ 02 - 93581311

SPAIN
Roland Electronics
de España, S. A.
Calle Bolivia 239
08020 Barcelona
SPAIN
☎ 93 - 308 - 1000

SWITZERLAND
Musitronic AG
Gerberstrasse 5, CH - 4410
Liestal
SWITZERLAND
☎ 061/921 16 15

Roland CK (Switzerland) AG
Hauptstrasse 21/Postfach
CH - 4456 Tenniken
SWITZERLAND
☎ 061/98 60 55
Repair Service by Musitronic AG

FRANCE
Musikengro
102 Avenue Jean - Jaures
69007 Lyon Cedex 07
FRANCE
☎ (7)858 - 54 60

Musikengro
(Paris Office)
Centre Region Parisienne
41 rue Charles - Fourier,
94400 Vitry s/Seine
FRANCE
☎ (1)4680 86 62

AUSTRIA
E. Dematte &Co.
Neu - Rum Siemens - Strasse 4
A - 6021 Innsbruck Box 591
AUSTRIA
☎ (0512)63 451

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V. Dimitriadis & Co. Ltd.
2 Phidiou Str., GR 106 78
Athens
GREECE
☎ 1 - 3620130

PORTUGAL
Casa Caius Instrumentos
Musicais Lda.
Rua de Santa Catarina 131
Porto
PORTUGAL
☎ 02 - 38 44 56

HUNGARY
Intermusica Ltd.
Warehouse Area 'DEPO'
Budapest. P.O. Box 3,
2045 Torokbalint
HUNGARY
☎ (1)1868905

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D.J.A. International Ltd.
25 Pinsker St.,
Tel Aviv
ISRAEL
☎ 03 - 283015

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FORESIGHT Corporation
R. Alvarenga 591
CEP - 05509 Sao Paulo
BRAZIL
FAX: (011)210 - 0286

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Tom Lee Music Co., Ltd.
Service Division
22 - 32 Pun Shan Street,
Tsuen Wan,
New Territories,
HONG KONG
☎ 415 - 0911

SINGAPORE
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Singapore 0178
SINGAPORE
☎ 3367886

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Theera Music Co., Ltd.
330 Verng Nakorn Kasem, Soi 2
Bangkok 10100,
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☎ 2248821

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Syarikat Bentley
No.142, Jalan Bukit Bintang
55100 Kuala Lumpur
MALAYSIA
☎ 2421288

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PT Galestra Inti
Kompleks Perkantoran
Duta Merlin Blok C/59
Jl. Gajah mada No.3 - 5
Jakarta 10130
INDONESIA
☎ (021) 354604, 354606

TURKEY
Barkat Sanayl ve Ticaret
Siraselviler Cad. 86/6 Taksim
Istanbul
TURKEY
☎ 149 93 24

CYPRUS
Radex Sound Equipment Ltd.
17 Panteli Katelari Str.
P.O.Box 2046, Nicosia
CYPRUS
☎ 453426, 466423

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