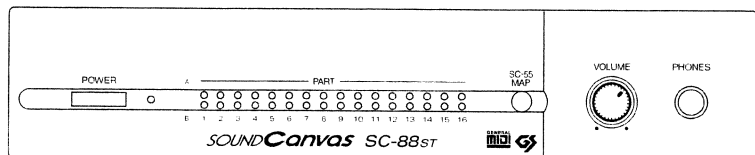




OWNER'S MANUAL

*SOUND*Canvas

MIDI SOUND GENERATOR *SC-88ST*



USING THE UNIT SAFELY

INSTRUCTIONS FOR THE PREVENTION OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS

About ⚠ WARNING and ⚠ CAUTION Notices

⚠ WARNING	Used for instructions intended to alert the user to the risk of death or severe injury should the unit be used improperly.
⚠ CAUTION	Used for instructions intended to alert the user to the risk of injury or material damage should the unit be used improperly. * Material damage refers to damage or other adverse effects caused with respect to the home and all its furnishings, as well to domestic animals or pets.

About the Symbols

	The ⚠ symbol alerts the user to important instructions or warnings. The specific meaning of the symbol is determined by the design contained within the triangle. In the case of the symbol at left, it is used for general cautions, warnings, or alerts to danger.
	The ⓧ symbol alerts the user to items that must never be carried out (are forbidden). The specific thing that must not be done is indicated by the design contained within the circle. In the case of the symbol at left, it means that the unit must never be disassembled.
	The ● symbol alerts the user to things that must be carried out. The specific thing that must be done is indicated by the design contained within the circle. In the case of the symbol at left, it means that the power-cord plug must be unplugged from the outlet.

ALWAYS OBSERVE THE FOLLOWING




⚠ WARNING

- Before using this unit, make sure to read the instructions below, and the Owner's Manual.
- Do not open (or modify in any way) the unit or its AC adaptor.
- Do not attempt to repair the unit, or replace parts within it (except when this manual provides specific instructions directing you to do so). Refer all servicing to your dealer, or qualified Roland service personnel.
- Never use or store the unit in places that are:
 - Subject to temperature extremes (e.g., direct sunlight in an enclosed vehicle, near a heating duct, on top of heat-generating equipment); or are
 - Damp (e.g., baths, washrooms, on wet floors); or are
 - Humid; or are
 - Dusty; or are
 - Subject to high levels of vibration.
- Make sure you always have the unit placed so it is level and sure to remain stable. Never place it on stands that could wobble, or on inclined surfaces.
- Be sure to use only the AC adaptor supplied with the unit. Also, make sure the line voltage at the installation matches the input voltage specified on the AC adaptor's body. Other AC adaptors may use a different polarity, or be designed for a different voltage, so their use could result in damage, malfunction, or electric shock.










⚠ WARNING

- Avoid damaging the power cord. Do not bend it excessively, step on it, place heavy objects on it, etc. A damaged cord can easily become a shock or fire hazard. Never use a power cord after it has been damaged.
- This unit, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level, or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should immediately stop using the unit, and consult an audiologist.
- Do not allow any objects (e.g., flammable material, coins, pins); or liquids of any kind (water, soft drinks, etc.) to penetrate the unit.
- Immediately turn the power off, remove the AC adaptor from the outlet, and request servicing by your dealer or qualified Roland service personnel when:
 - The AC adaptor or the power-supply cord has been damaged; or
 - Objects have fallen into, or liquid has been spilled onto the unit; or
 - The unit has been exposed to rain (or otherwise has become wet); or
 - The unit does not appear to operate normally or exhibits a marked change in performance.
- In households with small children, an adult should provide supervision until the child is capable of following all the rules essential for the safe operation of the unit.

⚠ WARNING

- Protect the unit from strong impact.
(Do not drop it!) 
- Do not force the unit's power-supply cord to share an outlet with an unreasonable number of other devices. Be especially careful when using extension cords—the total power used by all devices you have connected to the extension cord's outlet must never exceed the power rating (watts/amperes) for the extension cord. Excessive loads can cause the insulation on the cord to heat up and eventually melt through. 
- Before using the unit in a foreign country, consult with your dealer, or qualified Roland service personnel. 

⚠ CAUTION

- The unit and the AC adaptor should be located so their location or position does not interfere with their proper ventilation. 
- Always grasp only the plug or the body of the AC adaptor when plugging into, or unplugging from, an outlet or this unit. 
- Whenever the unit is to remain unused for an extended period of time, disconnect the AC adaptor. 
- Try to prevent cords and cables from becoming entangled. Also, all cords and cables should be placed so they are out of the reach of children. 
- Never climb on top of, nor place heavy objects on the unit. 
- Never handle the AC adaptor body, or its plugs, with wet hands when plugging into, or unplugging from, an outlet or this unit. 
- Before moving the unit, disconnect the AC adaptor and all cords coming from external devices. 
- Before cleaning the unit, turn off the power and unplug the AC adaptor from the outlet (p. 8). 
- Whenever you suspect the possibility of lightning in your area, disconnect the AC adaptor from the outlet. 

To users of EDIROL products

Although Roland and EDIROL products are supplied with identical manuals, all inquiries should be directed toward the company handling the product. Should you have any questions about the SC-88ST-ED, please direct them to the EDIROL Corporation. Please refrain from making any inquiries to the Roland Corporation.

Please contact with: EDIROL Corporation
1201-4th Ave. S., 3rdFloor
Seattle, WA 98134
U.S.A.
TEL:800-380-2580
FAX:360-332-4405

IMPORTANT NOTES

Before using this unit, carefully read the sections entitled: "USING THE UNIT SAFELY" and "IMPORTANT NOTES" (p. 2, p. 4). These sections provide important information concerning the proper operation of the unit. Additionally, in order to feel assured that you have gained a good grasp of every feature provided by your new unit, this manual should be read in its entirety. The manual should be saved and kept on hand as a convenient reference.

In addition to the items listed under "USING THE UNIT SAFELY" on page 2, please read and observe the following:

Power Supply

- Do not use this unit on the same power circuit with any device that will generate line noise (such as an electric motor or variable lighting system).
- The AC adaptor will begin to generate heat after long hours of consecutive use. This is normal, and is not a cause for concern.
- Before connecting this unit to other devices, turn off the power to all units. This will help prevent malfunctions and/or damage to speakers or other devices.

Placement

- Using the unit near power amplifiers (or other equipment containing large power transformers) may induce hum. To alleviate the problem, change the orientation of this unit; or move it farther away from the source of interference.
- This device may interfere with radio and television reception. Do not use this device in the vicinity of such receivers.
- Do not expose the unit to direct sunlight, place it near devices that radiate heat, leave it inside an enclosed vehicle, or otherwise subject it to temperature extremes. Excessive heat can deform or discolor the unit.

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 cloth impregnated with a mild, non-abrasive 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 possibility of discoloration and/or deformation.

Additional Precautions

- Use a reasonable amount of care when using the unit's buttons, sliders, or other controls; and when using its jacks and connectors. Rough handling can lead to malfunctions.
- When connecting / disconnecting all cables, grasp the connector itself—never pull on the cable. This way you will avoid causing shorts, or damage to the cable's internal elements.
- To avoid disturbing your neighbors, try to keep the unit's volume at reasonable levels. You may prefer to use headphones, so you do not need to be concerned about those around you (especially when it is late at night).
- When you need to transport the unit, package it in the box (including padding) that it came in, if possible. Otherwise, you will need to use equivalent packaging materials.

CONTENTS

USING THE UNIT SAFETY	2
IMPORTANT NOTES	4
CONTENTS	5
Introduction	6
Front and rear panel	7

Chapter 1. Try out the SC-88ST (Quick start)

Connect a MIDI keyboard and play the sounds	8
■ Making connections.....	8
■ Turning the power on or off.....	8
■ Is there sound?.....	9
Headphones.....	9
Audio input jacks.....	9

Chapter 2. Using the SC-88ST from a personal computer

Using the SC-88ST from a personal computer.....	10
■ Connections with your computer.....	10
■ MIDI data transfer with the computer.....	12
■ Connecting another MIDI sound source to the SC-88ST.....	12
Using MIDI messages to select sounds.....	12
■ Using MIDI messages to select Drum Sets.....	13
■ Exclusive data addresses	14

Chapter 3. MIDI and the SC-88ST

About MIDI	15
■ How MIDI messages are transmitted and received ...	15
■ MIDI channels and multi-timbral sound modules.....	15
MIDI messages that can be received by the SC-88ST	16
Using NRPNs with GS Sound modules	18
The General MIDI System and GS Format.....	20
■ What is the General MIDI System?	20
■ What is the GS Format?.....	20

Chapter 4. Structure of the SC-88ST

Chapter 5. Parameters

Chapter 6. Effects

Chapter 7. Appendix

Troubleshooting	31
COMPUTER Cable wiring diagrams	32
Instrument list.....	33
Drum set list	39
MIDI implementation	44
MIDI implementation chart	59
INDEX	60
Specifications	61
Information	62


Introduction

Main features of the SC-88ST Sound Canvas

- The SC-88ST is a sound module compatible with the Roland GS format. It can be used to playback any song data bearing the GS logo. The SC-88ST is also compatible with the General MIDI System. It can be used to playback any song data (General MIDI Scores) bearing the General MIDI logo. (☞ p.20)
- The SC-88ST is a 32-part, 64-voice multitimbral sound module. A single SC-88ST can produce the sounds of a large ensemble. It is an ideal sound module for use with sequencers or personal computers. (☞ p.10)
- The SC-88ST contains 654 high quality sounds and 24 different drum sound sets (including 2 sound effects sets). These sound include the same sounds as the SC-55/55mkII, allowing SC-55/55mkII song data to be played back correctly. (☞ p.21)
- By editing sound parameters such as vibrato, filter and envelope, you can modify sounds to your taste. (☞ p.25)
- A wide variety of effects are provided, including 8 types of reverb, 8 types of chorus, 10 types of delay, and 2-band equalization. In addition, for each effect you can specify parameters such as character, depth, rate, time, frequency etc., to make fine adjustments to the sound. (☞ p.28)
- The COMPUTER Connector allows the SC-88ST to be directly connected to an Apple or IBM personal computer. (☞ p.10)
- Audio input jacks allow you to connect another sound source, and output it from the audio output jacks mixed with the SC-88ST's own sound. (☞ p.9)



General MIDI system

The General MIDI system is a set of recommendations which seeks to provide a way to go beyond the limitations of proprietary designs, and standardize the MIDI capabilities of sound generating devices. Sound generating devices and music data that meets the General MIDI standard bears the General MIDI logo (). Music data bearing the General MIDI logo can be played back using any General MIDI sound generating unit to produce essentially the same musical performance.




GS format

The GS Format is Roland's set of specifications for standardizing the performance of sound generating devices. In addition to including support for everything defined by the General MIDI System, the highly-compatible GS Format additionally offers an expanded number of sounds, provides for the editing of sounds, and spells out many details for a wide range of extra features, including effects such as reverb and chorus.

Designed with the future in mind, the GS Format can readily include new sounds and support new hardware features when they arrive.

Since it is upwardly compatible with the General MIDI System, Roland's GS Format is capable of reliably playing back GM Scores equally as well as it performs GS Music Data (music data that has been created with the GS Format in mind).

GS () is a registered trademark of Roland Corporation.

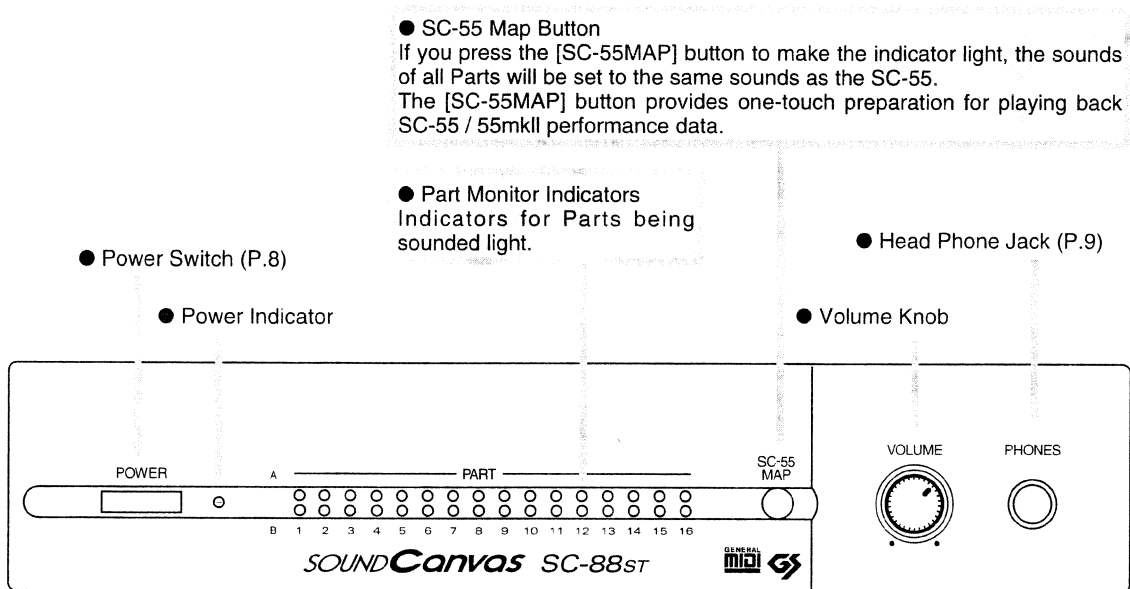
Apple® is a registered trademark of Apple Computer, Inc., in the United States and other countries.

Macintosh™ is a trademark of Apple Computer, Inc., in the United States and other countries.

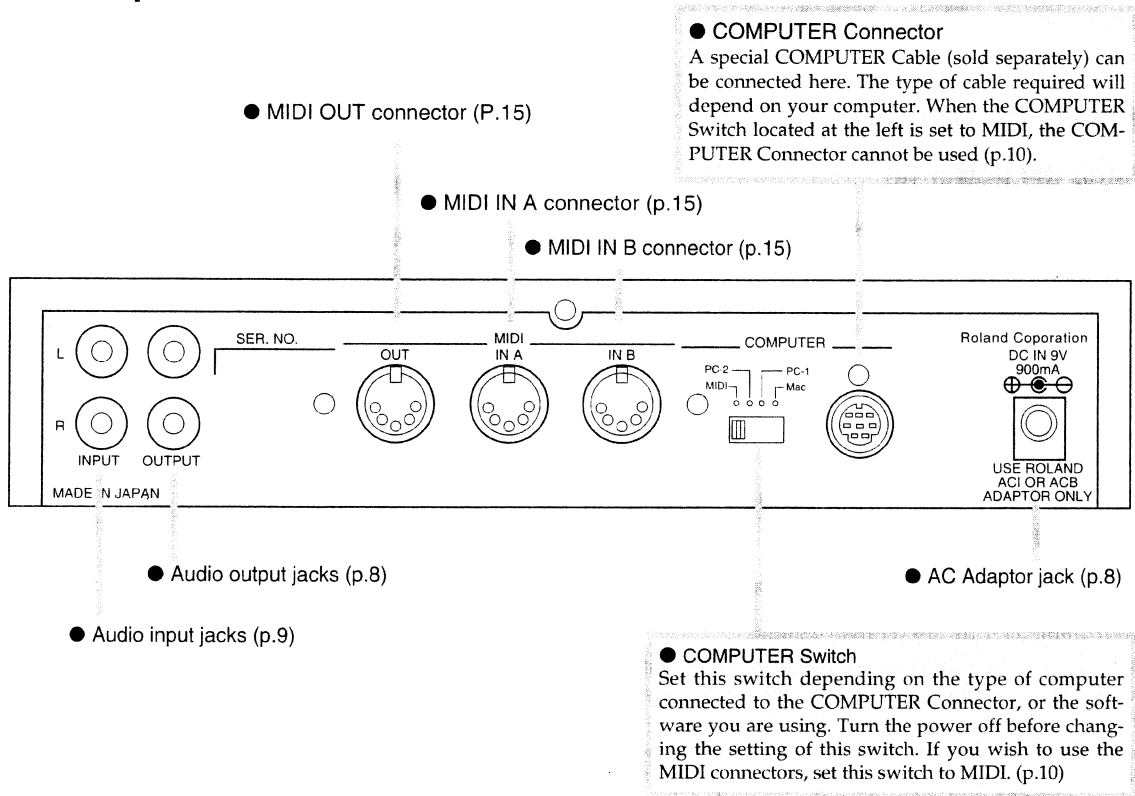
IBM, PC/AT are registered trademarks of International Business Machine Corporation.

Front and rear panel

■ Front panel

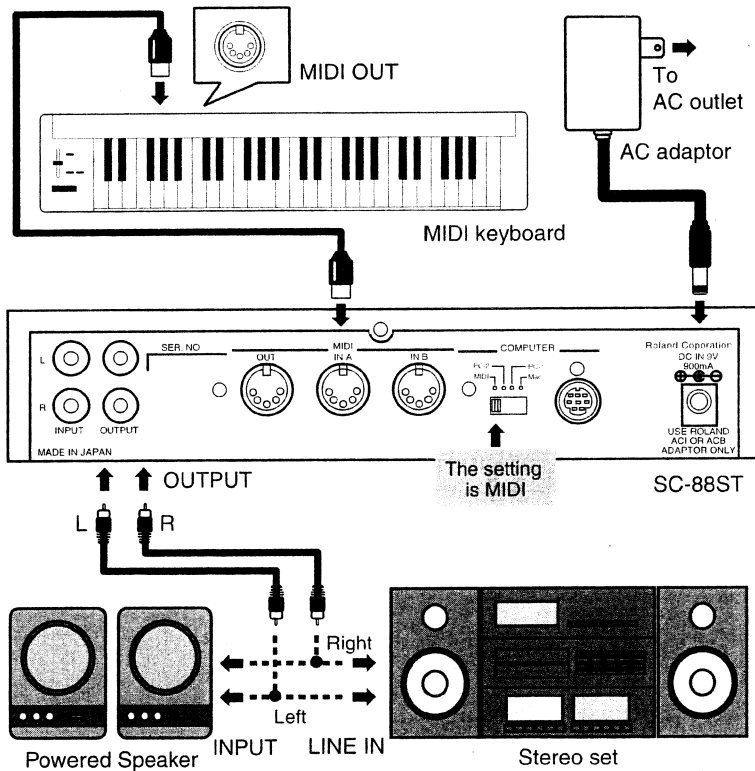


■ Rear panel



Chapter 1 Try out the SC-88ST (Quick start)

Connect a MIDI keyboard and play the sounds



■ Making connections

This section explains how to connect the SC-88ST to a MIDI keyboard and play the sounds. If you wish to connect a sequencer or personal computer to the SC-88ST, refer to p.10.

Set the COMPUTER Switch located on the back of the SC-88ST to MIDI.

Turn the power off before changing the setting of this switch.

* Use only the supplied adaptor. Using other AC adaptors can result in malfunction or electric shock.

■ Turning the power on or off

Turning the power on

1. Before you turn the power on, check the following points.

Make sure that the power cables of each device are correctly plugged into an AC outlet.

Make sure that the SC-88ST is correctly connected to any peripheral devices you are using.

Make sure that the volume of your amp/speaker system is turned down.

2. Turn on the power of the SC-88ST and your MIDI equipment.

3. Turn on the power of your audio system.

Set your amplifier to an appropriate volume.

* This unit is equipped with a protection circuit. A brief interval (a few seconds) after power up is required before the unit will operate normally.

* Excessive volumes can damage your speaker system. Please be aware that speakers used in conventional stereo systems are more vulnerable to being damaged by high volume levels than are speakers designed for musical instruments.

Turning the power off

1. Before you turn the power off, check the following points.

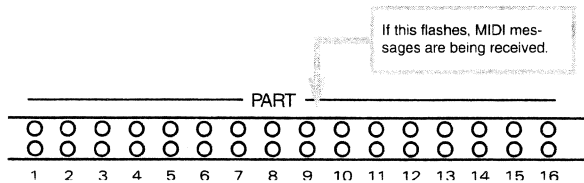
Make sure that the volume of your amp/speaker system is turned down.

2. Turn off each device in the following order.

Audio devices → SC-88ST and MIDI devices

■ Is there sound?

After making connections as explained in “Making connections”, turn the power on, and gradually raise the volume while playing the keyboard. Does the part monitor indicator of the SC-88ST flash? If it does, the SC-88ST is receiving MIDI messages correctly.



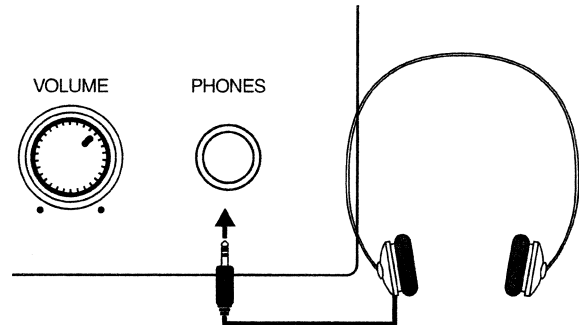
If you do not hear sound, check the volume settings of the amp and the connections with the speaker.

If the SC-88ST part monitor indicator does not flash, MIDI messages are not being received from your MIDI keyboard. Check your MIDI keyboard settings and MIDI cable connections.

* With the initial settings, the SC-88ST will produce sound in response to any channel 1 — 16, regardless of the transmit channel your keyboard is set to. This is because each Part is assigned to the correspondingly numbered MIDI channel. The number below the part monitor indicator is the Part number.

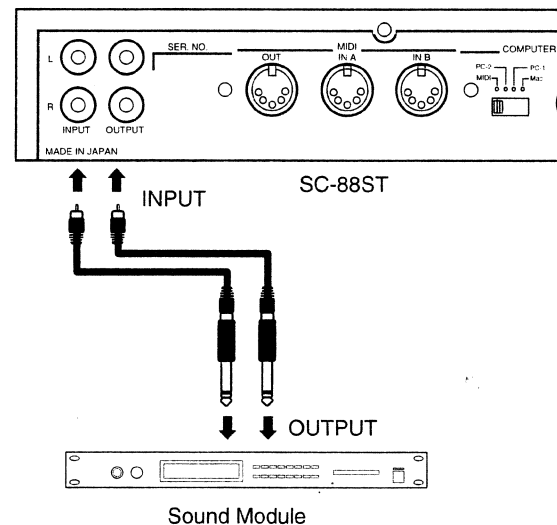
Headphones

Use headphones of 8 — 150 ohms impedance. Sound will be output from the audio output jacks even when headphones are connected.



Audio input jacks

You can connect the output jacks of other MIDI sound sources to these jacks. The audio signal that is input here will be mixed with the SC-88ST sound and output from the audio output jacks.



Chapter 2 Using the SC-88ST from a personal computer

Using the SC-88ST from a personal computer

The SC-88ST can be controlled by music software running on a personal computer. This will allow you to create your own songs, and also to select sounds or edit sounds from the computer display. This type of system is known as a Desk Top Music System (DTMS). The functions provided by a DTMS differ widely depending on the software, so it is important that you choose software suited to your needs.

Connections with your computer

There are two ways to connect the SC-88ST to your computer; using the MIDI connectors or the COMPUTER Connector. If you use the MIDI connectors, you will need to obtain a computer interface board (adapter) that has MIDI connectors (such as the Roland Super MPU, etc.). If you use the SC-88ST COMPUTER Connector, you can use a special cable to connect it directly with the computer, but your software must be able to correspond to the serial port.

If you wish to connect your computer via the MIDI connectors, refer to p.11 (Connecting a computer via the MIDI connectors) for how to make connections. The following explanation will show how to make connections using the SC-88ST COMPUTER Connector.

■ Connections

1. Turn off the SC-88ST power, and set the **COMPUTER Switch** located on the back of the SC-88ST.

Note

The Computer Switch will be validated when the power is turned off and then on after the setting has been made.

* The setting will depend on the type of computer you have and the software you use.

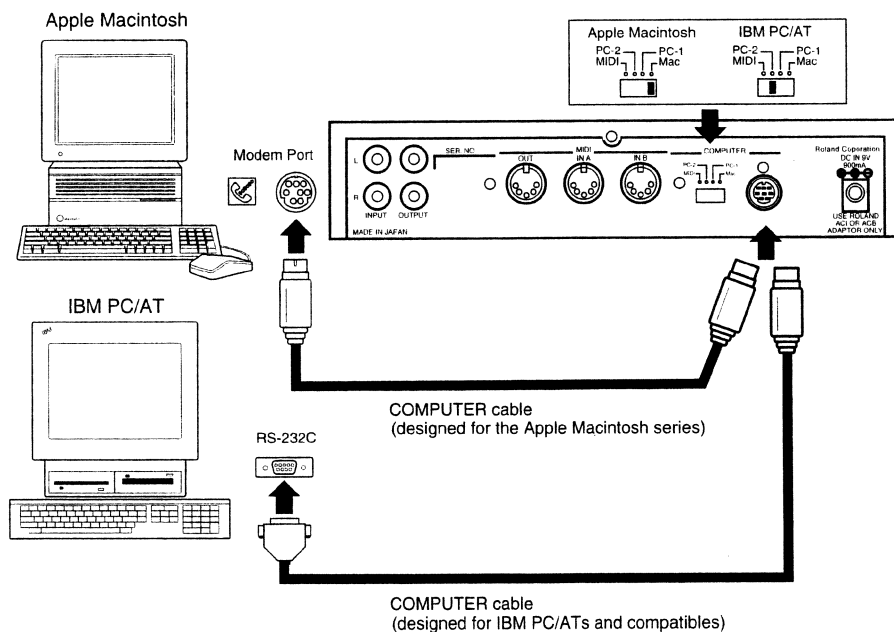
The PC-1 baud rate is 31.25K (bit/sec), and the PC-2 baud rate is 38.4K (bit/sec). Set the COMPUTER Switch to the baud rate required by your MIDI application (software). Carefully read the manual for your software regarding the switch setting.

In general, set the switch to Mac for Macintosh series computers, and to PC-2 for IBM PC/AT series computers.

2. Connect the **COMPUTER Cable** to the **RS232C connector or modem port** located on the back of your computer.
3. Connect the other end of the **COMPUTER Cable** to the **SC-88ST COMPUTER Connector (COMPUTER)**.
4. Turn on the SC-88ST power.

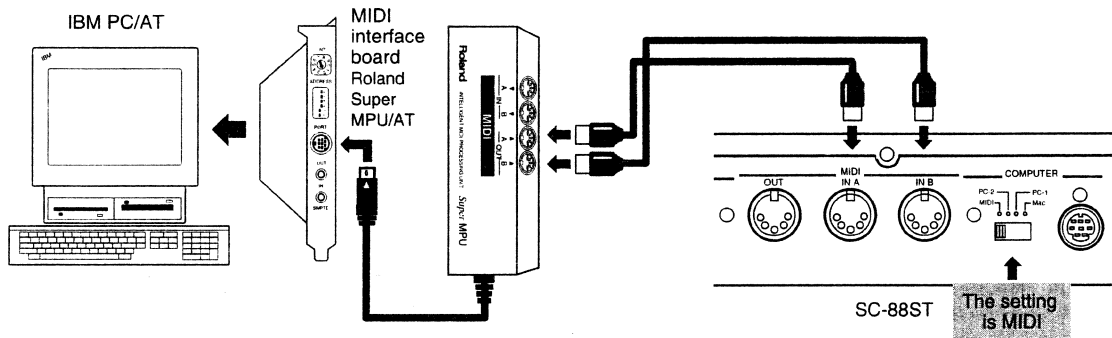
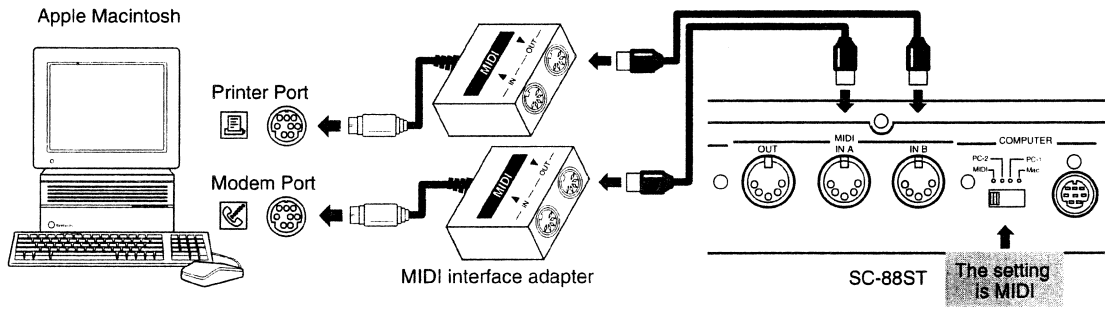
Caution when using the SC-88ST with the IBM PC/AT series

Even if the SC-88ST COMPUTER Connector is connected to your personal computer, it will not operate correctly if the software (MIDI application) is incompatible. Be sure to use software that is compatible with the serial port of the personal computer.



■ Connecting a computer via the MIDI connectors

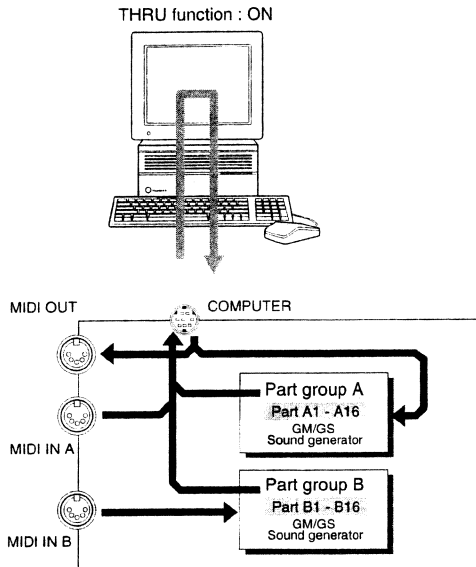
* Set the COMPUTER Switch located on the back of the SC-88ST to MIDI.



■ MIDI data transfer with the computer

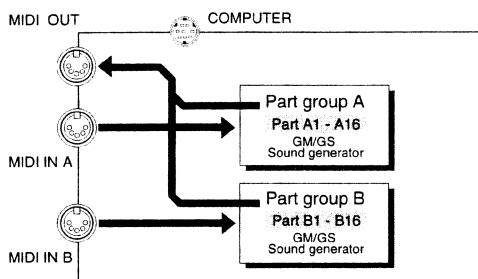
Depending on the setting of the COMPUTER Switch, MIDI data flow will be different as follows .

When the COMPUTER Switch is set to PC-1, PC-2 or Mac



- * In order for data received at MIDI IN A to be sent to the sound generator section, the Thru function of the computer software must be turned on. When thru function is turned on, the data received at MIDI IN A will pass through the computer and be played by the sound generator section. When transmitting MIDI Exclusive data from the sound generator section via the SC-88ST's MIDI OUT connector, it is also necessary for thru function to be on.
- * Data received at MIDI IN B will not be sent to the COMPUTER Connector, but will be passed directly to the sound generator section.
- * The number of sound generator Parts that can be controlled using the COMPUTER Connector will depend on the software you are using. This means that if you are using the COMPUTER Connector, you will not necessarily be able to play 32 Parts. Carefully read the operating manual for your software. Also be aware that although the SC-88ST allows two connectors MIDI IN A and B to be used for 32 Part performance, this may be impossible to achieve depending on your software.

When the COMPUTER Switch is set to MIDI

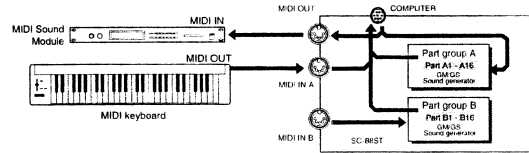


- * Be aware that when the COMPUTER Switch located on the back of the SC-88ST is set to MIDI, data will not be exchanged via the COMPUTER Connector.
- * Exclusive data address settings are explained on p.14.

■ Connecting another MIDI sound source to the SC-88ST

If you wish to connect another MIDI sound source to the SC-88ST's MIDI OUT connector, be aware of the following points.

Computer data received at the COMPUTER Connector will be transmitted from the SC-88ST MIDI OUT connector.



Using MIDI messages to select sounds

By sending MIDI messages from a MIDI keyboard or sequencer, you can remotely select the sound (Instrument) for each Part. When you press a sound select button on a MIDI keyboard, a MIDI message selecting a sound will be transmitted (p.16).

You can also use your personal computer to select SC-88ST sounds. You can specify sounds by inputting the Variation number and the Instrument number (p.33) into your computer program, but depending on your software the way in which numbers are displayed may differ, so be aware of this. On the SC-88ST, Variation numbers begin with 0, and Instrument numbers begin with 1.

Variation numbers correspond to MIDI Bank numbers, and Instrument numbers correspond to MIDI Program numbers.

- * MIDI Bank numbers have an upper (MSB) and lower (LSB) part. Each can specify a number 0 — 127, allowing you to specify 128 x 128 = 16384 banks. The upper part of the Bank number corresponds to the SC-88ST Variation number. The lower part switches between SC-55 and SC-88 sounds. (MIDI Implementation, p.44).
- * For the relation between the sound names and program numbers of your MIDI keyboard, refer to the manual for your MIDI keyboard.
- * If you specify a sound number that the SC-88ST does not have, a sound will not change. Refer to the instrument table on p.33 when selecting sounds.

SC-88 sound map

065	User Tone	...	User Tone	User Tone	User Tone	.....	User Tone	
064	User Tone	...	User Tone	User Tone	User Tone	.....	User Tone	
...	
024	Hard FM EP	...	Hard FM EP	Harp.s.o	...	...	003	Explosion
016	St.FM EP	...	St.FM EP	Harp.s.w	...	...	002	Lasergun
008	Detuned EP 2	...	Detuned EP 2	Couple Hps.	...	...	001	Machine Gun
000	Piano 1	...	E.Piano 2	Harp.sichord	Clav.	...	000	Gun Shot
	001		006	007	008		128	

Variation number

Instrument number

Variation sounds

Capital sounds

- * Variation numbers 64 and 65 of the SC-88 map are where User Instruments (p.54) can be stored. User Instrument settings are made using MIDI Exclusive messages (p.54).
- * When the SC-88ST is turned off, the values set for User Instrument will revert to their defaults.

When creating MIDI messages on a sequencer or personal computer and transmitting them, use the following procedure.

1. **The value of Control Change 0 : MIDI Bank Number (upper) (the SC-88ST Variation number)**
2. **The value of Control Change 32: MIDI Bank Number (lower)**
3. **Program Change value : MIDI Program Number (SC-88ST instrument number)**

1. and 2. are the Bank Select message. Bank Select messages are a type of Control Change message (p.16).

For example if you wish to select the Instrument (Piano3w) of Variation 8, Instrument number 3, you would transmit the following data to the SC-88ST.

(Expressed in decimal notation.)

1. **The value of Control Change 0 : 8 (Bank number (upper) 8; Variation number 8)**
2. **The value of Control Change 32: 0 (always leave this set to 0)**
3. **Program Change value : 2 (Program number 3 : Instrument number 3)**

* Note that the data actually transmitted as the Program number will be one less than the Program number.

(The example above can be expressed in hexadecimal as follows.)

1. **BnH 00H 08H**
2. **BnH 20H 00H**
3. **CnH 02H**

* H indicates that the value is expressed as a hexadecimal number. Decimal 32 is written as hexadecimal 20H.

* n indicates the MIDI channel.

* Note that for MIDI channels and Instrument numbers, the number is one less than the channel or Instrument number. For example if you wish to select a sound on the Part receiving MIDI channel 4, n would be 3. If you wish to select Instrument 3, the value in step 3 would be 2.

The SC-88ST processes the lower part of the bank select message (LSB) as follows (p.44).

Least significant byte (LSB)

- 00H** The setting of the [SC-55 MAP] button is followed. If the front panel [SC-55 MAP] button is lit, SC-55 sounds will be selected, and if the button is dark, SC-88 sounds will be selected.
- 01H** SC-55 sounds will be selected.
- 02H** SC-88 sounds will be selected.

If we use the previous example of selecting the Piano3w sound, if we transmit

1. **BnH 00H 08H**
2. **BnH 20H 02H**
3. **CnH 02H**

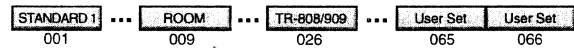
to the SC-88ST, the SC-88 sound Piano3w will be selected. If in step 2 we transmitted BnH 20H 01H, the SC-55 sound Piano3w would be selected.

■ Using MIDI messages to select Drum Sets

You can select Drum Sets by transmitting MIDI Program Change messages from a MIDI keyboard or sequencer, in the same way as you can select Instruments. When a Program Change message is received, the Drum Set will change. Transmit a Program Change message on the channel being received by the Drum Part. With the initial settings, Part 10 is the Drum Part (MIDI receive channel:10). On the SC-88ST, Drum Set numbers correspond to program numbers (p.39).

* Set the note numbers of the rhythm data being played back to match the note numbers of the Drum Set you are using (p.39).

Drum Set name and Drum Set number (Program number)



* SC-88 Drum Set program numbers 65 and 66 are where User Drum Sets (p.54) can be stored. User Drum Set settings are made using MIDI Exclusive messages.

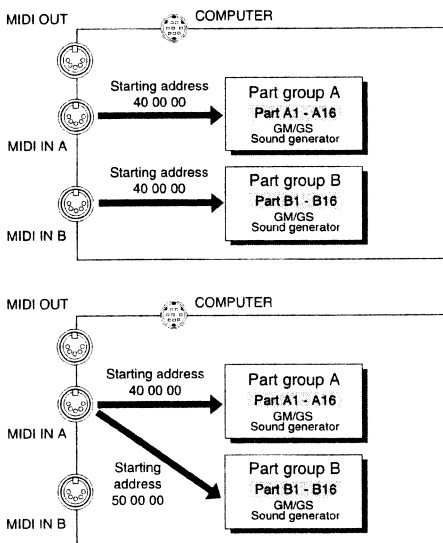
■ Exclusive data addresses

Receiving exclusive data

As listed in "MIDI Implementation" (p.48), the address of MIDI exclusive data (GS format) is defined in units of 16 Parts. In other words, starting from address 40 00 00 are the parameters for 16 Parts. The SC-88ST has data for another 16 Parts, making a total of 32 Parts. For this reason, the SC-88ST's MIDI exclusive data format expands the addressing, and places the remaining 16 Parts at starting address 50 00 00.

In the same way as with channel messages, exclusive data received at MIDI IN A is passed to Group A Parts, and exclusive data received at MIDI IN B is passed to Group B Parts. In other words, exclusive data for the 32 Parts is received using two MIDI IN connectors. If this is done, each MIDI IN receives exclusive data for 16 Parts, so it is not necessary to split up the data into addresses 40 00 00 and 50 00 00.

However it is also possible for the SC-88ST to receive exclusive data for all 32 Parts at a single MIDI IN. In this case it is necessary to use address 50 00 00. For example, the data at starting address 40 00 00 will be passed to Group A Parts, and the data at starting address 50 00 00 received at the same MIDI IN will be passed to Group B Parts. In other words, using starting address 50 00 00 means that the data will be passed to the Parts of the other Group than the MIDI IN that the data was received at.



Transmitting exclusive data

Since the SC-88ST has only one MIDI OUT, the exclusive data transmitted is sent using the two address areas of 40 00 00 and 50 00 00. User instrument data is located at starting areas of 20 00 00.

Chapter 3 MIDI and the SC-88ST

About MIDI

MIDI stands for Musical Instrument Digital Interface. MIDI devices can transmit musically related data such as performance data or data to select sounds. Since MIDI is a worldwide standard, musical data can be sent and received between devices even if they are of different types and were made by different manufacturers. In the MIDI standard, data describing a musical performance such as "play a note" or "press the pedal" are transmitted as MIDI messages.

As long as you are using the SC-88ST to simply play commercially available music data or to provide sound for game software, it is not necessary to know about MIDI. Simply follow the instructions in the manual for your music data playback device (MIDI player) or your software.

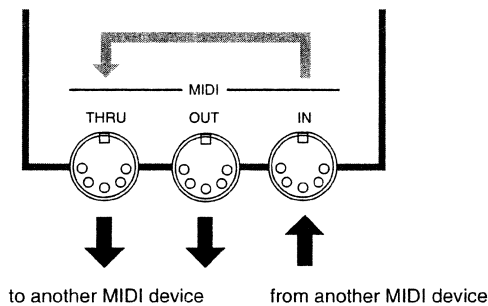
The explanation that follows will help you use MIDI to control the SC-88ST in greater detail.

How MIDI messages are transmitted and received

First we will briefly explain how MIDI messages are transmitted and received.

MIDI connectors

MIDI messages are transmitted and received using three types of connector. Connect MIDI cables to these connectors as appropriate for your setup.



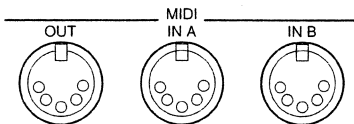
MIDI IN : This connector receives messages from another MIDI device.

MIDI OUT : This connector transmits messages from the SC-88ST.

MIDI THRU : This connector retransmits the messages received at MIDI IN.

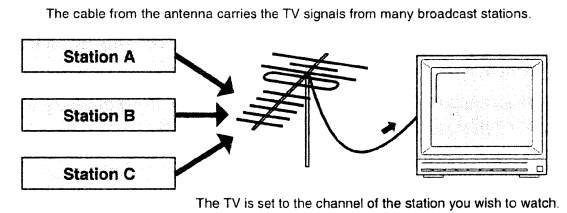
* It is possible to use MIDI THRU to connect two or more MIDI devices, but in practice the limit is 5 units. This is because as the signal path becomes longer, the signal deteriorates and the messages can no longer be received correctly.

* The SC-88ST is not equipped with MIDI THRU connector.



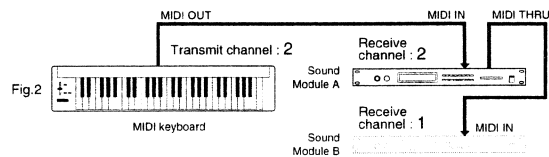
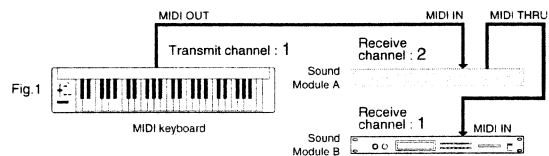
MIDI channels and multi-timbral sound modules

MIDI transmits a wide variety of performance data over a single MIDI cable. This is made possible by MIDI channels. MIDI channels allow specific data to be selected out of a large amount of data. The concept is similar to the idea of TV channels. By changing the channel of a TV receiver you can view the programs of different stations. By setting the channel of the receiver to match the channel of the transmitter, you can receive only the program you wish to watch. In the same way, MIDI allows you to receive data only when the channel of the receiver matches the channel of the transmitter.



MIDI uses sixteen channels, numbered 1 — 16. Music data is received when the transmit channel of the transmitting device matches the receive channel of the receiving device. If you make MIDI channel settings as follows, only sound source B will sound when you play the keyboard, and sound source A will not sound. This is because sound source B matches the transmit channel of the keyboard, but sound source A's channel does not match (Fig.1).

Conversely, if you set the transmit channel of the keyboard to match sound source A, sound source A will sound (Fig.2).



Since the SC-88ST has two MIDI IN connectors, it can receive a total of 32 channels simultaneously. By using 32 channels you can play ensembles of 32 Parts (p.21). Sound sources such as the SC-88ST which are able to simultaneously play many parts are called multi-timbral sound modules. Timbre is a word meaning sound.

The SC-88ST has two types of Parts: Normal Parts and Drum Parts (p.23). Normal Parts are used to play melody or bass lines. On GS/ General MIDI sound sources, the Drum Part uses channel 10.

MIDI messages that can be received by the SC-88ST

MIDI uses many different types of message to transmit musical performance data, and there are many types of MIDI message. For example, information indicating "which key was played how strongly" is transmitted as a Note message.

The way that a device responds when it receives each type of MIDI message (i.e., how it produces sound, etc.) will depend on the specifications of that device. This means that if the receiving device is not able to perform the function requested by the incoming message, the musical result will not be what you expected.

The main types of MIDI message received by the SC-88ST are as follows.

* *MIDI messages for which reception capability is required by the General MIDI system (level 1) are marked by a ☆ sign.*

■ Note messages ☆

These messages convey notes played on the keyboard. They include the following information.

- Note number : a number indicating the note (key) that was pressed or released
- Note on : data indicating that the note (key) was pressed
- Note off : data indicating that the note (key) was released
- Velocity : a number indicating how strongly the note (key) was pressed

Note numbers are a number from 0 — 127 which indicate the keyboard key position, with middle C (C4) as note number 60.

Correspondence between note numbers and note names (p.39).

■ Pitch bend ☆

This is used to transmit message about the operation of the pitch bend wheel (or lever) usually found on synthesizers. Pitch benders can continuously change the pitch of a note over a wide range.

■ Program Change ☆

These messages are used to select sounds. Sounds are selected by a Program numbers 1 — 128. On the SC-88ST, these messages will select sounds (Instruments). By using Bank Select messages (which are a type of Control Change message), an even wider variety of sounds can be selected (p.12).

■ Control Change

These messages control parameters such as modulation and pan. The function of the message is determined by its Control Change number.

Bank Select (control change number 0 / 32)

The tone is changed when used with a Program Change message. The tone is selected with a Program Change message after selecting the Bank Select message.

The tone will not change when only Bank Select message is received.

* *A Program Bank Select function (Tone switching by a combination of Control number 0 / 32 value and Program number) was added to the MIDI standard in 1990. This function significantly increases the number of selectable Tones on the SC-88ST.*

Modulation (control change number 1) ☆

This message controls vibrato.

Volume (control change number 7) ☆

This message controls the volume of a Part. When this message is received the volume of a Part will change.

Expression (control change number 11) ☆

This message conveys volume changes. It can be used to add expression during a song.

* *The volume of a Part will be affected both by Volume messages (control change 7) and by Expression messages (control change 11). If a value of 0 is received for either of these messages, the Part volume will be 0 and will not rise even if the other message is sent with a higher value. Be aware of this.*

Pan (control change number 10) ☆

This message controls the stereo position of a Part. (p.23)

Hold (1) (control change number 64) ☆

This message conveys the up/down movements of the damper pedal, causing the currently sounding notes to be sustained. When a message of Hold On is received, notes will be sustained. In the case of decay-type instruments such as a piano, the sound will decay gradually until a Hold Off message is received. In the case of sustain-type instruments such as an organ, the sound will continue sustaining until a Hold Off message is received.

Sostenuto (control change number 66)

The sostenuto pedal on a piano sustains only the notes which were already sounding at the moment the pedal was pressed. The Sostenuto message conveys the movement of this pedal. When Sostenuto On is received, only the notes which were already on at that moment will be sustained. In the case of decay-type instruments such as a piano, the sound will decay gradually until a Sostenuto Off message is received. In the case of sustain-type instruments such as an organ, the sound will continue sustaining until a Sostenuto Off message is received.

Soft (control change number 67)

The soft pedal on a piano softens the tone during the time the pedal is pressed. The Soft message conveys the movement of this pedal. When Soft On is received, the cutoff frequency will be lowered, causing a softer sound. When Soft Off is received, the previous sound will return.

* *With the initial settings, the SC-88ST will ignore NRPN messages. After a GS Reset message is received, NRPN messages will be received. You can also turn Rx.NRPN on (NRPN Receive Switch, p.23) by using exclusive messages, so that NRPN messages will be received.*

Reverb Send Level (control change number 91)

This message adds a reverb effect to the Part.

Chorus Send Level (control change number 93)

This message adds a chorus effect to the Part.

Delay Send Level (control change number 94)

This message adds a delay effect to the Part.

Portamento (control change number 65)**Portamento Time (control change number 5)****Portamento Control (control change number 84)**

Portamento is an effect that creates a smooth change in pitch between the previously played note and the newly played note. When a Portamento message is received, the portamento effect will be turned on or off. Portamento Time controls the speed of the pitch change. Portamento Control specifies the Source Note number (the previously played note).

RPN LSB, MSB (control change number 100/101) ☆**Data Entry (control change number 6/38) ☆**

Since the function of the RPN (Registered Parameter Number) is defined in the MIDI specification, this message can be used between devices of different types. The RPN MSB and LSB messages specify the parameter which is to be modified, and then Data Entry messages can be used to modify the value of that parameter. RPN can be used to adjust Pitch Bend Sensitivity, Master Coarse Tune, and Master Fine Tune.

* *The values modified using RPN messages will not be initialized even if Program Change messages etc. are received to select other sounds.*

NRPN LSB, MSB (control change number 98/99)**Data Entry (control change number 6/38)**

NRPN (Non-registered Parameter Number) messages can be used to modify the values of sound parameters unique to a particular device. The NRPN MSB and LSB messages specify the parameter which is to be modified, and then Data Entry messages can be used to modify the value of that parameter.

Since the GS format defines the function of several NRPN messages, GS compatible application programs can use NRPN messages to modify sound data parameters for Vibrato, Cutoff Frequency, Resonance, and Envelope values.

* *The values modified using NRPN messages will not be initialized even if Program Change messages etc. are received to select other sounds.*

● Using NRPNs with GS Sound Modules

Included within the various types of Control Changes (often abbreviated as "CC") is an extended range known as NRPNs (non-registered parameter numbers). The NRPNs can be used with GS sound modules to alter various sound parameters, such as those for the vibrato, filters, and envelopes. There are distinct advantages to using Control Changes rather than Exclusive messages when wishing to modify sounds. They are not as complicated, they are easier to handle, and they do not require a large amount of data (p.17, 45). Such Control Change messages include a number (the Control Number) which specifies the type of function that is to be controlled.

The MIDI specifications do not define any specific functions which can be set using NRPNs. This is because the NRPNs are intended to serve as a flexible range of controls which can be assigned whatever parameters are required for a specific device in order to achieve the desired changes in its sounds, or enhance its expressive capabilities. In contrast, there is another type of extended form of control known as an RPN (registered parameter number). As their name suggests, RPN functions are all defined (registered) within the MIDI specifications (p.46).

When using an NRPN, the function (sound parameter) being dealt with needs to be specified by means of the numeric values that are supplied for the NRPN MSB (Controller No. 99) and NRPN LSB (Controller No. 98). By then sending the appropriate value for Data Entry (Controller No. 6), the change in the specified sound parameter is accomplished.

Note that instead of the hexadecimal notation that is used within the "MIDI Implementation" (p.44), the numbers for the combinations of values for NRPNs that appear in the chart below have all been converted to decimal. (Note also that these NRPNs are specific only to GS sound modules.)

NRPN MSB	NRPN LSB	Range	Function
1	8	0-64-127	Vibrato Rate *1 (p.25)
1	9	0-64-127	Vibrato Depth *1 (p.25)
1	10	0-64-127	Vibrato Delay *1 (p.25)
1	32	0-64-127	TVF Cutoff Frequency *1 (p.26)
1	33	0-64-127	TVF Resonance *1 (p.26)
1	99	0-64-127	TVF&TVA Envelope Attack Time *1 (p.26)
1	100	0-64-127	TVF&TVA Envelope Decay Time *1 (p.26)
1	102	0-64-127	TVF&TVA Envelope Release Time *1 (p.26)
24	rr	0-64-127	Drum Instrument Pitch Coarse *1 Alters the pitch of individual percussion instruments in the drum Part.
26	rr	0-127	Drum Instrument TVA Level Alters the volume of individual percussion instruments in the drum Part.
28	rr	0,1-64-127	Drum Instrument Pan Alters the panning for individual percussion instruments in the Drum Part. A setting of "0" provides random panning, while "1" selects the leftmost position, "64" the center, and "127" places it at the rightmost position.
29	rr	0-127	Drum Instrument Reverb Send Level Sets the reverb depth for individual percussion instruments in the Drum Part.
30	rr	0-127	Drum Instrument Chorus Send Level Sets the chorus depth for individual percussion instruments in the Drum Part.
31	rr	0-127	Drum Instrument Delay Send Level Determines the amount of delay for individual percussion instruments in the Drum Part (SC-88ST only)

For example, let's say that you want to alter the TVF Cutoff Frequency. First, you need to assert that it is the TVF Cutoff Frequency that you wish to control by sending the appropriate NRPN MSB and NRPN LSB combination.

The value for Controller No. 99 is the NRPN MSB, and that for Controller No. 98 is the NRPN LSB.

So, you would transmit these values:

Controller No. 99: 1

Controller No. 98: 32

The unit has thus been made aware that it is the TVF Cutoff Frequency that you are going to change. To go ahead and make the actual change, you would then use the Data Entry Control Change message to supply the new value (xx) for the TVF Cutoff Frequency.

Thus, you would send:

Controller No. 6: xx

As a result of transmitting the above three controller values, the TVF Cutoff Frequency will have been altered, and the timbre of the instrument selected for that Part should sound differently.

After altering sound parameters using an NRPN, we recommend that you make a habit of asserting a "null" by sending the RPN values shown below. This will tell the unit that you are finished working with the parameter that has been specified, and that it should stop waiting for any further new values for that parameter. (It cancels the standing request for change in a particular NRPN or RPN.) This way you can avoid having unexpected changes made if any unintended Data Entry values get sent afterwards.

Controller No. 101: 127

Controller No. 100: 127

For the "NRPN LSB rr" value, you need to supply the value which corresponds to the note number of the particular percussion instrument that you want to address (these numbers can be found in the Drum Set Chart at the rear of the manual → p.39).

For example, let's say that you want to set the High Bongo so that no reverb will be applied to it. This instrument is assigned note number 60 (middle C), and is contained in the Standard Set 1 Drum Set.

To accomplish this you would transmit these values:

Controller No. 99: 29

Controller No. 98: 60

Controller No. 6: 0

Note that these MIDI messages need to be sent in the order listed above.

Parameters marked with *1 in the chart at left can be altered in a relative manner, with a value of "0" being the default value. Depending on the particular sound you are working with, the type of change available will be different (in some cases you may not even notice any change). Also, the range of change will vary.

You may need to consult the manual that came with your equipment or software for details on how to properly input and transmit Control Change messages. Note, though, that some devices may only allow you to work with a limited range of controller numbers.

Make sure that you always follow the order shown above when transmitting RPN, NRPN, and Data Entry data. Be careful, since if you insert a multiple number of MIDI messages at the same point in time (or in very close range of each other) when using some types of music software, the messages can sometimes be sent out in an order different than originally intended. To avoid problems, always allow sufficient space between adjacent messages (at least 1 tick at 96 TPQN, and 5 ticks at 480 TPQN).

* TPQN: Ticks Per Quarter Note

* Any value which has been imposed by means of an NRPN will not be initialized even when a different sound is changed to in compliance with a received Program Change. Settings which have been made using NRPNs can only be initialized by sending a GS Reset.

* At the initial settings, the SC-88ST will not respond to NRPN messages. However, after a GS Reset has been received it will recognize NRPNs. Alternately, you can enable recognition of NRPNs by turning on "Rx.NRPN" (NRPN reception switch p.23) through Exclusive messages.

■ Aftertouch (Channel Pressure only ☆)

Aftertouch is a message which conveys the pressure applied to the keyboard after playing a note, so that this information can be used to control various aspects of the sound. There are two types of aftertouch message; Polyphonic Key Pressure which is transmitted separately for each note, and Channel Key Pressure which is transmitted as one value that affects all notes on the specified MIDI channel.

* With the initial settings, Aftertouch messages will have no effect when received by the SC-88ST. In order for Aftertouch messages to do something, you need to set Aftertouch-related parameters. (p.25).

■ All Sounds Off

This message completely turns off the sound of all currently-sounding notes. The sound of the specified channel will be forcibly turned off.

■ All Notes Off ☆

This message causes a Note Off to be sent to each note of the specified channel that is currently on. However if Hold 1 or Sostenuato are on, the sound will continue until these are turned off.

■ Reset All Controllers ☆

This message returns controller values to their initial settings. The following controller values for the specified channel will be reset to their initial values.

Controller	Initial value
Pitch Bend	0 (center)
Polyphonic Key Pressure	0 (minimum)
Channel Pressure	0 (minimum)
Modulation	0 (minimum)
Expression	127 (maximum)
Hold	0 (off)
Portamento	0 (off)
Soft	0 (off)
Sostenuto	0 (off)
RPN	number unset
NRPN	number unset

* Parameter values that were modified using RPN or NRPN will not change even when a Reset All Controller message is received.

■ Active Sensing

This message is used to check for broken MIDI connections, such as MIDI connectors that have been pulled out or MIDI cables that have been broken. The SC-88ST transmits Active Sensing messages from MIDI OUT at specific intervals. Once an Active Sensing message is received at MIDI IN, Active Sensing monitoring will begin, and if an Active Sensing message fails to arrive for more than 420 msec, it is assumed that the cable has been disconnected. If this happens, all currently sounding notes will be turned off, the same procedure will be executed as if a Reset All Controllers message was received, and Active Sensing monitoring will stop.

■ System Exclusive messages

Exclusive messages are used to control functions which are unique to specific devices. Although Universal System Exclusive messages can be used even between devices of different manufacturers, most exclusive messages cannot be used between devices of different types or different manufacturers.

In order to recognize the device for which the data is intended, Roland exclusive messages contain a manufacturer ID, device ID and model ID.

The SC-88ST model ID is 42H. The device ID is 10H (fixed).

General MIDI System On ☆ (Universal System Exclusive)

When General MIDI System On is received, the unit will be set to the basic General MIDI settings. Also, NRPN Bank Select messages will no longer be received after General MIDI System On is received. The beginning of song data bearing the General MIDI logo contains a General MIDI System On message. This means that if you playback the data from the beginning, the sound generator device will be automatically initialized to the basic settings.

GS Reset (GS Format System Exclusive)

When GS Reset is received, the unit will be set to the basic GS settings. Also, NRPN messages specified in the GS format can be received after GS Reset is received. The beginning of song data bearing the GS logo contains a GS System Reset message. This means that if you playback the data from the beginning, the sound generator device will be automatically initialized to the basic settings.

Master Volume (Universal System Exclusive)

This is an exclusive message common to all MIDI devices that controls the master volume of all Parts.

Other exclusive messages

The SC-88ST can receive GS format exclusive messages (model ID 42H) that are common to all GS sound generators. Exclusive messages can be used to store SC-88ST settings or to make fine adjustments to parameters.

For details of the exclusive message transmitted and received by the SC-88ST, refer to the explanation on p.46 and following.

■ About MIDI implementation charts

MIDI has made it possible for a wide variety of devices to exchange information, but it is not always true that all types of MIDI messages can be exchanged between all types of devices. For example, if you use a synthesizer as a master device to control a digital piano, the pitch bender (the lever or wheel that modifies the pitch) of the synthesizer will have no effect on the sound of the piano.

The important thing to keep in mind when using MIDI is that the slave device must be able to 'understand' what the master is 'saying'. In other words, the MIDI messages must be common to both master and slave.

To help you quickly determine what types of MIDI messages can be exchanged between master and slave, the Operation Manual of each MIDI device includes a MIDI Implementation chart. By looking at this chart, you can quickly see what messages the device is able to transmit and receive. The left side of the chart lists the names of a variety of MIDI messages, and the Transmission and Reception columns use " o " and " x " marks to indicate whether or not each of these messages can be transmitted or received. This means that a specific MIDI message can be exchanged only if there is an " o " in both the Transmission column of the master and the Reception column of the slave device. MIDI implementation charts are standardized, so you can fold the charts from two manuals together to see at a glance how the two devices will communicate.

A detailed explanation concerning the data format used for Exclusive messages, and the implementation of MIDI used on the SC-88ST, can be found starting on P.44.

The General MIDI System and GS Format

■ What is the General MIDI System?

The General MIDI System is a universal set of specifications for sound generating devices. These specifications seek to allow for the creation of music data which is not limited to equipment by a particular manufacturer or to specific models.

The General MIDI System defines things such as the minimum number of voices that should be supported, the MIDI messages that should be recognized, which sounds correspond to which Program Change numbers, and the layout of rhythm sounds on the keyboard. Thanks to these specifications, any device that is equipped with sound sources supporting the General MIDI System will be able to accurately reproduce General MIDI Scores (music data created for the General MIDI System), regardless of the manufacturer or model.

■ What is the GS Format?

The GS Format is a standardized set of specifications for Roland's sound sources which defines the manner in which multi-timbral sound generating units will respond to MIDI messages. The GS Format also complies with the General MIDI System. The GS Format also defines a number of other details. These include unique specifications for sounds and the functions available for Tone editing and effects (chorus and reverb), and other specifications concerning the manner in which sound sources will respond to MIDI messages.

Any device that is equipped with GS Format sound sources can faithfully reproduce GS Music Data (music data created under the GS Format).

The SC-88ST supports both General MIDI and GS. Music data which carries either of these logos can be accurately reproduced.

Chapter 4 Structure of the SC-88ST

Parts and sounds

The SC-88ST is able to produce 32 different types of sound at once. An instrument such as the SC-88ST that can simultaneously produce many sounds from a single unit is called a multi-timbral sound generator. A Timbre is an instrumental sound. Being able to simultaneously play 32 sounds means that you can use 32 different instruments at once. In other words, you can create an orchestra-like ensemble of 32 musical parts. In the SC-88ST, the sound selected for each Part is called an Instrument. (Instrument chart, p.33) You can assign the sounds you want to each of 32 Parts to create your own ensemble.

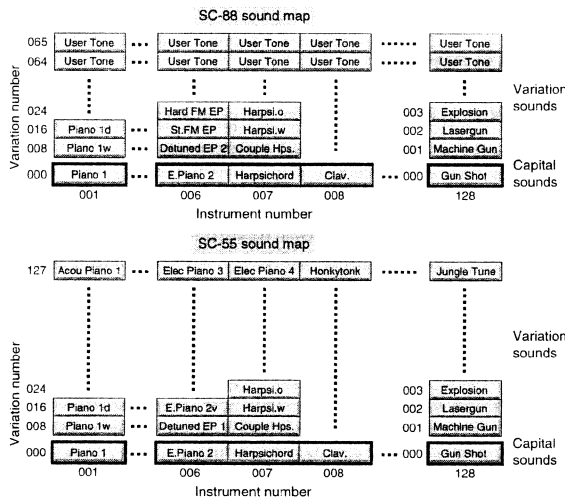
There are two types of Parts: Normal Parts and Drum Parts. We refer to this difference as the Part mode (p.23). Normal Parts are used for playing melody or bass lines. Drum Parts are used for playing percussion instruments (p. 39).

* For details about MIDI and Part Mode, refer to p.15, 23.

■ Reading the Instrument numbers and Variation numbers

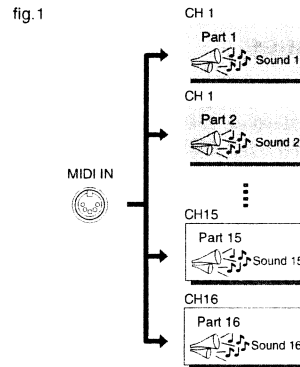
Each sound (Instrument) of the SC-88ST has two numbers; an Instrument number and a Variation number. Sounds with Variation number 000 are Capitals, and the sounds with numbers other than 000 are Variations.

* Variation numbers 64 and 65 of the SC-88 map are where User Instruments (p.54) can be stored. User Instrument settings are made using MIDI Exclusive messages (p.54). When the SC-88ST is turned off, the values set for User Instrument will revert to their defaults.



■ Part Channels

To each of the SC-88ST's 32 Parts, there is assigned an instrument and also a Channel. Channels are a concept used in MIDI to distinguish notes that should be played by different instruments in an ensemble. Normally, there is no need to change the channel of a Part when using the SC-88ST. However it may sometimes be interesting to set two Parts to the same channel so that two sounds will simultaneously play the same musical line (Fig.1). To change the MIDI channel of a Part, use System Exclusive Message (p. 51).

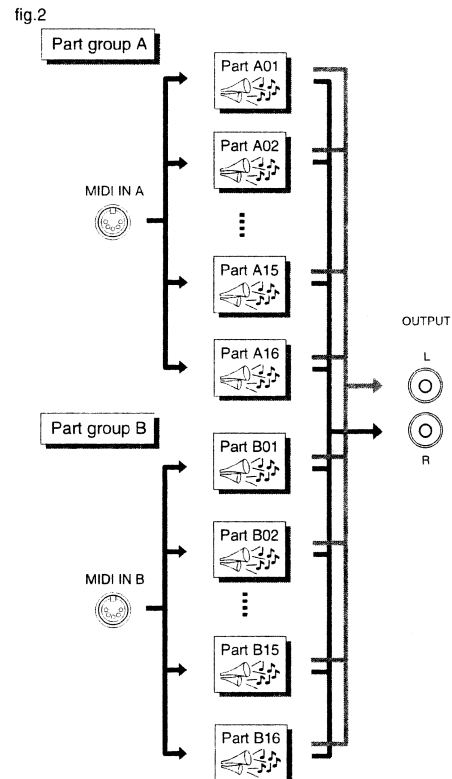


■ Which MIDI IN will be used by each Part?

The SC-88ST has two MIDI IN jacks. This is because since there are only 16 MIDI channels, it is necessary to have two MIDI jacks in order to play 32 Parts (Fig.2).

Parts are classified into Group A (A01 — A16) and Group B (B01 — B16), with sixteen in each group. The MIDI channels assigned to the Parts also are organized into groups A and B (A01 - A16, B11 - B16). Groups A and B correspond to the SC-88ST's two MIDI IN jacks A and B. In other words, MIDI messages received at MIDI IN A are sent to the group A Parts, and MIDI messages received at MIDI IN B are sent to the group B Parts. For example, a MIDI message on channel 5 received at MIDI IN B will sound Part B05 (with the initial settings).

* Exclusive messages received at MIDI IN A can be passed on to Parts of group B, depending on the specified address. (p.14)



■ How simultaneous note numbers and Voices are related

The sounds of the SC-88ST consist of units called "Voices". There is a limit to how many of these "Voices" can sound at once, and in the case of the SC-88ST, up to 64 simultaneous voices can be used. Some sounds (Instruments) use 1 voice and others use 2 voices (Instrument table, p.33). The main reason that some sounds use 2 voices is to allow different timbres to be produced by different velocity values.

If more than 64 voices are used at once, later-sounded notes will be given priority, and notes sounded previously will be turned off starting from the oldest. If you use only single-voice instruments, you will be able to play 64 notes simultaneously, but if some of the instruments are 2-voice, you will be able to play less than 64 simultaneous notes. Even if a MIDI Note Off message (p.16) is received, voices will be used for as long as the sound is heard. Be aware of this especially in the case of sound with a long release (p.26).

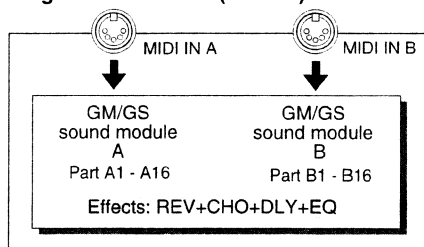
* If song data created with 64 voice playback in mind is played back on a sound source with fewer voices, some notes will drop out, and the musical result will not be as it should. The SC-55 has 24 voices, and the SC-55mkII has 28 voices.

Using the SC-88ST as two sound modules

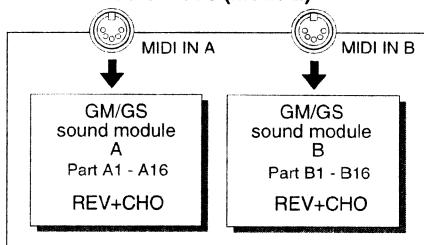
The SC-88ST has two modes of operation: Single Module Mode (Mode 1) and Double Module Mode (Mode 2). When Double Module Mode is selected, two types of effect can be used simultaneously. For example, you could use different types of reverb on Drum Parts than on Normal Parts. Other parameters can also be set separately in two groups. Normally the SC-88ST is in Single Module Mode.

To switch the mode, use System Exclusive Message (p.47). Be aware that if you change the operating mode, the settings of each Part will be initialized(GS Reset).

Single Module Mode (Mode 1)



Double Module Mode (Mode 2)



In both Single Module Mode and Double Module Mode, MIDI messages received at MIDI IN A are sent to Group A Parts, and MIDI messages received at MIDI IN B are sent to Group B Parts (p.21). It is possible to specify the address for Exclusive messages so that an Exclusive message received at MIDI IN A will be passed to Group B Parts. (p.14)

In Double Module Mode, two groups are provided for the following parameters.

Master Level.....	(p.27)
Master Pan.....	(p.27)
Master KEY SHIFT.....	(p.27)
Master Tune.....	(p.27)
Reverb Macro.....	(p.28)
Reverb Character.....	(p.29)
Reverb Pre-LPF (Reverb Pre Lowpass Filter).....	(p.29)
Reverb Level.....	(p.29)
Reverb Time.....	(p.29)
Reverb Delay Feedback.....	(p.29)
Chorus Macro.....	(p.28)
Chorus Pre-LPF (Chorus Pre-Lowpass Filter).....	(p.29)
Chorus Level.....	(p.29)
Chorus Feedback (Chorus Feedback Level).....	(p.29)
Chorus Delay (Chorus Delay Time).....	(p.29)
Chorus Rate.....	(p.29)
Chorus Depth.....	(p.29)
Chorus Send Level To Reverb.....	(p.29)

Initialize

The SC-88ST is initialized when the power is turned on.

■ Initialize for General MIDI/GS

When you wish to playback song data carrying the GS /General MIDI logo, you need to initialize the SC-88ST for GS /General MIDI settings (GS Reset, General MIDI System On p.46). When this is done, the SC-88ST will be set to the basic GS /General MIDI settings appropriate for playing back song data carrying the GS /General MIDI logo.

The beginning of song data carrying the GS /General MIDI logo contains data which requests the sound source to initialize itself (GS Reset, General MIDI System On p.46). This means that if you are playing back the song data from the beginning, initialization will be done automatically

Chapter 5 Parameters

Part parameters for performance

These parameters determine how each Part behaves when it receives MIDI messages. The way in which the sound changes in response to messages such as velocity, pitch bend, modulation and aftertouch will be determined by the settings of these parameters.

In this chapter, we provide a general description of each of the parameters.

For instructions on how to make settings, please refer to the MIDI Implementation (p. 44).

The range shown in this chapter is the same as that shown in the "Description" column of the MIDI Implementation.

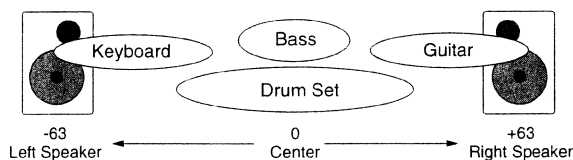
■ What each parameter does

LEVEL (Volume level): 0 — 127

This parameter adjusts the volume of each Part. Higher values result in a louder sound.

PAN (Panning): Rnd(-64), -63 — 0 — +63

Pan refers to the position in the stereo field. For example, you might place the drum set and bass in the center, the guitar at the right, and the keyboard at the left. To place the sound in the center, set this value to 0. As the - (minus) number decreases the sound will move further to the left, and as the + (plus) number increases the sound will move further to the right. With a setting of Random (-64), each note will be placed at an unpredictable location.



- * In the case of a Drum Set, the pan position has been fixed for each percussion instrument. Adjusting the Pan of a Drum Set will shift the overall set to left or right.
- * For some instruments, some sound may be heard from the opposite speaker even if Pan has been set fully left or right.
- * If your amp/speaker system is mono, Pan will have no effect.
- * The Random setting can only be made using exclusive messages. Control Change messages cannot be used to make this setting.

KEY SHIFT: -24 — ±0 — +24: semitone steps, 2 octaves

This parameter transposes the Part. As the value increases (decreases) the pitch will rise (fall) in steps of a semitone. 12 steps make a difference of 1 octave. With a setting of 0 the pitch will not be affected.

USE FOR RHYTHM PART (Part Mode): OFF/MAP1/MAP2

For Parts which are playing conventional instrument sounds, select OFF (Normal mode). For Parts which are playing percussion or drums, select MAP1 or MAP2. Drum Parts play a different sound (Instrument) for each different MIDI note number. In other words, a single Part can play many different percussion instrument sounds (List of drum sets p.39).

The MAP1 and MAP2 Parts allow you to simultaneously use two drum sets. For example if Drum Parts are set as shown below, when you change the STANDARD1 drum set of Part A10 to the TR-808/909Set, the selection for Part A12 will also change to TR-808Set. For details on how to assign a drum set to a Part, refer to p.51.

Part name	(USE FOR RHYTHM PART)	Name of drum set
Part A10	(MAP1) :	STANDARD
Part A11	(MAP2) :	JAZZ
Part A12	(MAP1) :	STANDARD

Mono/Poly Mode: Mono/Poly

If a Part is set to Mono (Mono Mode), that Part will play only one note at a time. It is effective to select Mono Mode for parts that are playing a naturally monophonic instrument such as a trumpet or sax. Select Poly Mode for Parts that are playing chords.

* For a Drum Set, changing the Mono/Poly Mode setting will not affect the sound.

Fine Tune: -100.0 — +100.0 cent

Use this parameter when you wish to make fine adjustments to the tuning of a Part. Positive (+) settings will raise the pitch, and negative (-) settings will lower the pitch. If two or more Parts are set to the same MIDI channel and the same sound, you can spread their Fine Tuning settings apart to add rich depth and breath to the sound.

- * To adjust the pitch of all Parts, use the Master Tune parameter .
- * To transposes the Part, use the KEY SHIFT parameter (p.23).

Rx Bank SELECT (Bank Select Receive Switch): On/Off

To remotely select SC-88ST sounds from another MIDI device, you can send Bank Select messages and Program Change messages to the SC-88ST. If Rx Bank Select is turned on, these MIDI messages can select Variation sounds (p.21). If this parameter is turned off, MIDI messages cannot select Variation sounds or User sounds (they will select Capital sounds).

Rx NRPN (NRPN Receive Switch): On/Off

NRPN (Non-registered Parameter Number p.17) messages allow you to modify vibrato, filter and envelope values (p.25, 26) via MIDI. If Rx NRPN is on, these sound parameters can be modified by MIDI messages. If Rx NRPN is off, this will not be possible.

- * When General MIDI System On is received, Bank Select Receive Switch and NRPN Receive Switch will be turned off.
- * When GS Reset is received, Bank Select Receive Switch and NRPN Receive Switch will be turned on.

Chapter 5

Pitch Bend Sensitivity: ±0 — +24

When you move the pitch bend lever or pitch bend wheel of a MIDI keyboard, pitch bend messages are transmitted to modify the pitch. The Pitch Bend Sensitivity setting determines the maximum range of pitch change that will result from incoming pitch bend messages. At a setting of 12, the pitch can be modified through a range of 1 octave. At a setting of 24, the pitch can be modified through a range of 2 octaves. At a setting of 0, pitch bend messages will have no effect.

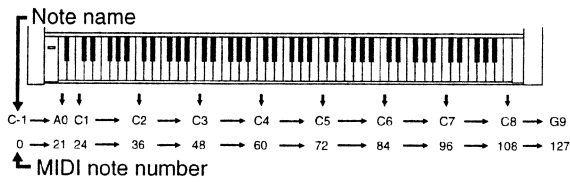
MOD. LFO1 PITCH DEPTH: 0 — 600 cent

When you move the modulation lever or modulation wheel of a MIDI keyboard, modulation messages are transmitted to control effects such as vibrato (with the initial settings). Vibrato is an effect that adds expression to the sound by cyclically varying the pitch. The MOD. LFO1 PITCH DEPTH setting determines the maximum effect of incoming modulation messages. Higher values will allow more modulation to be applied. At a setting of 0, modulation messages will have no effect.

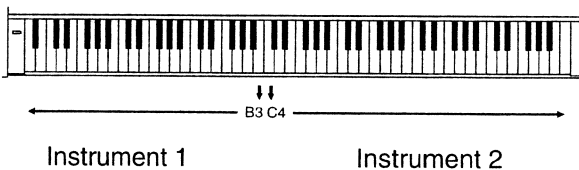
Key Range Low: C-1 — G9

Key Range High: C-1 — G9

The Key Range parameters determine the pitch range over which the instrument will be sounded. Key Range Low (the lowest note) and Key Range High (the highest) note will determine the range of notes that will sound. You can specify a value between C-1 and G9 (0 — 127), and middle C is C4 (60)



For example, if you assign two Parts to the same MIDI channel and set the Key Range of one to C-1 — B3 and the other to C4 — G9. Then you could assign different sounds to each Part, and play two different sounds on either side of C4. Or, you could set the keyboard ranges of two Parts to overlap, and layer the two sounds.



Velocity Sense Depth: 0 — 127

Velocity Sense Offset: 0 — 127

The force with which you play a note on MIDI keyboard is transmitted as MIDI Velocity data. Strongly played notes will have a higher velocity value. The Velocity Sense Depth and Velocity Sense Offset parameters determine the relation between the force of your keyboard playing and the loudness of the sound that results.

If Velocity Sense Depth is increased, small differences in your playing dynamics will make a large difference in the loudness of the sound (Fig.3). If Velocity Sense Depth is decreased, even large differences in your playing dynamics will make only a small difference in the loudness of the sound (Fig.2).

If Velocity Sense Offset is set higher than 64, even softly played notes (i.e., notes with a low velocity) will be sounded loudly (Fig.5). If Velocity Sense Offset is set lower than 64, even strongly played notes (i.e., notes with a high velocity) will be sounded softly (Fig.4).

* For some settings, there may be no sound. If so, increase Velocity Sense Depth or Velocity Sense Offset.

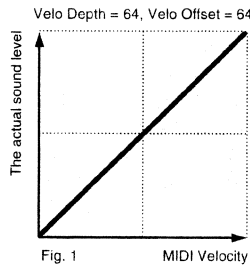


Fig. 1

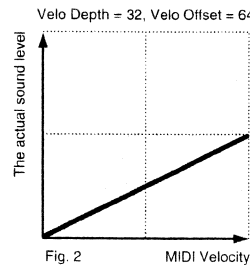


Fig. 2

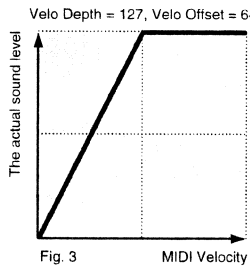


Fig. 3

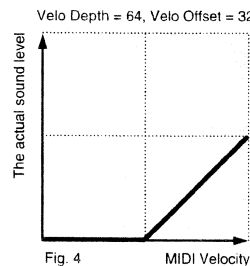


Fig. 4

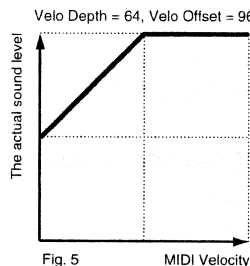


Fig. 5

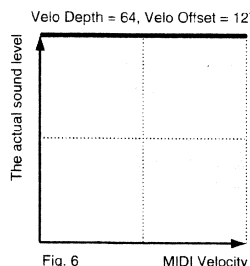


Fig. 6

CAf LFO Rate

(Channel Aftertouch Rate): -64 — +63

CAf LFO Pitch

(Channel Aftertouch Pitch Depth): 0 — 127

CAf LFO TVF

(Channel Aftertouch TVF Depth): 0 — 127

CAf LFO TVA

(Channel Aftertouch TVA Depth): 0 — 127

On some MIDI keyboards, pressing down on the keyboard after playing a note causes a message called Aftertouch to be transmitted. (Channel Aftertouch is also called Channel Pressure.) The SC-88ST can respond to incoming aftertouch messages by modifying the way in which pitch, timbre or volume are cyclically changed by the LFO to add expression to the sound.

When the LFO modulates the pitch, the result is vibrato (cyclical variation in pitch). When the LFO modulates the TVF, the result is a growl effect (cyclic variation in timbre). When the LFO modulates the TVA, the result is tremolo (cyclic variation in volume).

TVF : Time Variant Filter

TVA : Time Variant Amplifier

LFO : Low Frequency Oscillator

CAf LFO Rate adjusts the frequency of the LFO, controlling the speed of the modulation. Higher values result in faster modulation.

CAf LFO Pitch adjusts the depth of the vibrato controlled by aftertouch. Higher values result in more vibrato.

CAf LFO TVF adjusts the depth of the growl effect controlled by aftertouch. Higher values result in more growl.

CAf LFO TVA adjusts the depth of the tremolo effect controlled by aftertouch. Higher values result in more tremolo.

If each of these values are set to 0, there will be no effect.

* With the initial settings, incoming aftertouch messages will have no effect. If you want aftertouch to have an effect, you must modify the above parameters. Also you need to make sure that your MIDI keyboard is able to transmit aftertouch messages.

Part parameters for sound editing

On the SC-88ST, you can modify the values of a variety of parameters in order to create the sound most suitable for your playing. A "parameter" is something that affects the sound. The process of modifying parameter values is called "editing." Sound parameters affect the volume, timbre and pitch of the sound.

What each parameter does

On the SC-88ST, parameter settings are made for each Part. In other words, parameter values belong to Parts, and not to sounds (Instruments). For example if you set Vibrato Rate to +20 and then select a different sound for that Part, the Vibrato Rate of +20 will apply to the newly selected sound (not the initial value of ± 0). In this way, parameters belonging to Parts are called Part Parameters.

■ Vibrato

Vibrato is an effect created by modulating the pitch. Applying vibrato makes the sound more expressive.

Vibrato Rate: -64 — +63

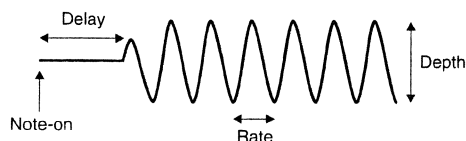
This parameter adjusts the speed (frequency) of the pitch modulation. Positive (+) settings make the pitch modulation faster, and negative (-) settings make it slower.

Vibrato Depth: -64 — +63

This parameter adjusts the depth of the pitch modulation. Positive (+) settings make the pitch modulation deeper, and negative (-) settings make it shallower.

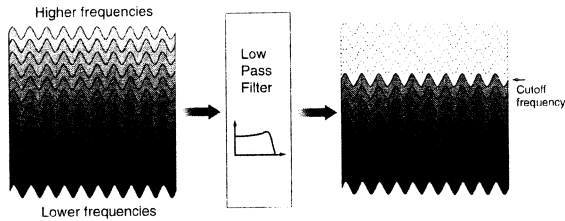
Vibrato Delay: -64 — +63

This parameter adjusts the time required for the vibrato effect to begin. Positive (+) settings increase the time before vibrato will begin, and negative settings shorten the time.



Filter

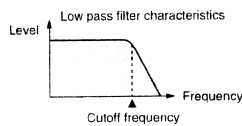
By modifying the filter settings, you can control the timbre (tone) of the sound. The type of filters in the SC-88ST are called Low Pass Filters, and allow only frequencies lower than a specified frequency to pass. This frequency is called the Cutoff Frequency. By modifying the setting of the Cutoff Frequency you can make the sound brighter or darker. The Cutoff Frequency can change over time, controlled by the "envelope". By adjusting the filter and envelope settings, you can create sounds that have movement and expression.



TVF Cutoff Freq (Cutoff Frequency): -64 — +63

Positive settings of TVF Cutoff Freq will raise the cutoff frequency. Negative settings will lower the cutoff frequency. As you set this value higher in the positive direction, more overtones will be allowed to pass, and the sound will become harder (brighter). The further this value is set in the negative direction, the fewer overtones will be allowed to pass, and the sound will become softer (darker).

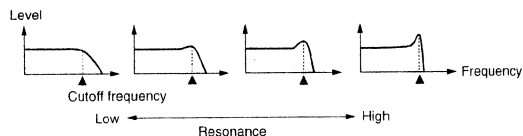
* For some sounds, positive (+) settings of Cutoff Freq will cause no noticeable change in the sound.



TVF Resonance: -64 — +63

When the TVF Resonance value is increased, the overtones in the area of the cutoff frequency will be emphasized, creating a sound with a strong character.

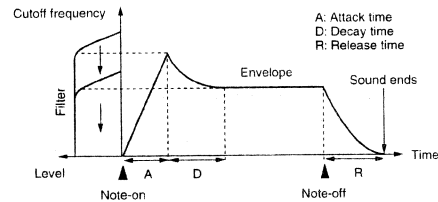
* For some sounds, negative (-) settings of Resonance will cause no noticeable change in the sound.



Envelope

The volume of an instrument changes with time, from the moment the note begins to sound to when it disappears. This change can be indicated on a graph as shown in the following diagram. This shape is unique to each instrument, and is an important element in how we distinguish sounds we hear. This shape is called the "envelope." The envelopes of musical instrument sounds can change depending on how

the instrument is played. For example if a trumpet is played sharply and strongly, the attack will be quick and the sound will be sharp. But if a trumpet is played lightly and softly, the attack will be softer. In order to adjust the attack of a sound, we can modify the Attack Time of the envelope. By modifying the values of the envelope we can simulate the characteristics of many different instruments.



The envelope shape that we create in this way will also affect the way in which the cutoff frequency changes. If the cutoff frequency had been lowered, it will rise as the envelope rises, and will fall as the envelope falls.

TVF & TVA Env.attack (Attack time): -64 — +63

This parameter adjusts the sharpness of the beginning of the sound.

TVF & TVA Env.decay(Decay Time): -64 — +63

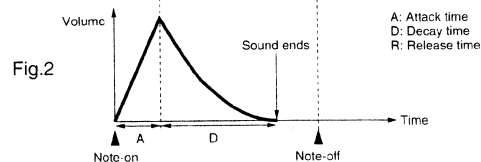
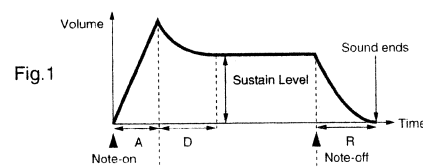
This parameter adjusts the time over which the sound will fall from the highest point of the attack down to the sustain level (Fig.1).

* Some sounds have a sustain level of 0 (Fig.2). Piano and guitar sounds are in this category.

TVF & TVA Env.release(Release Time): -64 — +63

This parameter adjusts the time over which the sound will decay after the note is released until it is no longer heard. The cutoff frequency will also fall according to this.

* For some sound, modifying the various Time settings of the envelope will cause no noticeable change in the sound.



Setting parameters common to all Parts

Here's how to make settings for parameters that are common to all Parts.

■ How each parameter works

Master Volume level: 0 — 127

This parameter adjusts the volume of all the Parts. As the value increases, the volume will increase. The basic volume level of the entire SC-88ST is adjusted by the Volume knob. If the volume knob is at minimum position, there will be no sound even if you increase this parameter.

Master Pan: - 63 — 0 — + 63

This parameter sets the Pan (stereo position) for all the Parts. As the - (minus) value decreases the sound will move further left, and as the + (plus) value increases the sound will move further right.

* *For some instruments, a bit of sound may be heard from the opposite speaker even if Pan has been set fully left or right.*

* *If you are listening to the SC-88ST in mono, Pan settings will have no effect.*

Master Key Shift

: -24 — ±0 — +24 semitone steps, 2 octaves

Key Shift adjusts the pitch of the sound in semitone steps. For example if you are singing along with sequence data, you can adjust Key Shift to move the song to the key most comfortable for your voice. As the value rises (falls) one step, the pitch will rise (fall) one semitone. This means that 12 steps equal one octave.

* *Even if you adjust Key Shift for all Parts, the pitch of the Drum Part will not be affected.*

Master Tune: -100.0 — 0 — +100.0 cent

When you are playing in an ensemble with other instruments or need to set the SC-88ST to match the pitch of another instrument, adjust the Master Tune setting.

Chapter 6 Effects

Effect settings

The effects of the SC-88ST include 8 types of reverb and chorus, and 10 types of delay. In addition, for each of these effects you can specify parameter values such as character, depth, rate and time. Reverb is an effect that adds reverberation to a sound, as you would hear in a concert hall. Chorus broadens the spatial image of the sound, adding depth and richness. Delay creates echoes. It is also possible to give depth and width to a sound by adding a short delay to the original sound. For these effects, you can set the overall level for all Parts and also individual levels for each Part.

The SC-88ST has a two-band equalizer (high range, low range). An equalizer lets you boost or cut specified frequency ranges of a sound to adjust the tone. For each range, high and low, you can specify the frequency and the amount of boost or cut (gain).

■ Reverb/Chorus/Delay/Equalizer parameter functions

Reverb MACRO

Reverb is an effect that adds reverberation to a sound, as you would hear in a concert hall. You can choose from 8 types of reverb.

Room1 Room2 Room3

These reverbs simulate the reverberation of a room. They provide a well-defined spacious reverberation.

Hall1 Hall2

These reverbs simulate the reverberation of a concert hall. They provide a deeper reverberation than the Room reverbs.

Plate

This simulates a plate reverb (a studio device using a metal plate).

Delay

This is a conventional delay that produces echo effects.

Panning Delay

This is a special delay in which the delayed sounds move left and right. It is effective when you are listening in stereo.

Chorus MACRO

Chorus broadens the spatial image of the sound, adding depth and richness. You can choose from 8 types of chorus.

Chorus1 Chorus2 Chorus3 Chorus4

These are conventional chorus effects that add spaciousness and depth to the sound.

Feedback Chorus

This is a chorus with a flanger-like effect and a soft sound.

Flanger

This is an effect sounding somewhat like a jet airplane taking off and landing.

Short Delay

This is a delay with a short delay time.

Short Delay (FB)

This is a short delay with many repeats.

Delay MACRO

Delay creates echoes. It is also possible to give depth and width to a sound by adding a short delay to the original sound. You can choose from 10 types of delay.

Delay1 Delay2 Delay3

These are conventional delays. 1, 2 and 3 have progressively longer delay times.

Delay4

This is a delay with a rather short delay time.

Pan Delay1 Pan Delay2 Pan Delay3

The delay sound moves between left and right. This is effective when listening in stereo. 1, 2 and 3 have progressively longer delay times.

Pan Delay4

This is a rather short delay with the delayed sound moving between left and right. It is effective when listening in stereo.

Dly ToRev

Reverb is added to the delay sound which moves between left and right. It is effective when listening in stereo.

PanRepeat

The delay sound moves between left and right, but the pan positioning is different than the effects listed above. It is effective when listening in stereo.

* *Delay cannot be used when Double Module Mode (p.22) is selected.*

EQ Low Freq.

(Equalizer Low Frequency): 200, 400 Hz

EQ High Freq.

(Equalizer High Frequency): 3, 6 kHz

These parameters set the cutoff frequencies of the ranges boosted or cut by the equalizer.

EQ Low Gain

(Equalizer Low Gain): -12 — 0 — +12dB

EQ High Gain

(Equalizer High Gain): -12 — 0 — +12dB

Specify the amount of boost or cut (gain) for the high frequency range (high) and the low frequency range (low). Positive (+) settings will boost, and negative (-) settings will cut.

* *With a Gain setting of 0, the equalizer will have no effect.*

* *The Equalizer cannot be used when Double Module Mode (p.22) is selected.*

* *The Equalizer gain settings are common to all Parts. They cannot be set independently for individual Parts.*

When you change the Reverb/Chorus/Delay MACRO, the following parameter values will automatically change. This is so that the parameter values will have the settings most appropriate for the selected Effect Type. You can modify the values to adjust the effect to your taste.

■ Reverb parameters

Reverb Character : 0 — 7

This parameter selects the type of reverb. 0 — 5 are reverb effects, and 6 and 7 are delay effects.

Reverb Pre - LPF : 0 — 7

A low pass filter can be applied to the sound coming into the reverb to cut the high frequency range. Higher values will cut more of the high frequencies, resulting in a more mellow reverberation.

Reverb Level : 0 — 127

This parameter sets the amount of the reverberant sound. Higher values result in louder reverberation.

Reverb Time : 0 — 127

This parameter sets the time over which the reverberation will continue. Higher values result in longer reverberation.

Reverb Delay Feedback : 0 — 127

This parameter is used when the Reverb Type is set to Rev Charac. 6, 7 Delay or Panning Delay. It sets the way in which delays repeat. Higher values result in more delay repeats.

Reverb Pre-Delay Time : 0ms — 127ms

This parameter sets the delay time until the reverberant sound is heard. Higher values result in a longer pre-delay time, simulating a larger reverberant space.

* *Delay cannot be used when Double Module Mode (p.22) is selected.*

■ Chorus parameters

Chorus Pre - LPF : 0 — 7

A low pass filter can be applied to the sound coming into the chorus to cut the high frequency range. Higher values will cut more of the high frequencies, resulting in a more mellow chorus sound.

Chorus Level : 0 — 127

This parameter sets the amount of the chorus sound.

Chorus Feedback Level : 0 — 127

This parameter sets the level at which the chorus sound is re-input (feed back) into the chorus. By using feedback, a denser chorus sound can be created. Higher values result in a greater feedback level.

Chorus Delay Time : 0 — 127

This parameter sets the delay time of the chorus effect.

Chorus Rate : 0 — 127

This parameter sets the speed (frequency) at which the chorus sound is modulated. Higher values result in faster modulation.

Chorus Depth : 0 — 127

This parameter sets the depth at which the chorus sound is modulated. Higher values result in deeper modulation.

Chorus Send Level To Reverb : 0 — 127

This parameter sets the amount of chorus sound that will be sent to the reverb. Higher values result in more sound being sent.

Chorus Send Level To Delay : 0 — 127

This parameter sets the amount of chorus sound that will be sent to the delay. Higher values result in more sound being sent.

* *Chorus Send Level To Delay cannot be used when Double Module Mode (p.22) is selected.*

■ Delay parameters

Delay Pre - LPF : 0 — 7

A low pass filter can be applied to the sound coming into the delay to cut the high frequency range. Higher values will cut more of the high frequencies, resulting in a more mellow delay sound.

Delay Time Center : 0.1ms — 1.0s

The delay effect of the SC-88ST allow you to set three delay times; center, left and right (when listening in stereo). Delay Time Center sets the delay time of the delay located at the center.

Delay Time Ratio Left : 4% — 500%

This parameter sets the delay time of the delay located at the left as a percentage of the Delay Time Center. (up to a max. of 1.0s)

Delay Time Ratio Right : 4% — 500%

This parameter sets the delay time of the delay located at the right as a percentage of the Delay Time Center. (up to a max. of 1.0s)

Delay Level Center : 0 — 127

This parameter sets the volume of the central delay. Higher values result in a louder center delay.

Delay Level Left : 0 — 127

This parameter sets the volume of the left delay. Higher values result in a louder left delay.

Delay Level Right : 0 — 127

This parameter sets the volume of the right delay. Higher values result in a louder right delay.

Delay Level : 0 — 127

This parameter sets the overall volume of the three delays (center, left and right). Higher values result in a louder overall delay.

Delay Feedback : -64 — 0 — +63

This parameter affects the number of times the delay will repeat. With a value of 0, the delay will not repeat. With higher values there will be more repeats. With negative (-) values, the center delay will be fed back with inverted phase. Negative values are effective with short delay times.

Delay Send Level To Reverb : 0 — 127

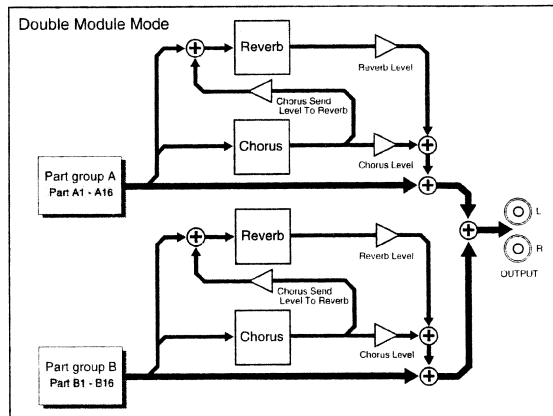
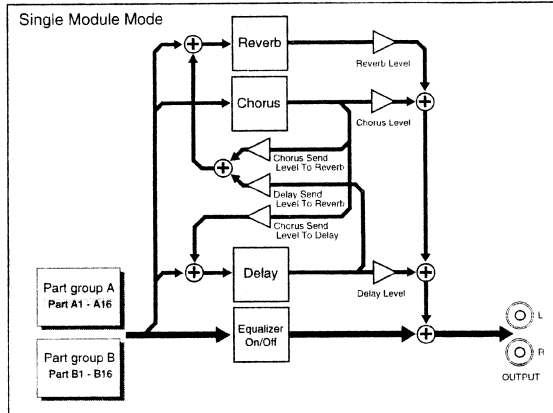
This parameter sets the amount of delay sound that is sent to the reverb. Higher values result in more sound being set.

* Delay cannot be used when Double Module Mode (p.22) is selected.

■ About the SC-88ST's effect structure

The SC-88ST effects that are available are somewhat different depending on whether you have selected Single Module Mode or Double Module Mode. In Double Module Mode, you cannot use the equalizer or delay, but you can simultaneously use two sets each of reverb and chorus. This is useful when you wish to apply different effects or settings to different Parts.

* For details of Single and Double modes, refer to p22.



Chapter 7 Appendix

Troubleshooting

If the SC-88ST does not function in the way you expect, first check the following points. If this does not resolve the problem, consult your dealer or a nearby Service Station (listed at the end of this manual).

● Cannot turn the power on

- Is the AC adaptor correctly plugged into an outlet?

● No sound

- Is the power turned on for the other devices connected to the SC-88ST?
- Is the volume knob turned all the way down?
- Have you incorrectly connected the MIDI IN and OUT connectors? (p.8,11)
- Can you hear sound through headphones? If you can hear sound through headphones, the problem may be that the audio cable transmitting the sound to the other devices is broken or incorrectly connected, or that there is a problem with your mixer/amp/speaker system.
- Does the part monitor indicator of the SC-88ST flash? If does, the SC-88ST is receiving MIDI messages correctly. Check the volume knob position and the cable connections once again.
- Has the Expression pedal etc. on a connected MIDI device turned the volume down?
- Is the rear panel COMPUTER Switch set to the correct position for the software you are using? (p.10) After changing the position of the COMPUTER Switch you must turn on the SC-88ST power once again.

● A specific Part does not sound

- Does the MIDI Receive channel of the Part match the MIDI Transmit channel of the connected MIDI device? (p.21)

● A specific keyboard area does not sound

- Has the Keyboard Range been set? (p.24)

● Cannot select the desired sound

- Are you sending an incorrect Program number? (p.12, 13)

● Sound is distorted

- If a specific sound or Part is distorted, lower the volume level of that Part.
- If all sounds are distorted, lower the overall volume level of all Parts, or use the Volume knob to lower the volume level.

● Pitch is incorrect

- Is the pitch of a specific Part incorrect? (p.23)
- Is the pitch of all Parts incorrect by a semitone or more? (p.27)

- Is the pitch of a specific Part incorrect by a semitone or more? (p.23)
- Has a MIDI Pitch Bend message been received to change the pitch? Return the pitch bend lever or wheel to the central position. Or, transmit a Pitch Bend message with the central value (40 00H).

● Sound is wrong

- Have you selected another sound after modifying sound parameter settings (filter, etc.)? Restore all sound parameter settings to a value of 0. (p.25, 26)

● Sounds are interrupted

- If you attempt to play more than 64 voices at once, sounds will be interrupted. (p.22)
- Is the same data being sent simultaneously to MIDI IN A and MIDI IN B?

● The SC-88ST does not transmit MIDI data

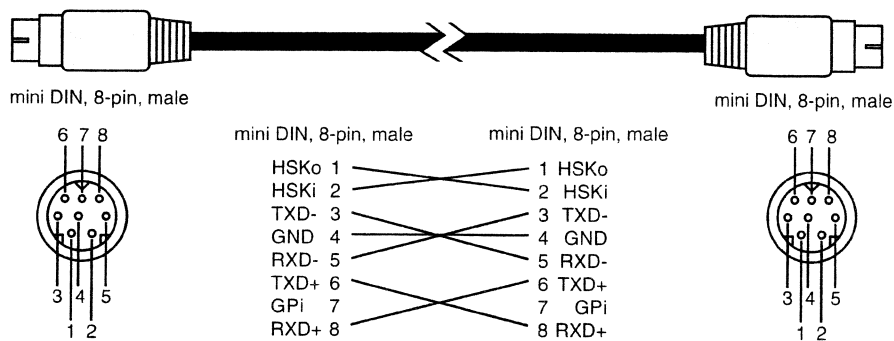
- If you wish to transmit SC-88ST data via the COMPUTER Connector, set the COMPUTER Switch to PC-1, PC-2 or Mac, depending on the software you are using. (p.10)
- When the rear panel COMPUTER Switch is set to MIDI, the SC-88ST will not transmit data from the COMPUTER Connector.

● MIDI sound sources connected to the SC-88ST are not played from a computer or sequencer

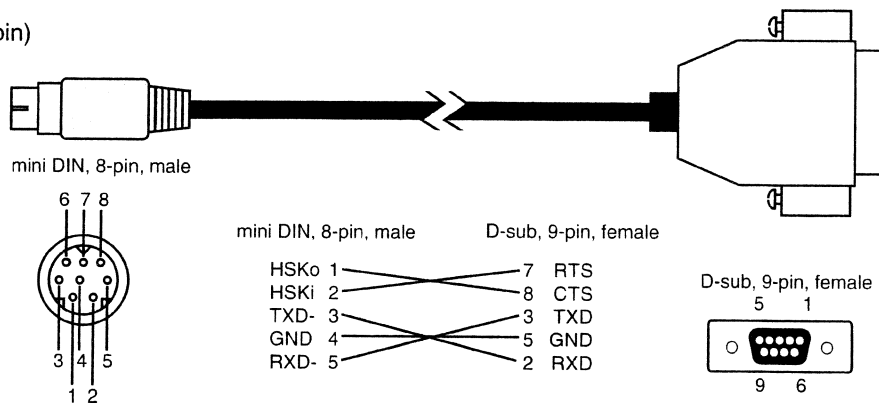
- Music data received at the SC-88ST COMPUTER Connector is transmitted from the MIDI OUT connector, but you need to set the COMPUTER Switch to PC-1, PC-2 or Mac depending on your software. (p.10)

COMPUTER Cable wiring diagrams

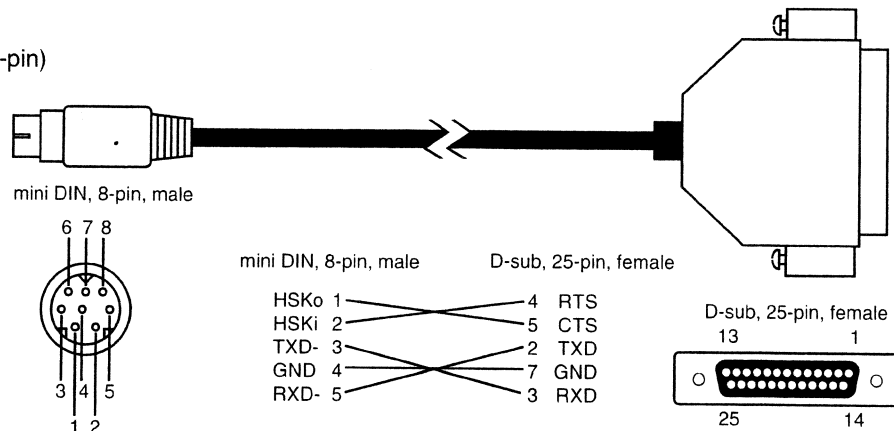
For Apple Macintosh



For IBM PC/AT (9-pin)



For IBM PC/AT (25-pin)



Instrument list

SC-88 MAP (1)

SC-88 MAP					PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark
PC	CC00	Instrument	No. of voices	Remark										
Piano														
001	000	Piano 1	1		028	000	Clean Gt.	1		028	000	Clean Gt.	1	
	008	Piano 1w	1			008	Chorus Gt.	2		029	000	Muted Gt.	1	
	016	Piano 1d	1			001	Muted Dis.Gt	1			001	Muted Dis.Gt	1	
002	000	Piano 2	1			008	Funk Pop	1			008	Funk Pop	1	
	008	Piano 2w	1			016	Funk Gt.2	1		030	000	Overdrive Gt	1	
003	000	Piano 3	1			017	60's Organ 1	1		031	000	DistortionGt	1	
	001	EG+Rhodes 1	2			018	60's Organ 2	1			001	Dist. Gt2	2	
	002	EG+Rhodes 2	2			024	Cheese Organ	1			002	Dazed Guitar	2	
	008	Piano 3w	1			032	Organ 4	1			008	Feedback Gt.	2	
004	000	Honky-tonk	2			033	Even Bar	2			009	Feedback Gt2	2	
	008	Old Upright	2			040	Organ Bass	1			016	Power Guitar	2	
005	000	E.Piano 1	2		018	000	Organ 2	1			017	Power Gt.2	2	
	008	St.Soft EP	2			001	Organ 201	2			018	5th Dist.	2	
	016	FM+SA EP	2			008	Detuned Or.2	2			024	Rock Rhythm	2	
	024	60's E.Piano	1			032	Organ 5	2			025	Rock Rhythm2	2	
	025	Hard Rhodes	2		019	000	Organ 3	2	*		000	Gt.Harmonics	1	*
	026	MellowRhodes	2			008	Rotary Org.	1		032	008	Gt. Feedback	1	*
006	000	E.Piano 2	2			016	Rotary Org.S	1			016	Ac.Gt.Harmnx	1	
	008	Detuned EP 2	2			024	Rotary Org.F	1		Bass				
	016	St.FM EP	2		020	000	Church Org.1	1		033	000	Acoustic Bs.	2	
	024	Hard FM EP	2			008	Church Org.2	2		034	000	Fingered Bs.	1	
007	000	Harpsichord	1			016	Church Org.3	2			001	Fingered Bs2	2	
	008	Coupled Hps.	2	*		024	Organ Flute	1			002	Jazz Bass	1	
	016	Harpsi.w	1			032	Trem.Flute	2		035	000	Picked Bass	1	
	024	Harpsi.o	2			021	Reed Organ	1	*		008	Mute PickBs.	1	
008	000	Clav.	1		022	000	Accordion Fr	1		036	000	Fretless Bs.	1	
Chromatic percussion						008	Accordion It	2			001	Fretless Bs2	2	
009	000	Celesta	1	*		023	000	Harmonica	1		002	Fretless Bs3	2	
010	000	Glockenspiel	1			001	Harmonica 2	2			003	Fretless Bs4	2	
011	000	Music Box	1			024	000	Bandoneon	1		004	Syn Fretless	2	
012	000	Vibraphone	1			Guitar					005	Mr.Smooth	2	
	001	Hard Vibe	2		025	000	Nylon-str.Gt	1		037	000	Slap Bass 1	1	
	008	Vib.w	1	*		008	Ukulele	1			008	Reso Slap	1	
013	000	Marimba	1			016	Nylon Gt.o	2		038	000	Slap Bass 2	2	
	008	Marimba w	1			024	Velo Harmnix	1		039	000	Synth Bass 1	2	
	016	Barafon	1			032	Nylon Gt.2	1			001	SynthBass101	1	*
	017	Barafon 2	1			040	Lequint Gt.	1			008	Acid Bass	1	
	024	Log drum	1		026	000	Steel-str.Gt	1			009	TB303 Bass	1	
014	000	Xylophone	1			008	12-str.Gt	2			010	Tekno Bass	2	
015	000	Tubular-bell	1	*		009	Nylon+Steel	2			016	Reso SH Bass	1	
	008	Church Bell	1	*		016	Mandolin	2						
	009	Carillon	1	*		032	Steel Gt.2	1						
016	000	Santur	1	*	027	000	Jazz Gt.	1	*					
	001	Santur 2	2			001	Mellow Gt.	2						
	008	Cimbalom	2			008	Pedal Steel	1						

PC : program number (Instrument number)
 CC00 : value of controller number 0 (Bank number, Variation number)
 Instrument : sound name
 No. of voices : number of voices used by the Instrument
 Remark * : same sound as SC-55 map
 Remark ** : a percussive sound which cannot be played melodically. Use near C4 (note number 60).

SC-88 MAP (2)

PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark
040	000	Synth Bass 2	2		056	000	OrchestraHit	2		Pipe				
	001	SynthBass201	2			008	Impact Hit	2		073	000	Piccolo	1	
	002	Modular Bass	2			009	Philly Hit	2		074	000	Flute	1	
	003	Seq Bass	2			010	Double Hit	2		075	000	Recorder	1	*
	008	Beef FM Bass	2			016	Lo Fi Rave	2		076	000	Pan Flute	2	
	009	X Wire Bass	2		Brass						008	Kawala	2	
	016	Rubber Bass	2	*	057	000	Trumpet	1		077	000	Bottle Blow	2	
	017	SH101 Bass 1	1			001	Trumpet 2	1		078	000	Shakuhachi	2	*
	018	SH101 Bass 2	1			008	Flugel Horn	1		079	000	Whistle	1	*
	019	Smooth Bass	2			024	Bright Tp.	2		080	000	Ocarina	1	*
						025	Warm Tp.	2		Synth lead				
Strings / orchestra					058	000	Trombone	1		081	000	Square Wave	2	*
041	000	Violin	1			001	Trombone 2	2	*		001	Square	1	*
	008	Slow Violin	1		059	000	Tuba	1			002	Hollow Mini	1	
042	000	Viola	1			001	Tuba 2	1			003	Mellow FM	2	
043	000	Cello	1		060	000	MutedTrumpet	1			004	CC Solo	2	
044	000	Contrabass	1		061	000	French Horns	1			005	Shmoog	2	
045	000	Tremolo Str	1			001	Fr.Horn 2	2	*		006	LM Square	2	
	008	Slow Tremolo	1			008	Fr.Horn Solo	1			008	Sine Wave	1	*
	009	Suspense Str	2			016	Horn Orch	2		082	000	Saw Wave	2	*
046	000	PizzicatoStr	1		062	000	Brass 1	1	*		001	Saw	1	*
047	000	Harp	1			008	Brass 2	2			002	Pulse Saw	2	
048	000	Timpani	1			016	Brass Fall	1			003	Feline GR	2	
Ensemble					063	000	Synth Brass1	2			004	Big Lead	2	
049	000	Strings	1			001	Poly Brass	2			005	Velo Lead	2	
	001	Strings 2	1			008	Synth Brass3	2	*		006	GR-300	2	
	008	Orchestra	2			009	Quack Brass	2			007	LA Saw	1	
	009	Orchestra 2	2			016	Octave Brass	2			008	Doctor Solo	2	*
	010	Tremolo Orch	2		064	000	Synth Brass2	2	*		016	Waspy Synth	2	
	011	Choir Str.	2			001	Soft Brass	2		083	000	Syn.Calliope	2	*
	016	St.Strings	2			008	Synth Brass4	1	*		001	Vent Synth	2	
	024	Velo Strings	2			016	Velo Brass 1	2			002	Pure PanLead	2	
050	000	Slow Strings	1			017	Velo Brass 2	2		084	000	Chiffer Lead	2	*
	001	SlowStrings2	1		Reed					085	000	Charang	2	*
	008	Legato Str.	2		065	000	Soprano Sax	1			008	Dist.Lead	2	
	009	Warm Strings	2		066	000	Alto Sax	1		086	000	Solo Vox	2	*
	010	St.Slow Str.	2			008	Hyper Alto	1		087	000	5th Saw Wave	2	*
051	000	Syn.Strings1	2		067	000	Tenor Sax	2			001	Big Fives	2	
	001	OB Strings	2			008	BreathyTenor	1		088	000	Bass & Lead	2	*
	008	Syn.Strings3	2	*	068	000	Baritone Sax	1			001	Big & Raw	2	
052	000	Syn.Strings2	2	*	069	000	Oboe	1			002	Fat & Perky	2	
053	000	Choir Aahs	1		070	000	English Horn	1		Synth pad, etc.				
	008	St.Choir	2		071	000	Bassoon	1		089	000	Fantasia	2	*
	009	Mello Choir	2		072	000	Clarinet	1			001	Fantasia 2	2	
	032	Choir Aahs 2	1	*		008	Bs Clarinet	1		090	000	Warm Pad	1	*
054	000	Voice Oohs	1	*							001	Thick Pad	2	
055	000	SynVox	1	*							002	Horn Pad	2	
	008	Syn.Voice	2								003	Rotary Strng	2	
											004	Soft Pad	2	

SC-88 MAP (3)

PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark	
091	000	Polysynth	2	*	103	000	Echo Drops	1	*	118	000	Melo. Tom 1	1	* **	
	001	80's PolySyn	2			001	Echo Bell	2	*		001	Real Tom	2	**	
092	000	Space Voice	1	*		002	Echo Pan	2	*		008	Melo. Tom 2	1	* **	
	001	Heaven II	2			003	Echo Pan 2	2			009	Rock Tom	2	**	
093	000	Bowed Glass	2	*		004	Big Panner	2		119	000	Synth Drum	1	* **	
094	000	Metal Pad	2	*		005	Reso Panner	2			008	808 Tom	2	**	
	001	Tine Pad	2			006	Water Piano	2			009	Elec Perc	1	* **	
	002	Panner Pad	2		104	000	Star Theme	2	*	120	000	Reverse Cym.	1	* **	
095	000	Halo Pad	2	*		001	Star Theme 2	2			001	Reverse Cym2	1	**	
096	000	Sweep Pad	1	*		Ethnic, etc.					008	Rev.Snare 1	1	**	
	001	Polar Pad	1		105	000	Sitar	1	*		009	Rev.Snare 2	1	**	
	008	Converge	1			001	Sitar 2	2	*		016	Rev.Kick 1	1	**	
	009	Shwimmer	2			002	Detune Sitar	2			017	Rev.ConBD	1	**	
	010	Celestial Pd	2			008	Tambra	1			024	Rev.Tom 1	1	**	
						016	Tamboura	2			025	Rev.Tom 2	1	**	
Synth SFX					106	000	Banjo	1		SFX					
097	000	Ice Rain	2	*		001	Muted Banjo	1		121	000	Gt.FretNoise	1	*	
	001	Harmo Rain	2			008	Rabab	2			001	Gt.Cut Noise	1	* **	
	002	African wood	2			016	Gopichant	2			002	String Slap	1	* **	
	008	Clavi Pad	2			024	Oud	2			003	Gt.CutNoise2	1	**	
098	000	Soundtrack	2	*		107	000	Shamisen	1	*		004	Dist.CutNoiz	1	**
	001	Ancestral	2			001	Tsugaru	2			005	Bass Slide	1	**	
	002	Prologue	2		108	000	Koto	1	*		006	Pick Scrape	1	**	
	008	Rave	2			008	Taisho Koto	1		122	000	Breath Noise	1	*	
099	000	Crystal	2	*		016	Kanoon	2			001	Fl.Key Click	1	* **	
	001	Syn Mallet	1	*		109	000	Kalimba	1		123	000	Seashore	1	* **
	002	Soft Crystal	2			110	000	Bagpipe	1			001	Rain	1	* **
	003	Round Glock	2			111	000	Fiddle	1	*		002	Thunder	1	* **
	004	Loud Glock	2			112	000	Shanai	1	*		003	Wind	1	* **
	005	GlockenChime	2			001	Shanai 2	1			004	Stream	2	* **	
	006	Clear Bells	2			008	Pungi	1			005	Bubble	2	* **	
	007	ChristmasBel	2			016	Hichiriki	2		124	000	Bird	2	* **	
	008	Vibra Bells	2			Percussive					001	Dog	1	* **	
	009	Digi Bells	2		113	000	Tinkle Bell	1	*		002	Horse-Gallop	1	* **	
	016	Choral Bells	2			008	Bonang	1			003	Bird 2	1	* **	
	017	Air Bells	2			009	Gender	1			004	Kitty	1	**	
	018	Bell Harp	2			010	Gamelan Gong	1			005	Growl	1	**	
	019	Gamelimba	2			011	St.Gamelan	2		125	000	Telephone 1	1	* **	
100	000	Atmosphere	2	*		016	RAMA Cymbal	1			001	Telephone 2	1	* **	
	001	Warm Atmos	2			114	000	Agogo	1		002	DoorCreaking	1	* **	
	002	Nylon Harp	2			008	Atarigane	1			003	Door	1	* **	
	003	Harpvox	2			115	000	Steel Drums	1	*		004	Scratch	1	* **
	004	HollowReleas	2			116	000	Woodblock	1	* **		005	Wind Chimes	2	* **
	005	Nylon+Rhodes	2			008	Castanets	1	* **		007	Scratch 2	1	**	
	006	Ambient Pad	2		117	000	Taiko	1	* **						
101	000	Brightness	2	*		008	Concert BD	1	* **						
102	000	Goblin	2	*											
	001	Goblinson	2												
	002	50's Sci-Fi	2												

PC : program number (Instrument number)
 CC00 : value of controller number 0 (Bank number, Variation number)
 Instrument : sound name
 No. of voices : number of voices used by the Instrument
 Remark * : same sound as SC-55 map
 Remark ** : a percussive sound which cannot be played melodically. Use near C4 (note number 60).

SC-55 MAP (1)

PC	CC00	Instrument	No. of voices	Remark	SC-55 MAP	PC	CC00	Instrument	No. of voices	Remark
126	000	Helicopter	1	* **	SC-55 MAP PC CC00 Instrument No. of voices Remark Piano 001 000 Piano 1 1 008 Piano 1w 1 016 Piano 1d 1 002 000 Piano 2 1 008 Piano 2w 1 003 000 Piano 3 1 008 Piano 3w 1 004 000 Honky-tonk 2 008 HonkyTonk w 2 005 000 E.Piano 1 1 008 Detuned EP1 2 016 E.Piano 1v 2 024 60s E.Piano 1 006 000 E.Piano 2 1 008 Detuned EP2 2 016 E.Piano 2v 2 007 000 Harpsichord 1 008 Coupled Hps 2 016 Harpsi.w 1 024 Harpsi.o 2 008 000 Clav. 1 Chromatic percussion 009 000 Celesta 1 010 000 Glockenspl 1 011 000 Music Box 1 012 000 Vibraphone 1 008 Vib.w 1 013 000 Marimba 1 008 Marimba w 1 014 000 Xylophone 1 015 000 Tubularbell 1 008 Church Bell 1 009 Carillon 1 016 000 Santur 1 Organ 017 000 Organ 1 1 008 Detuned Or1 2 016 60's Organ1 1 032 Organ 4 2 018 000 Organ 2 1 008 Detuned Or2 2 032 Organ 5 2 019 000 Organ 3 2 020 000 Church Org1 1 008 Church Org2 2 016 Church Org3 2	021	000	Reed Organ	1	
	001	Car-Engine	1	* **		022	000	Accordion F	2	
	002	Car-Stop	1	* **			008	Accordion I	2	
	003	Car-Pass	1	* **		023	000	Harmonica	1	
	004	Car-Crash	2	* **		024	000	Bandoneon	2	
	005	Siren	1	* **		Guitar				
	006	Train	1	* **		025	000	Nylon Gt.	1	
	007	Jetplane	2	* **			008	Ukulele	1	
	008	Starship	2	* **			016	Nylon Gt.o	2	
	009	Burst Noise	2	* **			032	Nylon Gt.2	1	
127	000	Applause	2	* **		026	000	Steel Gt.	1	
	001	Laughing	1	* **			008	12-str.Gt	2	
	002	Screaming	1	* **			016	Mandolin	1	
	003	Punch	1	* **		027	000	Jazz Gt.	1	
	004	Heart Beat	1	*			008	Hawaiian Gt	1	
	005	Footsteps	1	* **		028	000	Clean Gt.	1	
	006	Applause 2	2	**			008	Chorus Gt.	2	
128	000	Gun Shot	1	* **		029	000	Muted Gt.	1	
	001	Machine Gun	1	* **			008	Funk Gt.	1	
	002	Lasergun	1	* **			016	Funk Gt.2	1	
	003	Explosion	2	* **		030	000	OverdriveGt	1	
						031	000	Dist.Gt.	1	
							008	Feedback Gt	2	
						032	000	Gt.Harmonix	1	
							008	Gt.Feedback	1	
						Bass				
						033	000	Acoustic Bs	1	
						034	000	Fingered Bs	1	
						035	000	Picked Bass	1	
						036	000	Fretless Bs	1	
						037	000	Slap Bass 1	1	
						038	000	Slap Bass 2	1	
						039	000	Syn.Bass 1	1	
							001	Syn.Bass101	1	
							008	Syn.Bass 3	1	
						040	000	Syn.Bass 2	2	
							008	Syn.Bass 4	2	
							016	Rubber Bass	2	
						Strings / orchestra				
					041	000	Violin	1		
						008	Slow Violin	1		
					042	000	Viola	1		
					043	000	Cello	1		
					044	000	Contrabass	1		
					045	000	Tremolo Str	1		
					046	000	Pizzicato	1		
					047	000	Harp	1		
					048	000	Timpani	1		

SC-55 MAP (2)

PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark	PC	CC00	Instrument	No. of voices	Remark
Ensemble					Synth lead					Percussive				
049	000	Strings	1		081	000	Square Wave	2		113	000	Tinkle Bell	1	
	008	Orchestra	2			001	Square	1		114	000	Agogo	1	
050	000	SlowStrings	1			008	Sine Wave	1		115	000	Steel Drums	1	
051	000	SynStrings1	1		082	000	Saw Wave	2		116	000	Woodblock	1	**
	008	SynStrings3	2			001	Saw	1			008	Castanets	1	**
052	000	SynStrings2	2			008	Doctor Solo	2		117	000	Taiko	1	**
053	000	Choir Aah	1		083	000	SynCalliope	2			008	Concert BD	1	**
	032	Choir Aahs2	1		084	000	ChifferLead	2		118	000	Melo. Tom 1	1	**
054	000	Voice Oohs	1		085	000	Charang	2			008	Melo. Tom 2	1	**
055	000	SynVox	1		086	000	Solo Vox	2		119	000	Synth Drum	1	**
056	000	Orchest.Hit	2		087	000	5th Saw	2			008	808 Tom	1	**
Brass					088	000	Bass & Lead	2			009	Elec Perc	1	**
057	000	Trumpet	1		Synth pad, etc.					120	000	Reverse Cym	1	**
058	000	Trombone	1		089	000	Fantasia	2		SFX				
	001	Trombone 2	2		090	000	Warm Pad	1		121	000	Gt.FretNoiz	1	
059	000	Tuba	1		091	000	Polysynth	2			001	Gt.CutNoise	1	**
060	000	MuteTrumpet	1		092	000	Space Voice	1			002	String Slap	1	**
061	000	French Horn	2		093	000	Bowed Glass	2		122	000	BreathNoise	1	
	001	Fr.Horn 2	2		094	000	Metal Pad	2			001	Fl.KeyClick	1	**
062	000	Brass 1	1		095	000	Halo Pad	2		123	000	Seashore	1	**
	008	Brass 2	2		096	000	Sweep Pad	1			001	Rain	1	**
063	000	Syn.Brass 1	2		Synth SFX						002	Thunder	1	**
	008	Syn.Brass 3	2		097	000	Ice Rain	2			003	Wind	1	**
	016	Analog Brs1	2		098	000	Soundtrack	2			004	Stream	2	**
064	000	Syn.Brass 2	2		099	000	Crystal	2			005	Bubble	2	**
	008	Syn.Brass 4	1			001	Syn Mallet	1		124	000	Bird	2	**
	016	Analog Brs2	2		100	000	Atmosphere	2			001	Dog	1	**
Reed					101	000	Brightness	2			002	HorseGallop	1	**
065	000	Soprano Sax	1		102	000	Goblin	2			003	Bird 2	1	**
066	000	Alto Sax	1		103	000	Echo Drops	1		125	000	Telephone 1	1	**
067	000	Tenor Sax	1			001	Echo Bell	2			001	Telephone 2	1	**
068	000	BaritoneSax	1			002	Echo Pan	2			002	Creaking	1	**
069	000	Oboe	1		104	000	Star Theme	2			003	Door	1	**
070	000	EnglishHorn	1		Ethnic, etc.						004	Scratch	1	**
071	000	Bassoon	1		105	000	Sitar	1			005	Wind Chimes	2	**
072	000	Clarinet	1			001	Sitar 2	2		126	000	Helicopter	1	**
Pipe					106	000	Banjo	1			001	Car-Engine	1	**
073	000	Piccolo	1		107	000	Shamisen	1			002	Car-Stop	1	**
074	000	Flute	1		108	000	Koto	1			003	Car-Pass	1	**
075	000	Recorder	1			008	Taisho Koto	2			004	Car-Crash	2	**
076	000	Pan Flute	1		109	000	Kalimba	1			005	Siren	1	**
077	000	Bottle Blow	2		110	000	Bagpipe	1			006	Train	1	**
078	000	Shakuhachi	2		111	000	Fiddle	1			007	Jetplane	2	**
079	000	Whistle	1		112	000	Shanai	1			008	Starship	2	**
080	000	Ocarina	1								009	Burst Noise	2	**
										127	000	Applause	2	**
											001	Laughing	1	**
											002	Screaming	1	**
											003	Punch	1	**
											004	Heart Beat	1	
											005	Footsteps	1	**
										128	000	Gun Shot	1	**
											001	Machine Gun	1	**
											002	Lasergun	1	**
											003	Explosion	2	**

PC : program number (Instrument number)
 CC00 : value of controller number 0 (Bank number, Variation number)
 Instrument : sound name
 No. of voices : number of voices used by the Instrument
 Remark * : same sound as SC-55 map
 Remark ** : a percussive sound which cannot be played melodically. Use near C4 (note number 60).

SC-55 MAP (3)

CM-64				CM-64				CM-64			
PC	CC00	Instrument	No. of voices	PC	CC00	Instrument	No. of voices	PC	CC00	Instrument	No. of voices
001	126	Piano 2	1	001	127	Acou Piano1	1	065	127	Acou Bass 1	1
002	126	Piano 2	1	002	127	Acou Piano2	1	066	127	Acou Bass 2	1
003	126	Piano 2	1	003	127	Acou Piano3	1	067	127	Elec Bass 1	1
004	126	Honky-tonk	2	004	127	Elec Piano1	1	068	127	Elec Bass 2	1
005	126	Piano 1	1	005	127	Elec Piano2	1	069	127	Slap Bass 1	1
006	126	Piano 2	1	006	127	Elec Piano3	1	070	127	Slap Bass 2	1
007	126	Piano 2	1	007	127	Elec Piano4	1	071	127	Fretless 1	1
008	126	E.Piano 1	1	008	127	Honkytonk	2	072	127	Fretless 2	1
009	126	Detuned EP1	2	009	127	Elec Org 1	1	073	127	Flute 1	1
010	126	E.Piano 2	1	010	127	Elec Org 2	2	074	127	Flute 2	1
011	126	Steel Gt.	1	011	127	Elec Org 3	1	075	127	Piccolo 1	1
012	126	Steel Gt.	1	012	127	Elec Org 4	1	076	127	Piccolo 2	2
013	126	12-str.Gt	2	013	127	Pipe Org 1	2	077	127	Recorder	1
014	126	Funk Gt.	1	014	127	Pipe Org 2	2	078	127	Pan Pipes	1
015	126	Muted Gt.	1	015	127	Pipe Org 3	2	079	127	Sax 1	1
016	126	Slap Bass 1	1	016	127	Accordion	2	080	127	Sax 2	1
017	126	Slap Bass 1	1	017	127	Harpsi 1	1	081	127	Sax 3	1
018	126	Slap Bass 1	1	018	127	Harpsi 2	2	082	127	Sax 4	1
019	126	Slap Bass 1	1	019	127	Harpsi 3	1	083	127	Clarinet 1	1
020	126	Slap Bass 2	1	020	127	Clavi 1	1	084	127	Clarinet 2	1
021	126	Slap Bass 2	1	021	127	Clavi 2	1	085	127	Oboe	1
022	126	Slap Bass 2	1	022	127	Clavi 3	1	086	127	Engl Horn	1
023	126	Slap Bass 2	1	023	127	Celesta 1	1	087	127	Bassoon	1
024	126	Fingered Bs	1	024	127	Celesta 2	1	088	127	Harmonica	1
025	126	Fingered Bs	1	025	127	Syn Brass 1	2	089	127	Trumpet 1	1
026	126	Picked Bass	1	026	127	Syn Brass 2	2	090	127	Trumpet 2	1
027	126	Picked Bass	1	027	127	Syn Brass 3	2	091	127	Trombone 1	2
028	126	Fretless Bs	1	028	127	Syn Brass 4	2	092	127	Trombone 2	2
029	126	Acoustic Bs	1	029	127	Syn Bass 1	1	093	127	Fr Horn 1	2
030	126	Choir Aahs	1	030	127	Syn Bass 2	2	094	127	Fr Horn 2	2
031	126	Choir Aahs	1	031	127	Syn Bass 3	2	095	127	Tuba	1
032	126	Choir Aahs	1	032	127	Syn Bass 4	1	096	127	Brs Sect 1	1
033	126	Choir Aahs	1	033	127	Fantasy	2	097	127	Brs Sect 2	2
034	126	SlowStrings	1	034	127	Harmo Pan	2	098	127	Vibe 1	1
035	126	Strings	1	035	127	Chorale	1	099	127	Vibe 2	1
036	126	SynStrings3	2	036	127	Glasses	2	100	127	Syn Mallet	1
037	126	SynStrings3	2	037	127	Soundtrack	2	101	127	Windbell	2
038	126	Organ 1	1	038	127	Atmosphere	2	102	127	Glock	1
039	126	Organ 1	1	039	127	Warm Bell	2	103	127	Tube Bell	1
040	126	Organ 1	1	040	127	Funny Vox	1	104	127	Xylophone	1
041	126	Organ 2	1	041	127	Echo Bell	2	105	127	Marimba	1
042	126	Organ 1	1	042	127	Ice Rain	2	106	127	Koto	1
043	126	Organ 1	1	043	127	Oboe 2001	2	107	127	Sho	2
044	126	Organ 2	1	044	127	Echo Pan	2	108	127	Shakuhachi	2
045	126	Organ 2	1	045	127	Doctor Solo	2	109	127	Whistle 1	2
046	126	Organ 2	1	046	127	School Daze	1	110	127	Whistle 2	1
047	126	Trumpet	1	047	127	Bellsinger	1	111	127	Bottleblow	2
048	126	Trumpet	1	048	127	Square Wave	2	112	127	Breathpipe	1
049	126	Trombone	1	049	127	Str Sect 1	1	113	127	Timpani	1
050	126	Trombone	1	050	127	Str Sect 2	1	114	127	Melodic Tom	1
051	126	Trombone	1	051	127	Str Sect 3	1	115	127	Deep Snare	1 **
052	126	Trombone	1	052	127	Pizzicato	1	116	127	Elec Perc 1	1 **
053	126	Trombone	1	053	127	Violin 1	1	117	127	Elec Perc 2	1 **
054	126	Trombone	1	054	127	Violin 2	1	118	127	Taiko	1 **
055	126	Alto Sax	1	055	127	Cello 1	1	119	127	Taiko Rim	1
056	126	Tenor Sax	1	056	127	Cello 2	1	120	127	Cymbal	1
057	126	BaritoneSax	1	057	127	Contrabass	1	121	127	Castanets	1 **
058	126	Alto Sax	1	058	127	Harp 1	1	122	127	Triangle	1 **
059	126	Brass 1	1	059	127	Harp 2	1	123	127	Orche Hit	1
060	126	Brass 1	1	060	127	Guitar 1	1	124	127	Telephone	1 **
061	126	Brass 2	2	061	127	Guitar 2	1	125	127	Bird Tweet	1 **
062	126	Brass 2	2	062	127	Elec Gtr 1	1	126	127	OneNote Jam	1 **
063	126	Brass 1	1	063	127	Elec Gtr 2	1	127	127	Water Bell	2
064	126	Orchest.Hit	2	064	127	Sitar	2	128	127	Jungle Tune	2

Drum set list

SC-88 Drum set (1)

	PC 1 STANDARD Set1	PC 2 STANDARD Set2	PC 9 ROOM Set	PC 17 POWER Set	PC 25 ELECTRONIC Set
25	Snare Roll	←	←	←	←
26	Finger Snap	←	←	←	←
27	High Q	←	←	←	←
28	Slap	←	←	←	←
29	Scratch Push [EXC7]	←	←	←	Scratch Push2 [EXC7]
30	Scratch Pull [EXC7]	←	←	←	Scratch Pull2 [EXC7]
31	Sticks	←	←	←	←
32	Square Click	←	←	←	←
33	Metronome Click	←	←	←	←
34	Metronome Bell	←	←	←	←
35	Standard 1 Kick 2	Standard 2 Kick 2	Room Kick 2	Power Kick 2	Electric Kick 2
C2 36	Standard 1 Kick 1	Standard 2 Kick 1	Room Kick 1	Power Kick 1	Electric Kick 1
37	Side Stick	←	←	←	←
38	Standard 1 Snare 1	Standard 2 Snare 1	Room Snare 1	Power Snare 1	Electric Snare 1
39	Hand Clap	←	←	←	←
40	Standard 1 Snare 2	Standard 2 Snare 2	Room Snare 2	PowerSnare 2	Electric Snare 2
41	Low Tom2 *	←	Room Low Tom2 *	Power Low Tom2 *	Electric Low Tom2 *
42	Closed Hi-hat1 [EXC1]	Closed Hi-hat2 [EXC1]	Closed Hi-hat3 [EXC1]	Closed Hi-hat3 [EXC1]	Closed Hi-hat2 [EXC1]
43	Low Tom1 *	←	Room Low Tom1 *	Power Low Tom1 *	Electric Low Tom1 *
44	Pedal Hi-hat [EXC1]	←	←	←	←
45	Mid Tom2 *	←	Room Mid Tom2 *	Power Mid Tom2 *	Electric Mid Tom2 *
46	Open Hi-hat1 [EXC1]	Open Hi-hat2 [EXC1]	Open Hi-hat3 [EXC1]	Open Hi-hat3 [EXC1]	Open Hi-hat2 [EXC1]
47	Mid Tom1 *	←	Room Mid Tom1 *	Power Mid Tom1 *	Electric Mid Tom1 *
C3 48	High Tom2 *	←	Room Hi Tom2 *	Power Hi Tom2 *	Electric Hi Tom2 *
49	Crash Cymbal1	←	←	←	←
50	High Tom1 *	←	Room Hi Tom1 *	Power Hi Tom1 *	Electric Hi Tom1 *
51	Ride Cymbal1	←	←	←	←
52	Chinese Cymbal	←	←	←	Reverse Cymbal
53	Ride Bell	←	←	←	←
54	Tambourine	←	←	←	←
55	Splash Cymbal	←	←	←	←
56	Cowbell	←	←	←	←
57	Crash Cymbal2	←	←	←	←
58	Vibra-slap	←	←	←	←
59	Ride Cymbal2	←	←	←	←
C4 60	High Bongo	←	←	←	←
61	Low Bongo	←	←	←	←
62	Mute High Conga	←	←	←	←
63	Open High Conga	←	←	←	←
64	Low Conga	←	←	←	←
65	High Timbale	←	←	←	←
66	Low Timbale	←	←	←	←
67	High Agogo	←	←	←	←
68	Low Agogo	←	←	←	←
69	Cabasa	←	←	←	←
70	Maracas	←	←	←	←
71	Short Hi Whistle [EXC2]	←	←	←	←
C5 72	Long Low Whistle [EXC2]	←	←	←	←
73	Short Guiro [EXC3]	←	←	←	←
74	Long Guiro [EXC3]	←	←	←	←
75	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	←	←	←	←
C6 84	Bell Tree	Bar Chimes	←	←	←
85	Castanets	←	←	←	←
86	Mute Surdo [EXC6]	←	←	←	←
87	Open Surdo [EXC6]	←	←	←	←
88	----	----	----	----	----
89	----	----	----	----	----
90	----	----	----	----	----
91	----	----	----	----	----
92	----	----	----	----	----
93	----	----	----	----	----
94	----	----	----	----	----
95	----	----	----	----	----
C7 96	----	----	----	----	----
97	----	----	----	----	----
98	----	----	----	----	----
99	----	----	----	----	----

Note Number

PC : Program Number (Drum Set Number)
 ---- : No sound
 * : Tones which are created using two voices

← : Same as the percussion sound of "STANDARD" (PC1).
 [EXC] : Percussion sound of the same number will not be heard at the same time.

SC-88 Drum set (2)

	PC 26 TR-808/909 Set	PC 27 DANCE Set	PC 33 JAZZ Set	PC 41 BRUSH Set	PC 49 ORCHESTRA Set
25	←	←	←	←	←
26	←	←	←	←	←
27	←	←	←	←	←
28	←	←	←	←	Closed Hi-hat2 [EXC1]
29	Scratch Push2 [EXC7]	Scratch Push2 [EXC7]	←	←	Pedal Hi-hat [EXC1]
30	Scratch Pull2 [EXC7]	Scratch Pull2 [EXC7]	←	←	Open Hi-hat2 [EXC1]
31	←	←	←	←	Ride Cymbal1
32	←	←	←	←	←
33	←	←	←	←	←
34	←	←	←	←	←
35	909 Bass Drum	Dance Kick	Jazz Kick 2	Jazz Kick 2	Jazz Kick 1
C2 36	808 Bass Drum	Electric Kick 2	Jazz Kick 1	Jazz Kick 1	Concert BD1
37	808 Rim Shot	←	←	←	←
38	808 Snare 1	Dance Snare 1	Jazz Snare 1	Brush Tap1	Concert SD
39	←	←	Hand Clap2	Brush Slap1	Castanets
40	909 Snare 1	Dance Snare 2	Jazz Snare 2	Brush Swirl1	Concert SD
41	808 Low Tom2 *	Electric Low Tom2 *	←	Brush Low Tom2 *	Timpani F
42	808 CHH [EXC1]	CR-78 CHH [EXC1]	Closed Hi-hat2 [EXC1]	Brush Closed Hi-hat [EXC1]	Timpani F#
43	808 Low Tom1 *	Electric Low Tom1 *	←	Brush Low Tom1 *	Timpani G
44	808 CHH [EXC1]	808 CHH [EXC1]	←	←	Timpani G#
45	808 Mid Tom2 *	Electric Mid Tom2 *	←	Brush Mid Tom2 *	Timpani A
46	808 OHH [EXC1]	CR-78 OHH [EXC1]	Open Hi-hat2 [EXC1]	Brush Open Hi-hat [EXC1]	Timpani A#
47	808 Mid Tom1 *	Electric Mid Tom1 *	←	Brush Mid Tom1 *	Timpani B
C3 48	808 Hi Tom2 *	Electric High Tom2 *	←	Brush Hi Tom2 *	Timpani c
49	808 Cymbal	←	←	Brush Crash Cymbal	Timpani c#
50	808 Hi Tom1 *	Electric High Tom1 *	←	Brush Hi Tom1 *	Timpani d
51	←	←	←	Brush Ride Cymbal	Timpani d#
52	←	Reverse Cymbal	←	←	Timpani e
53	←	←	←	Brush Ride Bell	Timpani f
54	←	←	←	←	←
55	←	←	←	←	←
56	808 Cowbell	←	←	←	←
57	←	←	←	←	Concert Cymbal2
58	←	←	←	←	←
59	←	←	←	←	Concert Cymbal1
C4 60	←	←	←	←	←
61	←	←	←	←	←
62	808 High Conga	←	←	←	←
63	808 Mid Conga	←	←	←	←
64	808 Low Conga	←	←	←	←
65	←	←	←	←	←
66	←	←	←	←	←
67	←	←	←	←	←
68	←	←	←	←	←
69	←	←	←	←	←
70	808 Maracas	←	←	←	←
71	←	←	←	←	←
C5 72	←	←	←	←	←
73	←	←	←	←	←
74	←	←	←	←	←
75	808 Claves	←	←	←	←
76	←	←	←	←	←
77	←	←	←	←	←
78	←	High Hoo [EXC4]	←	←	←
79	←	Low Hoo [EXC4]	←	←	←
80	←	Electric Mute Triangle [EXC5]	←	←	←
81	←	Electric Open Triangle [EXC5]	←	←	←
82	←	←	←	←	←
83	←	←	←	←	←
C6 84	←	←	←	←	←
85	←	←	←	←	←
86	←	←	←	←	←
87	←	←	←	←	←
88	----	----	----	----	Applause *
89	----	----	----	----	----
90	----	----	----	----	----
91	----	----	----	----	----
92	----	----	----	----	----
93	----	----	----	----	----
94	----	----	----	----	----
95	----	----	----	----	----
C7 96	----	----	----	----	----
97	----	----	----	----	----
98	----	----	----	----	----
99	----	----	----	----	----

↑
Note Number

PC : Program Number (Drum Set Number)
 ---- : No sound
 * : Tones which are created using two voices

← : Same as the percussion sound of "STANDARD" (PC1).
 [EXC] : Percussion sound of the same number will not be heard at the same time.

SC-88 Drum set (3)

	PC 50 ETHNIC Set	PC 51 KICK&SNARE Set	PC 57 SFX Set	PC 58 RHYTHM FX Set
25	Finger Snap	----	----	----
26	Tambourine	----	----	----
27	Castanets	----	----	----
28	Crash Cymbal1	----	----	----
29	Snare Roll	----	----	----
30	Concert Snare Drum	----	----	----
31	Concert Cymbal	----	Scratch Push2 [EXC1]	----
32	Concert BD1	----	Scratch Pull2 [EXC1]	----
33	Jingle Bell	----	Cutting Noise 2 Up	----
34	Bell Tree	----	Cutting Noise 2 Down	----
35	Bar Chimes	----	Distortion Guitar Cutting Noise Up	----
C2 36	Wadaiko *	----	Distortion Guitar Cutting Noise Down	Reverse Kick 1
37	Wadaiko Rim *	----	Bass Slide	Reverse Concert BD 1
38	Shime Taiko	----	Pick Scrape	Reverse Power Kick 1
39	Atarigane	----	High Q	Reverse Electric Kick 1
40	Hyoushigi	Standard 1 Kick 1	Slap	Reverse Snare 1
41	Ohkawa	Standard 1 Kick 2	Scratch Push [EXC7]	Reverse Snare 2
42	High Kotsuzumi	Standard 2 Kick 1	Scratch Pull [EXC7]	Reverse Standard set1 Snare 1
43	Low Kotsuzumi	Standard 2 Kick 2	Sticks	Reverse Tight Snare
44	Ban Gu	Kick 1	Square Click	Reverse Dance Snare
45	Big Gong	Kick 2	Metronome Click	Reverse 808 Snare
46	Small Gong	Soft Kick	Metronome Bell	Reverse Tom1
47	Bend Gong	Jazz Kick 1	Guitar Fret Noise	Reverse Tom2
C3 48	Thai Gong	Jazz Kick 2	Guitar Cutting Noise Up	Reverse Sticks
49	Rama Cymbal	Concert BD	GuitarCutting Noise Down	Reverse Slap
50	Gamelan Gong	Room Kick 1	String Slap of Double Bass	Reverse Cymbal1
51	Udo Short [EXC1]	Room Kick 2	Fl.Key Click	Reverse Cymbal2
52	Udo Long [EXC1]	Power Kick 1	Laughing	Reverse Open Hi-hat
53	Udo Slap	Power Kick 2	Scream	Reverse Ride Cymbal
54	Bendir	Electric Kick 2	Punch	Reverse CR-78 OHH
55	Req Dum	Electric Kick 1 *	Heart Beat	Reverse Closed Hi-hat
56	Req Tik	Electric Kick	Footsteps1	Reverse Gong
57	Tabla Te	808 Bass Drum	Footsteps2	Reverse Bell Tree
58	Tabla Na	909 Bass Drum	Applause *	Reverse Guiro
59	Tabla Tun	Dance Kick	Door Creaking	Reverse Bendir
C4 60	Tabla Ge	Standard 1 Snare 1	Door	Reverse Gun Shot
61	Tabla Ge Hi	Standard 1 Snare 2	Scratch	Reverse Scratch
62	Talking Drum *	Standard 2 Snare 1	Wind Chimes *	Reverse Laser
63	Bend Talking Drum *	Standard 2 Snare 2	Car-Engine	Key Click
64	Caxixi	Tight Snare	Car-Stop	Tekno Thip
65	Djembe	Concert Snare	Car-Pass	Pop Drop
66	Djembe Rim	Jazz Snare 1	Car-Crash *	Woody Slap
67	Timbales Low	Jazz Snare 2	Siren	Distortion Kick *
68	Timbales Paila	Room Snare 1	Train	Syn.Drop
69	Timbales High	Room Snare 2	Jetplane *	Reverse High Q
70	Cowbell	Power Snare 1	Helicopter	Pipe
71	Hi Bongo	Power Snare 2	Starship *	Ice Block
C5 72	Low Bongo	Gated Snare	Gun Shot	Digital Tambourine *
73	Mute Hi Conga	Dance Snare 1	Machine Gun	Alias
74	Open Hi Conga	Dance Snare 2	Lasergun	Modulated Bell
75	Mute Low Conga	Disco Snare	Explosion *	Spark
76	Conga Slap	Electric Snare2	Dog	Metalic Percussion
77	Open Low Conga	House Snare *	Horse-Gallop	Velocity Noise FX
78	Conga Slide *	Electric Snare 1	Birds *	Stereo Noise Clap *
79	Mute Pandiero	Electric Snare 3 *	Rain	Swish
80	Open Pandiero	808 Snare 1	Thunder	Slappy *
81	Open Surdo [EXC2]	808 Snare 2 *	Wind	Voice Ou
82	Mute Surdo [EXC2]	909 Snare 1	Seashore	Voice Au
83	Tamborim	909 Snare 2 *	Stream *	Hoo
C6 84	High Agogo	Brush Tap1	Bubble *	Tape Stop1 *
85	Low Agogo	Brush Tap2	Kitty	Tape Stop2 *
86	Shaker	Brush Slap1	Bird2	Missile *
87	High Whistle [EXC3]	Brush Slap2	Growl	Space Bird
88	Low Whistle [EXC3]	Brush Slap3	Applause2 *	Flying Monster
89	Mute Cuica [EXC4]	Brush Swirl1	Telephone1	----
90	Open Cuica [EXC4]	Brush Swirl2	Telephone2	----
91	Mute Triangle [EXC5]	Brush Long Swirl	----	----
92	Open Triangle [EXC5]	----	----	----
93	Short Guiro [EXC6]	----	----	----
94	Long Guiro [EXC6]	----	----	----
95	Cabasa Up	----	----	----
C7 96	Cabasa Down	----	----	----
97	Claves	----	----	----
98	High Wood Block	----	----	----
99	Low Wood Block	----	----	----

Note Number

PC : Program Number (Drum Set Number)
 ---- : No sound
 * : Tones which are created using two voices

← : Same as the percussion sound of "STANDARD" (PC1).
 [EXC] : Percussion sound of the same number will not be heard at the same time.

SC-55 Drum set (1)

	PC 1 / PC 33 STANDARD Set / 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
25	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---
27	High Q	←	←	←	←	←	Closed Hi-hat [EXC1]
28	Slap	←	←	←	←	←	Pedal Hi-hat [EXC1]
29	Scratch Push	←	←	←	←	←	Open Hi-hat [EXC1]
30	Scratch Pull	←	←	←	←	←	Ride Cymbal1
31	Sticks	←	←	←	←	←	←
32	Square Click	←	←	←	←	←	←
33	Metronome Click	←	←	←	←	←	←
34	Metronome Bell	←	←	←	←	←	←
35	Kick Drum2 / Jazz BD2	←	←	←	←	Jazz BD2	Concert BD2
C2 36	Kick Drum1 / Jazz BD1	←	MONDO Kick	Elec BD	808 Bass Drum	Jazz BD1	Concert BD1
37	Side Stick	←	←	←	808 Rim Shot	←	←
38	Snare Drum1	←	Gated SD	Elec SD	808 Snare Drum	Brush Tap	Concert SD
39	Hand Clap	←	←	←	←	Brush Slap	Castanets
40	Snare Drum2	←	←	Gated SD	←	Brash Swirl	Concert SD
41	Low Tom2	Room Low Tom2	Room Low Tom2	Elec Low Tom2	808 Low Tom2	←	Timpani F
42	Closed Hi-hat [EXC1]	←	←	←	808 CHH [EXC1]	←	Timpani F#
43	Low Tom1	Room Low Tom1	Room Low Tom1	Elec Low Tom1	808 Low Tom1	←	Timpani G
44	Pedal Hi-hat [EXC1]	←	←	←	808 CHH [EXC1]	←	Timpani G#
45	Mid Tom2	Room Mid Tom2	Room Mid Tom2	Elec Mid Tom2	808 Mid Tom2	←	Timpani A
46	Open Hi-hat [EXC1]	←	←	←	808 OHH [EXC1]	←	Timpani A#
47	Mid Tom1	Room Mid Tom1	Room Mid Tom1	Elec Mid Tom1	808 Mid Tom1	←	Timpani B
C3 48	High Tom2	Room Hi Tom2	Room Hi Tom2	Elec Hi Tom2	808 Hi Tom2	←	Timpani c
49	Crash Cymbal1	←	←	←	808 Cymbal	←	Timpani c#
50	High Tom1	Room Hi Tom1	Room Hi Tom1	Elec Hi Tom1	808 Hi Tom1	←	Timpani d
51	Ride Cymbal1	←	←	←	←	←	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 Cymbal2	←	←	←	←	←	Concert Cymbal2
58	Vibra-slap	←	←	←	←	←	←
59	Ride Cymbal2	←	←	←	←	←	Concert Cymbal1
C4 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]	←	←	←	←	←	←
C5 72	Long Low Whistle [EXC2]	←	←	←	←	←	←
73	Short Guiro	←	←	←	←	←	←
74	Long Guiro	←	←	←	←	←	←
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	←	←	←	←	←	←
C6 84	Bell Tree	←	←	←	←	←	←
85	Castanets	←	←	←	←	←	←
86	Mute Surdo [EXC6]	←	←	←	←	←	←
87	Open Surdo [EXC6]	←	←	←	←	←	←
88	---	---	---	---	---	---	Applause
89	---	---	---	---	---	---	---
90	---	---	---	---	---	---	---
91	---	---	---	---	---	---	---
92	---	---	---	---	---	---	---
93	---	---	---	---	---	---	---
94	---	---	---	---	---	---	---
95	---	---	---	---	---	---	---
C7 96	---	---	---	---	---	---	---
97	---	---	---	---	---	---	---
98	---	---	---	---	---	---	---
99	---	---	---	---	---	---	---

Note Number

PC : Program Number (Drum Set Number)
 --- : No sound
 * : Tones which are created using two voices

← : Same as the percussion sound of "STANDARD" (PC1).
 [EXC] : Percussion sound of the same number will not be heard at the same time.

SC-55 Drum set (2)

	PC 57	PC 128
	SFX Set	CM-64/32L Set
	----	CM Kick Drum
C2 36	37	CM Kick Drum
	----	CM Rim Shot
38	----	CM Snare Drum
	39 High Q	CM Hand Clap
40	Slap	CM Electronic Snare Drum
	Scratch Push [EXC7]	CM Acoustic Low Tom
41	42 Scratch Pull [EXC7]	CM Closed High Hat [EXC1]
	Sticks	CM Acoustic Low Tom
43	44 Square Click	CM Open Hi-Hat2
	Metronome Click	CM Acoustic Middle Tom
45	46 Metronome Bell	CM Open Hi-Hat1 [EXC1]
	Guitar Fret Noise	CM M.TomAcoustic Middle Tom
47		
C3 48	Guitar cutting noise/up	CM Acoustic High Tom
	49 Guitar cutting noise/down	CM Crash Cymbal
50	String slap of double bass	CM Acoustic High Tom
	51 Fl.Key Click	CM Ride Cymbal
52	Laughing	----
	Scream	----
53	54 Punch	CM Tambourine
	Heart Beat	----
55	56 Footsteps1	CM Cowbell
	Footsteps2	----
57	58 Applause *	----
	Door Creaking	----
59		
C4 60	Door	CM High Bongo
	61 Scratch	CM Low Bongo
62	Wind Chimes *	CM Mute High Conga
	63 Car-Engine	CM High Conga
64	Car-Stop	CM Low Conga
	Car-Pass	CM High Timbale
65	66 Car-Crash *	CM Low Timbale
	Siren	CM High Agogo
67	68 Train	CM Low Agogo
	Jetplane *	CM Cabasa
69	70 Helicopter	CM Maracas
	Starship *	CM Short Whistle
71	Gun Shot	CM Long Whistle
C5 72	73 Machine Gun	CM Vibrato Slap
	Laser gun	----
74	75 Explosion *	CM Claves
	Dog	Laughing
76	Horse-Gallop	Scream
	78 Birds *	Punch
79	Rain *	Heart Beat
	80 Thunder	Footsteps1
81	Wind	Footsteps2
	82 Seashore	Applause *
83	Stream *	Creaking
	Bubble *	Door
C6 84	85	Scratch
	----	Wind Chimes *
86	87	Car-Engine
	----	Car-Stop
88	----	Car-Pass
	89	Car-Crash *
89	90	Siren
	----	Train
91	92	Jetplane *
	----	Helicopter
93	94	Starship *
	----	Gun Shot
C7 96	97	Machine Gun
	----	Laser gun
98	99	Explosion *
	----	Dog
100	----	Horse-Gallop
	101	Birds *
101	102	Rain *
	----	Thunder
103	104	Wind
	----	SeaShore
105	106	Stream *
	----	Bubble *
C8 107	----	
108	----	

Switching between the SC-88 map and SC-55 map

Press the front panel button [SC-55] to make the indicator light, and the SC-55 map will be selected. (p.7)
 You can also use MIDI Bank Select messages to switch between the SC-88 map and SC-55 map. (p.13)

↑
Note Number

PC : Program Number (Drum Set Number)
 ---- : No sound
 * : Tones which are created using two voices

← : Same as the percussion sound of "STANDARD" (PC1).
 [EXC] : Percussion sound of the same number will not be heard at the same time.

The SC-88ST has additional functions and parameters which were not found on previous GS format sound sources. These functions and parameters are marked as [88]. If MIDI messages marked as [88] are transmitted to a different GS format sound source, it is possible that these messages may not be received.

Section 1. Receive data

■ Channel voice messages

● Note off

Status	2nd byte	3rd byte	
8nH	kkH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
9nH	kkH	00H	kk=note number : 00H - 7FH (0 - 127) vv=note off velocity : 00H - 7FH (0 - 127)

* For Drum Parts, these messages are received when Rx.NOTE OFF = ON for each Instrument.

* The velocity values of Note Off messages are ignored.

● Note on

Status	2nd byte	3rd byte	
9nH	kkH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			kk=note number : 00H - 7FH (0 - 127)
			vv=note on velocity : 01H - 7FH (1 - 127)

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

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

● Polyphonic Key Pressure

Status	2nd byte	3rd byte	
AnH	kkH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			kk=note number : 00H - 7FH (0 - 127)
			vv=Key pressure : 00H - 7FH (0 - 127)

* Not received when Rx.POLY PRESSURE (PAf) = OFF. (Initial value is ON)

* The resulting effect is determined by System Exclusive messages. With the initial settings, there will be no effect.

● Control Change

* When Rx.CONTROL CHANGE = OFF, all control change messages except for Channel Mode messages will be ignored.

* The value specified by a Control Change message will not be reset even by a Program Change, etc.

○ Bank Select (Controller number 0,32) [88]

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

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

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

Initial value = 00H

ll=Bank number LSB : 00H - 02H (MAP) Initial value = 00H

* Not received when Rx.BANK SELECT = OFF

* " Rx.BANK SELECT " is set to OFF by " Turn General MIDI System On ", and set to ON by " GS RESET ". (Power on default value is ON.)

* When Rx.BANK SELECT LSB = OFF, Bank number LSB will be handled as 00H regardless of the received value.

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

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

* The SC-88ST recognizes the Bank Select LSB (Controller number 32) as a flag for switching between the SC-88MAP and the SC-55MAP. With a Bank Select LSB of 00H, the map selected by the front panel SC-55MAP button will be selected. With a LSB of 01H, the SC-55MAP will be selected. With a LSB of 02H, the SC-88MAP will be selected.

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

○ Modulation (Controller number 1)

Status	2nd byte	3rd byte	
BnH	01H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Modulation depth : 00H - 7FH (0 - 127)

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

* The resulting effect is determined by System Exclusive messages. With the initial settings, this is Pitch Modulation Depth.

○ Portamento Time (Controller number 5)

Status	2nd byte	3rd byte	
BnH	05H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Portamento Time : 00H - 7FH (0 - 127)
			Initial value = 00H (0)

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

○ Data Entry (Controller number 6,38)

Status	2nd byte	3rd byte	
BnH	06H	mmH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	26H	llH	mm,ll=the value of the parameter specified by RPN/NRPN

○ Volume (Controller number 7)

Status	2nd byte	3rd byte	
BnH	07H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Volume : 00H - 7FH (0 - 127)
			Initial value = 64H (100)

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

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

○ Pan (Controller number 10)

Status	2nd byte	3rd byte	
BnH	0AH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=pan: 00H - 40H - 7FH (Left - Center - Right)
			Initial value = 40H (Center)

* For Rhythm Parts, this is a relative adjustment of each Instrument's pan setting.

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

○ Expression (Controller number 11)

Status	2nd byte	3rd byte	
BnH	0BH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Expression : 00H - 7FH (0 - 127)
			Initial value = 7FH (127)

* It can be used independently from Volume messages. Expression messages are used for musical expression within a performance; e.g., expression pedal movements, crescendo and decrescendo.

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

○ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte	
BnH	40H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Control value : 00H - 7FH (0 - 127)
			0-63=OFF, 64-127=ON

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

○ Portamento (Controller number 65)

Status	2nd byte	3rd byte	
BnH	41H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Control value : 00H - 7FH (0 - 127)
			0-63=OFF 64-127=ON

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

○ Sostenuto (Controller number 66)

Status	2nd byte	3rd byte	
BnH	42H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Control value : 00H - 7FH (0 - 127)
			0-63=OFF 64-127=ON

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

○ Soft (Controller number 67)

Status	2nd byte	3rd byte	
BnH	43H	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			vv=Control value : 00H - 7FH (0 - 127)
			0-63=OFF 64-127=ON

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

○ Portamento control (Controller number 84)

Status	2nd byte	3rd byte	
BnH	54H	kkH	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
			kk=source note number : 00H - 7FH (0 - 127)

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

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

Example 1)		
On MIDI	Description	Result
90 3C 40	Note on C4	C4 on
B0 54 3C	Portamento Control from C4	no change (C4 voice still sounding)
90 40 40	Note on E4	Glide from C4 to E4
80 3C 40	Note off C4	no change
80 40 40	Note off E4	E4 off

Example 2)		
On MIDI	Description	Result
B0 54 3C	Portamento Control from C4	no change
90 40 40	Note on E4	E4 is played with glide from C4 to E4
80 40 40	Note off E4	E4 off

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

Status	2nd byte	3rd byte	
BnH	5BH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16) vv=Control value : 00H - 7FH (0 - 127) Initial value = 28H (40)

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

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

Status	2nd byte	3rd byte	
BnH	5DH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16) vv=Control value : 00H - 7FH (0 - 127) Initial value = 00H (0)

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

○ **Effect 4 (Delay Send Level) (Controller number 94) [88]**

Status	2nd byte	3rd byte	
BnH	5EH	vvH	n=MIDI channel number: 0H - FH (ch.1 - ch.16) vv=Control value : 00H - 7FH (0 - 127) Initial value = 00H (0)

* This message adjusts the Delay Send Level of each Part.
 * Some other GS devices may not recognize this message.
 * Delay cannot be used in MODE-2 (Double Module mode).

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

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

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

* NRPN can be received when Rx.NRPN = ON. " Rx.NRPN " is set to OFF by power-on reset or by receiving " Turn General MIDI System On", and it is set to ON by "GS Reset".
 * The value set by NRPN will not be reset even if Program Change or Reset All Controllers is received.

NRPN

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used.
 To use these messages, you must first use NRPN MSB and NRPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter. Refer to Section 5. Supplementary material "Examples of actual MIDI messages" <Example 4> (Page 57). On the SC-88ST, Data entry LSB (llH) of NRPN is ignored, so it is no problem to send Data entry MSB (mmH) only (without Data entry LSB).
 On the SC-88ST, NRPN can be used to modify the following parameters.

NRPN Data entry

MSB	LSB	MSB	Description
01H	08H	mmH	Vibrato Rate (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	09H	mmH	Vibrato Depth (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	0AH	mmH	Vibrato Delay (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	20H	mmH	TVF Cutoff Frequency (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	21H	mmH	TVF Resonance (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	63H	mmH	TVF&TVA Env. Attack Time (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	64H	mmH	TVF&TVA Env. Decay Time (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	66H	mmH	TVF&TVA Env. Release Time (relative change on specified channel) mm: 00H - 40H - 7FH (-64 - 0 - +63)
18H	rrH	mmH	Pitch Coarse of drum instrument (relative change on specified drum instrument) rr: key number of drum instrument mm: 00H - 40H - 7FH (-64 - 0 - +63 semitone)
1AH	rrH	mmH	TVA level of drum instrument (absolute change on specified drum instrument) rr: key number of drum instrument mm: 00H - 7FH (0 - max)
1CH	rrH	mmH	Panpot of drum instrument (absolute change on specified drum instrument) rr: key number of drum instrument mm: 00H, 01H - 40H - 7FH (random, left-center-right)
1DH	rrH	mmH	Reverb send level of drum instrument (absolute change on specified drum instrument) rr: key number of drum instrument mm: 00H - 7FH (0 - max)
1EH	rrH	mmH	Chorus send level of drum instrument (absolute change on specified drum instrument) rr: key number of drum instrument mm: 00H - 7FH (0 - max)
1FH	rrH	mmH	Delay send level of drum instrument (absolute change on specified drum instrument) [88] rr: key number of drum instrument mm: 00H - 7FH (0 - max)

* Data entry LSB (llH) is ignored.
 * Parameters marked "relative change" will change relative to the preset value. Even among different GS devices, "relative change" parameters may sometimes differ in the way the sound changes or in the range of change.
 * Parameters marked "absolute change" will be set to the absolute value of the parameter, regardless of the preset value.
 * It is not possible to simultaneously use both Chorus Send Level and Delay Send Level on a single Drum Instrument.

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

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

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

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

RPN

The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.
 To use these messages, you must first use RPN MSB and RPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter. Refer to Section 5. "Examples of actual MIDI messages" <Example 4> (Page 57).
 On the SC-88ST, RPN can be used to modify the following parameters.

RPN	Data entry	MSB	LSB	MSB	LSB	Explanation
00H 00H	mmH ---					Pitch Bend Sensitivity mm: 00H - 18H (0 - 24 semitones) Initial value = 02H (2 semitones) ll: ignored (processed as 00H) specify up to 2 octaves in semitone steps
00H 01H	mmH llH					Master Fine Tuning mm,ll: 00 00H - 40 00H - 7F 7FH (-100-0+99.99 cents) Initial Value = 40 00H (± 0 cent) Refer to 5. Supplementary material, "About tuning".
00H 02H	mmH ---					Master Coarse Tuning mm: 28H - 40H - 58H (-24 - 0 +24 semitones) Initial Value = 40H (± 0 semitone) ll: ignored (processed as 00H)
7FH 7FH	--- ---					RPN null Set condition where RPN and NRPN are unspecified. The data entry messages after set RPN null will be ignored. (No Data entry messages are required after RPN null). Settings already made will not change. mm,ll: ignored

● Program Change

Status	2nd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
CnH	ppll	pp=Program number : 00H - 7FH (prog.1 - prog.128)

- * Not received when Rx.PROGRAM CHANGE = OFF. (Initial value is ON)
- * After a Program Change message is received, the sound will change beginning with the next Note-on. Voices already sounding when the Program Change message was received will not be affected.
- * For Drum Parts, Program Change messages will not be received on bank numbers 129 - 16384 (the value of Control Number 0 is other than 0(00H)).

● Channel Pressure

Status	2nd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
DnH	vvH	vv=Channel Pressure : 00H - 7FH (0 - 127)

- * Not received when Rx.CH PRESSURE (CAf) = OFF. (Initial value is ON)
- * The resulting effect is determined by System Exclusive messages. With the initial settings there will be no effect.

● Pitch Bend Change

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
EnH	llH	mmH	mm,ll=Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

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

■ Channel Mode Messages

● All Sounds Off (Controller number 120)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	78H	00H	

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

● Reset All Controllers (Controller number 121)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	79H	00H	

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

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

● All Notes Off (Controller number 123)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	7BH	00H	

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

● OMNI OFF (Controller number 124)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	7CH	00H	

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

● OMNI ON (Controller number 125)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	7DH	00H	

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

● MONO (Controller number 126)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	7EH	mmH	mm=mono number : 00H - 10H (0 - 16)

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

● POLY (Controller number 127)

Status	2nd byte	3rd byte	n=MIDI channel number: 0H - FH (ch.1 - ch.16)
BnH	7FH	00H	

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

■ System Realtime Messages

○ Active Sensing

Status
FEH

- * When Active Sensing is received, the unit will begin monitoring the intervals of all further messages. While monitoring, if the interval between messages exceeds 420 ms, the same processing will be carried out as when All Sounds Off, All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

■ System Exclusive Message

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

- F0H : System Exclusive Message status
- ii = ID number : an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H. ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).
- dd, ..., ee = data : 00H - 7FH (0 - 127)
- F7H : EOx (End Of Exclusive)

The System Exclusive Messages received by the SC-88ST are; messages related to mode settings, Universal Realtime System Exclusive messages, Data Requests (RQ1), and Data Set (DT1).

● System exclusive messages related to mode settings

These messages are used to initialize a device to GS or General MIDI mode, or change the operating mode. When creating performance data, a "Turn General MIDI System On" message should be inserted at the beginning of a General MIDI score, a "GS Reset" message at the beginning of a GS music data, and a "System Mode Set" message at the beginning of data especially for the SC-88ST. Each song should contain only one mode message as appropriate for the type of data. (Do not insert two or more mode setting messages in a single song.)
"System Mode Set" and "GS Reset" use Roland system exclusive format "Data Set 1 (DT1)". "Turn General MIDI System On" use Universal Non-realtime Message format.

○ Turn General MIDI System On

This is a command message that resets the internal settings of the unit to the General MIDI initial state (General MIDI System - Level 1). After receiving this message, SC-88ST will automatically be set to the proper condition for correctly playing a General MIDI score.

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

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

○ GS Reset

GS Reset is a command message that resets the internal settings of a device to the GS initial state. This message will appear at the beginning of GS music data, and a GS device that receives this message will automatically be set to the proper state to correctly playback GS music data. If the SC-88ST is in MODE-1 (single module mode) all 32 Parts will be initialized. If in MODE-2 (double module mode), only the corresponding 16 Parts will be initialized. In MODE-2 if the receiving MIDI connector for each Part has been changed, this may affect playback from the other MIDI connector. In this case, first perform initialization (page 22) before using this command.

Status	Data byte	Status
F0H	41H, 10H, 42H, 12H, 40H, 00H, 7FH, 00H, 41H	F7H
Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
10H	Device ID	
42H	Model ID (GS)	
12H	Command ID (DT1)	
40H	Address MSB	
00H	Address	
7FH	AddressLSB	
00H	Data (GS reset)	
41H	Checksum	
F7H	EOX (End Of Exclusive)	

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

○ System Mode Set [88]

System Mode Set is a message that sets the SC-88ST operating mode to MODE-1 (single module mode) or MODE-2 (double module mode). When this message is received, the operating mode will be set, and at the same time all internal parameters (except for the map settings of each Part) will be reset to the initial state.

Status	Data byte	Status
F0H	41H, 10H, 42H, 12H, 00H, 00H, 7FH, ddH, sumH	F7H
Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
10H	Device ID	
42H	Model ID (GS)	
12H	Command ID (DT1)	
00H	Address MSB	
00H	Address	
7FH	Address LSB	
ddH	Data 00H (MODE-1), 01H (MODE-2)	
sumH	Checksum 01H (MODE-1), 00H (MODE-2)	
F7H	EOX (End Of Exclusive)	

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

● Universal Realtime System Exclusive Messages

○ Master volume

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

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

○ Identity Request Message

Status	Data byte	Status
F0H	7EH, dev, 06H, 01H	F7H
Byte	Explanation	
F0H	Exclusive status	
7EH	ID number (universal realtime message)	
dev	Device ID	
06H	Sub ID#1 (General Information)	
01H	Sub ID#2 (Identity Request)	
F7H	EOX (End Of Exclusive)	

* The "dev" is 10H (own device number) or 7FH (Broadcast).

● Data transmission

The SC-88ST can use Exclusive messages to transmit internal settings to other devices. There are two types of Exclusive data transmission; Individual Parameter Transmission (section 3) in which single parameters are transmitted one by one, and Bulk Dump Transmission (section 4) in which a large amount of data is transmitted at once.

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

○ Data request 1 RQ1 (11H)

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

For Individual Parameter Request, refer to "3. Individual Parameter Transmission" (p.48).

For Bulk Dump Request, refer to "4. Bulk Dump" (p.55).

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

Status	Data byte	Status
F0H	41H, 10H, 42H, 11H, aaH, bbH, ccH, ssH, ttH, uuH, sum	F7H
Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
10H	Device ID	
42H	Model ID (GS)	
11H	Command ID (RQ1)	
aaH	Address MSB : upper byte of the starting address of the requested data	
bbH	Address : middle byte of the starting address of the requested data	
ccH	Address LSB : lower byte of the starting address of the requested data	
ssH	Size MSB	
ttH	Size	
uuH	Size LSB	
sum	Checksum	
F7H	EOX (End Of Exclusive)	

* The amount of data that can be transmitted at once time will depend on the type of data, and data must be requested using a specific starting address and size. Refer to the Address and Size listed in Section 3 (p.48).
 * Regarding the checksum please refer to Section 5 (p.57).

○ Data set 1 DT1 (12H)

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

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

* The amount of data that can be transmitted at one time depends on the type of data, and data can be received only from the specified starting address and size. Refer to the Address and Size given in Section 3 (p.48).
 * Data larger than 128 bytes must be divided into packets of 128 bytes or less. If "Data Set 1" is transmitted successively, there must be an interval of at least 40 ms between packets.
 * Regarding the checksum please refer to section 5 (p.57).

Section 2. Transmit data

■ System realtime messages

● Active sensing

Status
F7H

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

■ System exclusive messages

"Identity Reply" and "Data Set 1 (DT1)" are the only System Exclusive messages transmitted by GS format sound sources. When an appropriate "Data Request 1 (RQ1)" message is received, the requested internal data will be transmitted.

○ Identity Reply

Status	Data byte	Status
FOH	7EH, 10H, 06H, 02H, 41H, 42H, 00H, 02H, ssH, ssH, ssH, ssH	F7H

Byte	Explanation
FOH	Exclusive status
7EH	ID number (universal non-realtime message)
10H	Device ID
06H	Sub ID#1 (General Information)
02H	Sub ID#2 (Identity Reply)
41H	ID number (Roland)
42H	Device family code (LSB)
00H	Device family code (MSB)
001H	Device family number code (LSB)
02H	Device family number code (MSB)
ssH	Software Revision Level
ssH	Software Revision Level
ssH	Software Revision Level
ssH	Software Revision Level
F7H	EOX (End Of Exclusive)

* Reply the message by the unique device ID(10H) when the device has received the "Identity Request Message" in the Broadcast.

○ Data set 1 DT1 (12H)

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

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

* The amount of data that can be transmitted at one time depends on the type of data, and data will be transmitted from the specified starting address and size. Refer to the Address and Size given in Section 3 (p.48).
 * Data larger than 128 bytes will be divided into packets of 128 bytes or less, and each packet will be sent at an interval of about 40ms.
 * Regarding the checksum please refer to section 5 (p.57)

There are two ways in which GS data is transmitted: Individual Parameter Transmission (Section 3) in which individual parameters are transmitted one by one, and Bulk Dump Transmission (Section 4) in which a large amount of data is transmitted at once.

Section 3. Individual Parameter Transmission (Model ID=42H)

Individual Parameter Transmission transmits data (or requests data) for one parameter as one exclusive message (one packet of "F0 F7"). In Individual Parameter Transmission, you must use the Address and Size listed in the following "Parameter Address Map". Addresses marked at "#" cannot be used as starting addresses.

■ Address Block Map

The address map for Individual Parameter Transmission is as follows.

<Model ID = 42H>

● Port-A

Address(H)Block

00 00 00	| SYSTEM |		
20 00 00	| USER TONE BANK |		
21 00 00	| USER DRUM SET |		
40 00 00	| PATCH COMMON #A |	50 00 00	| PATCH COMMON B |
4C 10 00	| PATCH PART A |	50 10 00	| PATCH PART B |
	| (BLOCK 00-0F) |		| (BLOCK 10-1F) |
41 00 00	| DRUM SETUP A |	51 00 00	| DRUM SETUP B |

* Blocks delineated by dotted lines (: : :) cannot be accessed in Mode-1 (Single Module mode).

* Blocks listed as "#A" are parameter blocks which are common to the entire device in Mode-1, and valid only for Parts A01 - A16 in Mode-2 (Double Module mode).

● Port-B

Address(H) Block

00 00 00	| SYSTEM |		
20 00 00	| USER TONE BANK |		
21 00 00	| USER DRUM SET |		
50 00 00	| PATCH COMMON A |	40 00 00	| PATCH COMMON #B |
50 10 00	| PATCH PART A |	40 10 00	| PATCH PART B |
	| (BLOCK 00-0F) |		| (BLOCK 10-1F) |
51 00 00	| DRUM SETUP A |	41 00 00	| DRUM SETUP B |

* Blocks delineated by dotted lines (: : :) cannot be accessed in Mode-1 (Single Module mode).

* Blocks listed as "#B" are parameter blocks which are common to the entire device in Mode-1, and valid only for Parts B01 - B16 in Mode-2 (Double Module mode).

Parameter address map

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

The parameters at address 5* ** ** are not given in this map. The parameters for address 5* ** ** are the same format as those at address 4* ** **.

○ System parameters [88]

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

<MODEL ID = 42H>						
Address(H)	Size(H)	Data(H)	Parameter	Description	Default(H)	Description
00 00 7F	00 00 01	00 - 01	SYSTEM MODE SET	[88] 00: MODE-1 (Single module mode) 01: MODE-2 (Double module mode)	00	00 (MODE1)
* Refer to "System exclusive messages related to Mode settings" (p.47).						
00 01 00	00 00 01	00 - 01	CHANNEL MSG RX PORT BLOCK00	[88] PORT A - B	00	PORT A
:	:	:	:	:	:	:
00 01 0F	00 00 01	00 - 01	BLOCK0F	PORT A - B	00	PORT A
00 01 10	00 00 01	00 - 01	BLOCK10	PORT A - B	01	PORT B
:	:	:	:	:	:	:
00 01 1F	00 00 01	00 - 01	BLOCK1F	PORT A - B	01	PORT B

* You can modify the receiving MIDI port at which channel messages will be received for each BLOCK. We suggest that normally you use PORT1 for BLOCK01-0F, and PORT2 for BLOCK10-1F. (In this case there is no need to change the setting.)

* Refer to page 51 for details of each BLOCK.

● Patch parameters

○ Patch common parameters

In MODE-1 (Single module mode) the SC-88ST functions as a single sound source module with 32 Parts. In MODE-2 (Double module mode) it functions as two sound source modules with 16 Parts each. The parameters common to all Parts in each module are called Patch Common parameters.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 00 00	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 - +100.0 [cent]	00 04 00 00	0 [cent]
40 00 01#				Use nibbled data.		
40 00 02#						
40 00 03#						
* Refer to section 5. Supplementary material, "About tuning" (p.58).						
40 00 04	00 00 01	00 - 7F	MASTER VOLUME (= F0 7F 7F 04 01 00 vv F7)	0 - 127	7F	127
40 00 05	00 00 01	28 - 58	MASTER KEY-SHIFT	-24 - +24 [semitones]	40	0[semitones]
40 00 06	00 00 01	01 - 7F	MASTER PAN	-63 (LEFT) - +63 (RIGHT)	40	0 (CENTER)
40 00 7F	00 00 01	00	MODE SET (Rx. only)	00 = GS Reset		
* Refer to "System exclusive messages related to Mode settings" (p.47).						
40 01 30	00 00 01	00 - 07	REVERB MACRO	00: Room 1 01: Room 2 02: Room 3 03: Hall 1 04: Hall 2 05: Plate 06: Delay 07: Panning Delay	04	Hall 2
40 01 31	00 00 01	00 - 07	REVERB CHARACTER	0 - 7	04	4
40 01 32	00 00 01	00 - 07	REVERB PRE-LPF	0 - 7	00	0
40 01 33	00 00 01	00 - 7F	REVERB LEVEL	0 - 127	40	64
40 01 34	00 00 01	00 - 7F	REVERB TIME	0 - 127	40	64
40 01 35	00 00 01	00 - 7F	REVERB DELAY FEEDBACK	0 - 127	00	0
40 01 37	00 00 01	00 - 7F	REVERB PREDELAY TIME	[88] 0 - 127[ms]	00	0

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

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

* In MODE-2 (Double module mode), REVERB PREDELAY TIME cannot be used.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 01 38	00 00 01	00 - 07	CHORUS MACRO	00: Chorus 1 01: Chorus 2 02: Chorus 3 03: Chorus 4 04: Feedback Chorus 05: Flanger 06: Short Delay 07: Short Delay(FB)	02	Chorus 3
40 01 39	00 00 01	00 - 07	CHORUS PRE-LPF	0-7	00	0
40 01 3A	00 00 01	00 - 7F	CHORUS LEVEL	0-127	40	64
40 01 3B	00 00 01	00 - 7F	CHORUS FEEDBACK	0-127	08	8
40 01 3C	00 00 01	00 - 7F	CHORUS DELAY	0-127	50	80
40 01 3D	00 00 01	00 - 7F	CHORUS RATE	0-127	03	3
40 01 3E	00 00 01	00 - 7F	CHORUS DEPTH	0-127	13	19
40 01 3F	00 00 01	00 - 7F	CHORUS SEND LEVEL TO REVERB	0-127	00	0
40 01 40	00 00 01	00 - 7F	CHORUS SEND LEVEL TO DELAY [88]	0-127	00	0

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

* In MODE-2 (Double module mode), CHORUS SEND LEVEL TO DELAY cannot be used.

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 01 50	00 00 01	00 - 09	DELAY MACRO	[88] 00: Delay 1 01: Delay 2 02: Delay 3 03: Delay 4 04: Pan Delay 1 05: Pan Delay 2 06: Pan Delay 3 07: Pan Delay 4 08: Delay to Reverb 09: Pan Repeat	00	Delay1
40 01 51	00 00 01	00 - 07	DELAY PRE-LPF	[88] 0 - 7	00	0
40 01 52	00 00 01	01 - 73	DELAY TIME CENTER	[88] 0.1ms - 1sec	61	340
40 01 53	00 00 01	01 - 78	DELAY TIME RATIO LEFT	[88] 4 - 500%	01	4
40 01 54	00 00 01	01 - 78	DELAY TIME RATIO RIGHT	[88] 4 - 500%	01	4
40 01 55	00 00 01	00 - 7F	DELAY LEVEL CENTER	[88] 0 - 127	7F	127
40 01 56	00 00 01	00 - 7F	DELAY LEVEL LEFT	[88] 0 - 127	00	0
40 01 57	00 00 01	00 - 7F	DELAY LEVEL RIGHT	[88] 0 - 127	00	0
40 01 58	00 00 01	00 - 7F	DELAY LEVEL	[88] 0 - 127	40	64
40 01 59	00 00 01	00 - 7F	DELAY FEEDBACK	[88] -64 - +63	50	80
40 01 5A	00 00 01	00 - 7F	DELAY SENDLEVEL TO REVERB [88]	0 - 127	00	0

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

* The relation between the DELAY TIME CENTER value and the actual delay time is as follows.

DELAY TIME	Time Range[ms]	Resolution[ms]	DELAY TIME	Time Range[ms]	Resolution[ms]
01 - 14	0.1 - 2.0	0.1	46 - 50	50.0 - 100.0	5.0
14 - 23	2.0 - 5.0	0.2	50 - 5A	100.0 - 200.0	10.0
23 - 2D	5.0 - 10.0	0.5	5A - 69	200.0 - 500.0	20.0
2D - 37	10.0 - 20.0	1.0	69 - 73	500.0 - 1000.0	50.0
37 - 46	20.0 - 50.0	2.0			

* DELAY TIME RATIO LEFT and DELAY TIME RATIO RIGHT specify the ratio in relation to DELAY TIME CENTER. The resolution is 100/24(%).

* In MODE-2 (Double module mode), Delay cannot be used.

40 02 00	00 00 01	00 - 01	EQ LOW FREQ.	[88] 100Hz, 200Hz	00	200Hz
40 02 01	00 00 01	34 - 4C	EQ LOW GAIN	[88] -12 - +12dB	40	0
40 02 02	00 00 01	00 - 01	EQ HIGH FREQ.	[88] 4kHz, 8kHz	00	8kHz
40 02 03	00 00 01	34 - 4C	EQ HIGH GAIN	[88] -12 - +12dB	40	0

* In MODE-2 (Double module mode), EQ (equalizer) cannot be used.

○ Patch Part parameters

The SC-88ST has 16 Parts in Group A and 16 Parts in Group B. Parameters that can be set individually for each Part are called Patch Part parameters. If you use exclusive messages to set Patch Part parameters, specify the address by Block number rather than Part Number (normally the same number as the MIDI channel). The Block number can be specified as one of 16 blocks, from 0(H) to F(H). To specify a Part of group A, use the Block number corresponding to the Part and specify an address of 40 ** ** via PORT A (normally MIDI IN A). To specify a Part of group B, use the Block number corresponding to the Part and specify an address of 40 ** ** via PORT B (normally MIDI IN B). To specify a Part of either group A or B from a single PORT, specify an address of 40 ** ** for group A Parts or an address of 50 ** ** for group B Parts when using PORT A. Conversely, to specify a Part of either group A or B from PORT B, specify an address of 50 ** ** for group A Parts or an address of 40 ** ** for group B Parts. In other words, when specifying Parts of the opposite side as the PORT being used, use addresses 50 ** **.

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

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

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

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

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

40 1x 0B	00 00 01	00 - 01	Rx. MODULATION	OFF / ON	01	ON
40 1x 0C	00 00 01	00 - 01	Rx. VOLUME	OFF / ON	01	ON
40 1x 0D	00 00 01	00 - 01	Rx. PANPOT	OFF / ON	01	ON
40 1x 0E	00 00 01	00 - 01	Rx. EXPRESSION	OFF / ON	01	ON
40 1x 0F	00 00 01	00 - 01	Rx. HOLD1	OFF / ON	01	ON
40 1x 10	00 00 01	00 - 01	Rx. PORTAMENTO	OFF / ON	01	ON
40 1x 11	00 00 01	00 - 01	Rx. SOSTENUTO	OFF / ON	01	ON
40 1x 12	00 00 01	00 - 01	Rx. SOFT	OFF / ON	01	ON
40 1x 13	00 00 01	00 - 01	MONO/POLY MODE	Mono / Poly (=CC# 126 01 / CC# 127 00)	01	Poly
40 1x 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE 1 = LIMITED-MULTI 2 = FULL-MULTI	SC-88MAP 01 SC-55MAP 00 at x=0 01 at x≠0	LIMITED-MULTI SINGLE (Drum Part) LIMITED-MULTI (Normal Part)

* ASSIGN MODE is the parameter that determines how voice assignment will be handled when sounds overlap on identical note numbers in the same channel (i.e., repeatedly struck notes). This is initialized to a mode suitable for each Part, so for general purposes there is no need to change this.

40 1x 15	00 00 01	00 - 02	USE FOR RHYTHM PART	0 = OFF 1 = MAP1 2 = MAP2	00 at x≠0 01 at x=0	OFF (Normal Part) at x≠0 MAP1 (Drum Part) at x=0
----------	----------	---------	---------------------	---------------------------------	------------------------	---

* This parameter sets the Drum Map of the Part used as the Drum Part. The SC-88ST can simultaneously (in different Parts) use up to two Drum Maps (MAP1, MAP2). With the initial settings, Part10 (MIDI CH=10, x=0) is set to MAP1 (1), and other Parts are set to normal instrumental Parts (OFF(0)).

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 1x 16	00 00 01	28 - 58	PITCH KEY SHIFT	-24 - +24 [semitones]	40	0 [semitones]
40 1x 17	00 00 02	08 - F8	PITCH OFFSET FINE	-12.0 - +12.0 [Hz]	08 00	0 [Hz]
40 1x 18#				Use nibblized data.		
* PITCH OFFSET FINE allows you to alter, by a specified frequency amount, the pitch at which notes will sound. This parameter differs from the conventional Fine Tuning (RPN #1) parameter in that the amount of frequency alteration (in Hertz) will be identical no matter which note is played. When a multiple number of Parts, each of which has been given a different setting for PITCH OFFSET FINE, are sounded by means of an identical note number, you can obtain a Celeste effect.						
40 1x 19	00 00 01	00 - 7F	PART LEVEL	0 - 127 (=CC# 7)	64	100
40 1x 1A	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40	64
40 1x 1B	00 00 01	00 - 7F	VELOCITY SENSE OFFSET	0 - 127	40	64
40 1x 1C	00 00 01	00 - 7F	PART PANPOT	-64(RANDOM), -63(LEFT) - +63(RIGHT) (=CC# 10, except RANDOM)	40	0 (CENTER)
40 1x 1D	00 00 01	00 - 7F	KEY RANGE LOW	(C-1) - (G9)	00	C-1
40 1x 1E	00 00 01	00 - 7F	KEY RANGE HIGH	(C-1) - (G9)	7F	G 9
40 1x 1F	00 00 01	00 - 5F	CC1 CONTROLLER NUMBER	0 - 95	10	16
40 1x 20	00 00 01	00 - 5F	CC2 CONTROLLER NUMBER	0 - 95	11	17
40 1x 21	00 00 01	00 - 7F	CHORUS SEND LEVEL	0 - 127 (=CC# 93)	00	0
40 1x 22	00 00 01	00 - 7F	REVERB SEND LEVEL	0 - 127 (=CC# 91)	28	40
40 1x 23	00 00 01	00 - 01	Rx.BANK SELECT	OFF / ON	01(00*)	ON(OFF*)
* Rx.BANK SELECT is set to ON by power-on or by receiving "GS RESET", and will be set OFF when "Turn General MIDI System On" is received.						
40 1x 24	00 00 01	00 - 01	RX BANK SELECT LSB	[88] OFF / ON	01	ON
* When RX BANK SELECT LSB = OFF, Bank Select LSB (Bn 20 11) will be treated as 00H regardless of its value.						
40 1x 2A	00 00 02	00 00 - 40 00 - 7F 7F	PITCH FINE TUNE	[88] -100 - 0 - +100 cent (= RPN#1)	0	
40 1x 2B#						
40 1x 2C	00 00 01	00 - 7F	DELAY SEND LEVEL	[88] 0-127 (=CC# 94)	00	0
* This cannot be used in MODE-2 (Double module mode).						
40 1x 30	00 00 01	00 - 7F	TONE MODIFY1 Vibrato Rate	[88] -64 - +63 (=NRPN# 8)	40	0
40 1x 31	00 00 01	00 - 7F	TONE MODIFY2 Vibrato Depth	[88] -64 - +63 (=NRPN# 9)	40	0
40 1x 32	00 00 01	00 - 7F	TONE MODIFY3 TVF Cutoff Freq.	[88] -64 - +63 (=NRPN# 32)	40	0
40 1x 33	00 00 01	00 - 7F	TONE MODIFY4 TVF Resonance	[88] -64 - +63 (=NRPN# 33)	40	0
40 1x 34	00 00 01	00 - 7F	TONE MODIFY5 TVF&TVA Env.attack	[88] -64 - +63 (=NRPN# 99)	40	0
40 1x 35	00 00 01	00 - 7F	TONE MODIFY6 TVF&TVA Env.decay	[88] -64 - +63 (=NRPN# 100)	40	0
40 1x 36	00 00 01	00 - 7F	TONE MODIFY7 TVF&TVA Env.release	[88] -64 - +63 (=NRPN# 102)	40	0
40 1x 37	00 00 01	00 - 7F	TONE MODIFY8 Vibrato Delay	[88] -64 - +63 (=NRPN# 10)	40	0
40 1x 40	00 00 0C	00 - 7F	SCALE TUNING C	-64 - +63 [cent]	40	0 [cent]
40 1x 41#		00 - 7F	SCALE TUNING C#	-64 - +63 [cent]	40	0 [cent]
40 1x 42#		00 - 7F	SCALE TUNING D	-64 - +63 [cent]	40	0 [cent]
40 1x 43#		00 - 7F	SCALE TUNING D#	-64 - +63 [cent]	40	0 [cent]
40 1x 44#		00 - 7F	SCALE TUNING E	-64 - +63 [cent]	40	0 [cent]
40 1x 45#		00 - 7F	SCALE TUNING F	-64 - +63 [cent]	40	0 [cent]
40 1x 46#		00 - 7F	SCALE TUNING F#	-64 - +63 [cent]	40	0 [cent]
40 1x 47#		00 - 7F	SCALE TUNING G	-64 - +63 [cent]	40	0 [cent]
40 1x 48#		00 - 7F	SCALE TUNING G#	-64 - +63 [cent]	40	0 [cent]
40 1x 49#		00 - 7F	SCALE TUNING A	-64 - +63 [cent]	40	0 [cent]
40 1x 4A#		00 - 7F	SCALE TUNING A#	-64 - +63 [cent]	40	0 [cent]
40 1x 4B#		00 - 7F	SCALE TUNING B	-64 - +63 [cent]	40	0 [cent]
* SCALE TUNING is a function that allows fine adjustment to the pitch of each note in the octave. The pitch of each identically-named note in all octaves will change simultaneously. A setting of ±0 cent (40H) is equal temperament. Refer to Section 5. Supplementary material, "The Scale Tune Feature" (p.58).						
40 2x 00	00 00 01	28 - 58	MOD PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 01	00 00 01	00 - 7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 03	00 00 01	00 - 7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 04	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 [cent]	0A	47 [cent]
40 2x 05	00 00 01	00 - 7F	MOD LFO1 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 06	00 00 01	00 - 7F	MOD LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 07	00 00 01	00 - 7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 08	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 09	00 00 01	00 - 7F	MOD LFO2 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 0A	00 00 01	00 - 7F	MOD LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 2x 10	00 00 01	40 - 58	BEND PITCH CONTROL	0 - 24 [semitones]	42	2 [semitones]
40 2x 11	00 00 01	00 - 7F	BEND TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 12	00 00 01	00 - 7F	BEND AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 13	00 00 01	00 - 7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 14	00 00 01	00 - 7F	BEND LFO1 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 15	00 00 01	00 - 7F	BEND LFO1 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 16	00 00 01	00 - 7F	BEND LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 17	00 00 01	00 - 7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 18	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 19	00 00 01	00 - 7F	BEND LFO2 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 1A	00 00 01	00 - 7F	BEND LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 20	00 00 01	28 - 58	CAf PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 21	00 00 01	00 - 7F	CAf TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 22	00 00 01	00 - 7F	CAf AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 23	00 00 01	00 - 7F	CAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 24	00 00 01	00 - 7F	CAf LFO1 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 25	00 00 01	00 - 7F	CAf LFO1 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 26	00 00 01	00 - 7F	CAf LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 27	00 00 01	00 - 7F	CAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 28	00 00 01	00 - 7F	CAf LFO2 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 29	00 00 01	00 - 7F	CAf LFO2 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 2A	00 00 01	00 - 7F	CAf LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 30	00 00 01	28 - 58	PAf PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 31	00 00 01	00 - 7F	PAf TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 32	00 00 01	00 - 7F	PAf AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 33	00 00 01	00 - 7F	PAf LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 34	00 00 01	00 - 7F	PAf LFO1 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 35	00 00 01	00 - 7F	PAf LFO1 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 36	00 00 01	00 - 7F	PAf LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 37	00 00 01	00 - 7F	PAf LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 38	00 00 01	00 - 7F	PAf LFO2 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 39	00 00 01	00 - 7F	PAf LFO2 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 3A	00 00 01	00 - 7F	PAf LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 40	00 00 01	28 - 58	CC1 PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 41	00 00 01	00 - 7F	CC1 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 42	00 00 01	00 - 7F	CC1 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 43	00 00 01	00 - 7F	CC1 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 44	00 00 01	00 - 7F	CC1 LFO1 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 45	00 00 01	00 - 7F	CC1 LFO1 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 46	00 00 01	00 - 7F	CC1 LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 47	00 00 01	00 - 7F	CC1 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 48	00 00 01	00 - 7F	CC1 LFO2 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 49	00 00 01	00 - 7F	CC1 LFO2 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 4A	00 00 01	00 - 7F	CC1 LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 50	00 00 01	28 - 58	CC2 PITCH CONTROL	-24 - +24 [semitones]	40	0 [semitones]
40 2x 51	00 00 01	00 - 7F	CC2 TVF CUTOFF CONTROL	-9600 - +9600 [cent]	40	0 [cent]
40 2x 52	00 00 01	00 - 7F	CC2 AMPLITUDE CONTROL	-100.0 - +100.0 [%]	40	0 [%]
40 2x 53	00 00 01	00 - 7F	CC2 LFO1 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 54	00 00 01	00 - 7F	CC2 LFO1 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 55	00 00 01	00 - 7F	CC2 LFO1 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 56	00 00 01	00 - 7F	CC2 LFO1 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 2x 57	00 00 01	00 - 7F	CC2 LFO2 RATE CONTROL	-10.0 - +10.0 [Hz]	40	0 [Hz]
40 2x 58	00 00 01	00 - 7F	CC2 LFO2 PITCH DEPTH	0 - 600 [cent]	00	0 [cent]
40 2x 59	00 00 01	00 - 7F	CC2 LFO2 TVF DEPTH	0 - 2400 [cent]	00	0 [cent]
40 2x 5A	00 00 01	00 - 7F	CC2 LFO2 TVA DEPTH	0 - 100.0 [%]	00	0 [%]
40 4x 00	00 00 01	00 - 02	TONE MAP NUMBER (= CC#32): Bank number LSB	[88] MAP 0 - 2 00: SELECTED 01: SC-55 MAP 02: SC-88 MAP	00	
*When "GS Reset" is received, this will be 00: SELECTED.						
40 4x 01	00 00 01	01 - 02	TONE MAP-0 NUMBER	[88] 01: SC-55 MAP 02: SC-88 MAP	(02)	
* When TONE MAP NUMBER is 00, this specifies the MAP. This setting will not be reset when the power is turned on or when "GS Reset", "General MIDI System On" or "System Mode Set" is received.						
40 4x 20	00 00 01	00 - 01	EQ ON/OFF	[88] OFF / ON	01	ON
* This turns the EQ (equalizer) on/off. In MODE-2 (Double module mode) it cannot be used.						

● **Drum setup parameters**

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

Address(H)	Size(H)	Data(H)	Parameter	Description
41 m1 rr	00 00 01	00 - 7F	PLAY NOTE NUMBER	Pitch coarse
41 m2 rr	00 00 01	00 - 7F	LEVEL	TVA level (=NRPN# 26)
41 m3 rr	00 00 01	00 - 7F	ASSIGN GROUP NUMBER	Non, 1 - 127
41 m4 rr	00 00 01	00 - 7F	PANPOT	-64(RANDOM), -63(LEFT) - +63(RIGHT) (=NRPN# 28, except RANDOM)
41 m5 rr	00 00 01	00 - 7F	REVERB SEND LEVEL	0.0 - 1.0 Multiplicand of the part reverb level (=NRPN# 29)
41 m6 rr	00 00 01	00 - 7F	CHORUS SEND LEVEL	0.0 - 1.0 Multiplicand of the part chorus level (=NRPN# 30)
41 m7 rr	00 00 01	00 - 01	Rx. NOTE OFF	OFF / ON
41 m8 rr	00 00 01	00 - 01	Rx. NOTE ON	OFF / ON
41 m9 rr	00 00 01	00 - 7F	DELAY SEND LEVEL	[88] 0.0 - 1.0 Multiplicand of the part reverb level (=NRPN# 31)

* When the Drum Set is changed, DRUM SETUP PARAMETER values will all be initialized.
 * It is not possible to simultaneously use both Chorus Send Level and Delay Send Level for a single Drum Instrument.

● **User instrument**

You can modify the parameters of an SC-88ST sound to your taste, and save your new settings in Variation numbers 64 or 65 of the SC-88 map (p.21). A sound saved in this way is called a User Instrument, and this procedure is called User Editing. You can save 256 different sounds in this way. When the SC-88ST is turned off, the values set for User Instrument will revert to their defaults.

The parameters you can set are Vibrato, Filter and Envelope.

The other sound parameters will use the values specified for the Part (Part parameters, p.23). Each Part has Part parameters which are named identically to the User parameters listed above which can be set for each sound. This means that the parameter value that actually applies to the sound will be a combination of these two settings. For example, if the Vibrato Rate has been set to +20 as a Part parameter, and to -5 as a User sound parameter, the Vibrato Rate of the resulting sound will be 20-5=+15.

* b: bank number (0H = GS Variation number 64, 1H = GS Variation number 65)
 * pp: program number (00 - 7F: 1 - 128)

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
20 b0 pp	00 00 01	01 - 02	SOURCE TONE# (MAP)	[88] --		
20 b1 pp	00 00 01	00 - 7F	(CC#00 : Bank number MSB)	[88] --		
20 b2 pp	00 00 01	00 - 7F	(PG# : Program number)	[88] --		
20 b3 pp	00 00 01	00 - 7F	USER INST MODIFY1-2	[88] -64 - +63	40	0
20 b4 pp	00 00 01	00 - 7F	Vibrato Rate	[88] -64 - +63	40	0
20 b4 pp	00 00 01	00 - 7F	USER INST MODIFY2-2	[88] -64 - +63	40	0
20 b5 pp	00 00 01	00 - 7F	Vibrato Depth	[88] -64 - +63	40	0
20 b5 pp	00 00 01	00 - 7F	USER INST MODIFY3-2	[88] -64 - +63	40	0
20 b6 pp	00 00 01	00 - 7F	TVF Cutoff Freq	[88] -64 - +63	40	0
20 b6 pp	00 00 01	00 - 7F	USER INST MODIFY4-2	[88] -64 - +63	40	0
20 b7 pp	00 00 01	00 - 7F	TVF Resonance	[88] -64 - +63	40	0
20 b7 pp	00 00 01	00 - 7F	USER INST MODIFY5-2	[88] -64 - +63	40	0
20 b8 pp	00 00 01	00 - 7F	TVF&TVA Env.attack	[88] -64 - +63	40	0
20 b8 pp	00 00 01	00 - 7F	USER INST MODIFY6-2	[88] -64 - +63	40	0
20 b9 pp	00 00 01	00 - 7F	TVF&TVA Env.decay	[88] -64 - +63	40	0
20 b9 pp	00 00 01	00 - 7F	USER INST MODIFY7-2	[88] -64 - +63	40	0
20 bA pp	00 00 01	00 - 7F	TVF&TVA Env.release	[88] -64 - +63	40	0
20 bA pp	00 00 01	00 - 7F	USER INST MODIFY8-2	[88] -64 - +63	40	0
20 bA pp	00 00 01	00 - 7F	Vibrato Delay	[88] -64 - +63	40	0

● **User Drum Set**

You can modify drum sound parameters to your liking, and save this data as a Drum Set. A Drum Set saved in this way is called a User Drum Set. You can save up to two Drum Sets, and since each set contains 84 instrumental sounds, this provides a total of 168 instrumental sounds (Drum Instruments). User Drum Sets are stored in Drum Set numbers 65 and 66 of the SC-88 map. You can also give each User Drum Set a name of your choice .

* d: drum set number (0H = User drum set number 65, 1H = GS Variation number 66)
 * rr: drum part note number (00 - 7F)

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
21 d1 rr	00 00 01	00 - 7F	PLAY NOTE	[88] 0 - 127	--	--
21 d2 rr	00 00 01	00 - 7F	LEVEL	[88] 0 - 127	--	--
21 d3 rr	00 00 01	00 - 7F	ASSIGN GROUP	[88] 0 - 127	--	--
21 d4 rr	00 00 01	00 - 7F	PAN	[88] 0 - 127	--	--
21 d5 rr	00 00 01	00 - 7F	REVERB SEND LEVEL	[88] 0 - 127	--	--
21 d6 rr	00 00 01	00 - 7F	CHORUS SEND LEVEL	[88] 0 - 127	--	--
21 d7 rr	00 00 01	00 - 01	RX NOTE OFF	[88] OFF / ON	--	--
21 d8 rr	00 00 01	00 - 01	RX NOTE ON	[88] OFF / ON	--	--
21 d9 rr	00 00 01	00 - 7F	DELAY SEND LEVEL	[88] 0 - 127	--	--
21 dA rr	00 00 01	01 - 02	SOURCE DRUM SET# (MAP)	[88] 1 - 2	--	--
21 dB rr	00 - 7F		(PG#)	[88] 0 - 127	--	--
21 dC rr	00 00 01	00 - 7F	SOURCE NOTE NUMBER	[88] 0 - 127	--	--

Section 4. Bulk Dump

Bulk Dump allows you to transmit a large amount of data at once, and is convenient for storing settings for the entire unit on a computer or sequencer. To make the SC-88ST perform a Bulk Dump transmission, send it a "Bulk Dump Request" message. Bulk Dump Request uses the Data Request 1 (RQ1) format, but unlike when transmitting Individual parameters, the "Size" specified by the request message refers not to the size of the data but rather specifies the contents of the data. For the data contents corresponding to each Size, refer to "Parameter Dump."
When the SC-88ST receives a Bulk Dump Request, it will transmit a Bulk Dump in the format given below.
The SC-88ST is also able to transmit a list of its internal sounds. This function can be used to display a list of sounds on a computer.

■ Parameter dump

○ Parameter dump request (receive only) [88]

This is a command that requests a set of parameter data, and uses "Data Request 1 (RQ1)" format. The Size specifies the requested data contents.

Address: 0C 00 00

Size: 00 00 00 : ALL request a dump of all parameters
00 00 01 : ALL 1 use this when not using USER TONE BANK or USER DRUM SET
00 00 02 : ALL 2 use this when USER TONE BANK, USER DRUM SET and DRUM SETUP settings have not been modified
00 00 10 : 16-part GS 1 use this when using only 16 Parts
00 00 11 : 16-part GS 2 use this when using only 16 Parts, and DRUM SETUP settings have not been modified
00 01 00 : USER TONE BANK (ALL) request a dump of all USER TONE BANK data
00 01 40 : USER TONE BANK #64 request a dump of USER TONE BANK #64 data (128 sounds)
00 01 41 : USER TONE BANK #65 request a dump of USER TONE BANK #65 data (128 sounds)
00 02 00 : USER DRUM SET (ALL) request a dump of all USER DRUM SET data
00 02 40 : USER DRUM SET #65 request a dump of USER DRUM SET #64 data
00 02 41 : USER DRUM SET #66 request a dump of USER DRUM SET #65 data

Example) Dump request for all parameters: F0 41 10 42 11 0C 00 00 00 00 00 74 F7

Normally, using ALL (00 00 00) provides the greatest predictability, but the amount of data is very large, and transmission requires approximately 20 seconds. In order to reduce transmission time and data volume, we suggest that you request a dump only of the necessary data.

○ Parameter dump [88]

When a Parameter Dump Request is received, the following data will be transmitted in "Data Set 1" format.

Address	Description	Number of packets	16-part USER TONE BANK USER DRUM SET																			
			ALL	ALL1	ALL2	GS1	GS2	ALL	#64	#65	ALL	#64	#65									
08 00 00 - 08 00 7F	SETUP	15	○	○	○	○	○															
28 00 00 - 28 0A 7F	USER TONE BANK #64	11	○							○	○											
28 10 00 - 28 1A 7F	USER TONE BANK #65	11	○							○		○										
29 00 00 - 29 0B 0F	USER DRUM SET #65	12	○															○	○			
29 10 00 - 29 1B 0F	USER DRUM SET #66	12	○															○		○		
48 1D 10 - 48 26 0F	PATCH EXTENSION A	9	○	○	○	○	○															
48 00 00 - 48 1D 0F	SYSTEM/PATCH A	30	○	○	○	○	○															
49 00 00 - 49 1F 7F	DRUM SETUP A	32	○	○			○															
58 1D 10 - 58 26 0F	PATCH EXTENSION B	9	○	○	○																	
58 00 00 - 58 1D 0F	SYSTEM/PATCH B	30	○	○	○																	
59 00 00 - 59 1F 7F	DRUM SETUP B	32	○	○																		

This table lists the data contents that will be transmitted, or when a Parameter Dump Request is received at MIDI IN A. When a Parameter Dump Request is received at MIDI IN B, A and B will be reversed for PATCH EXTENSION, SYSTEM/PATCH and DRUM SETUP.

* When data dumped by the SC-88ST is reloaded into the SC-88ST, be aware that the data may not be set correctly if the transmission order of the packets is changed, if the time interval between packets is changed, or if other messages are inserted between packets.

* The Parameter Dump data of the SC-88ST includes data for GS format compatible devices, and this data is compatible in both directions. However, depending on the settings of parameters which are newly extended on the SC-88ST, the musical result may differ.

* If the SC-88ST does not operate correctly with Bulk Dump data from another GS format compatible device, first initialize the SC-88ST before retransmitting the data.

* When another GS format compatible device receives Parameter Dump data that was transmitted by the SC-88ST, it may display a message such as "Address Error", but this is because the parameter addresses newly extended on the SC-88ST were not recognized by the other device. Parameters which could be recognized by that device have been correctly set.

■ Dumping a list of internal sounds

● Instrument list dump

○ Instrument list dump request (request only) [88]

This command requests a bulk dump of a list of the preset sounds (Instruments) in internal memory, and uses "Data Request 1 (RQ1)" format. The Size specifies the contents of the requested data.

```
Address: 0C 00 01
Size:    00 00 00 : ALL
         00 00 01 : SC-55 MAP
         00 00 02 : SC-88 MAP
         00 mm bb mm = MAP# 01 - 02 ( 01 = SC-55 MAP, 02 = SC-88 MAP)
         bb = BANK# 00 - 7F
```

○ Instrument list dump (transmit only) [88]

When Instrument List Dump Request is received, or when a dump operation is performed from the front panel, the sound names of the specified map will be transmitted continuously in the format given below, where 16 bytes are used for each sound name. The Address of the transmitted data is 0C 00 01 for all packets.

User bank sound names are not transmitted in a SC-88 MAP Instrument List dump.

```
DUMP FORMAT:
  C 1 2 3 4 5 6 7 8 9 A B C D E F
+-----+
|CC0|MAP|PC|00| TONE NAME(ASCII 12 characters)|
+-----+
CC0 : Variation number
MAP : MAP number 01 = SC-55 MAP, 02 = SC-88 MAP
PC  : Program number
```

● Drum set list dump

○ Drum set list dump request (receive only) [88]

This command requests a bulk dump transmission of a list of Preset Drum Sets in internal memory, and uses "Data Request 1 (RQ1)" format. The Size specifies the desired data contents.

```
Address: 0C 00 02
Size:    00 00 00 : ALL
         00 00 01 : SC-55 MAP
         00 00 02 : SC-88 MAP
```

○ Drum set list dump (transmit only) [88]

When a Drum Set Dump request is received, or when panel operations initiate a dump, the Drum Set names of the specified MAP will be transmitted successively in the format given below, where 16 bytes are used for each sound. The Address of the transmitted data will be 0C 00 02 for each packet.

```
DUMP FORMAT:
  0 1 2 3 4 5 6 7 8 9 A B C D E F
+-----+
|00|MAP|PC|00| DRUM TONE NAME(ASCII 12 characters)|
+-----+
MAP : MAP number 01 = SC-55 MAP, 02 = SC-88 MAP
PC  : Program number
```

● Drum instrument list dump

○ Drum instrument list dump request (receive only) [88]

This command requests a bulk dump transmission of the Instrument list of an internal Preset Drum Sets, and uses "Data Request 1 (RQ1)" format. The Size specifies the desired data contents.

```
Address: 0C 00 03
Size:    00 mm pp mm = MAP# 01 - 02 ( 01 = SC-55 MAP, 02 = SC-88 MAP)
         pp = Drum set# 00 - 7F (same as PC#)
```

○ Drum instrument list dump (transmit only) [88]

When a Drum Instrument Dump Request is received, or when a dump is initiated by panel operation, the Drum Instrument names of the specified Drum Set will be transmitted in the following format where 16 bytes are used for each Drum Instrument name. The address of the transmitted data will be 0C 00 03 for each packet.

```
DUMP FORMAT:
  0 1 2 3 4 5 6 7 8 9 A B C D E F
+-----+
|00|MAP|PC|KEY| DRUM TONE NAME(ASCII 12 characters)|
+-----+
MAP : MAP number 01 = SC-55 MAP, 02 = SC-88 MAP
PC  : Program number
KEY : Note number
```

Section 5. Supplementary material

● Decimal and Hexadecimal table

In MIDI documentation, data values and addresses/sizes of exclusive messages etc. are expressed as hexadecimal values for each 7 bits. The following table shows how these correspond to decimal numbers.

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

* Decimal values such as MIDI channel, bank select, and program change are listed as one(1) greater than the values given in the above table.

* A 7-bit byte can express data in the range of 128 steps. For data where greater precision is required, we must use two or more bytes. For example, two hexadecimal numbers aa bbH expressing two 7-bit bytes would indicate a value of aa x 128 + bb.

* In the case of values which have a \pm sign, 00H = -64, 40H = \pm 0, and 7FH = +63, so that the decimal expression would be 64 less than the value given in the above chart. In the case of two types, 00 00H = -8192, 40 00H = \pm 0, and 7F 7FH = +8191. For example if aa bbH were expressed as decimal, this would be aa bbH - 40 00H = aa x 128 + bb - 64 x 128.

* Data marked "nibbled" is expressed in hexadecimal in 4-bit units. A value expressed as a 2-byte nibble 0a 0bH has the value of a x 16 + b.

<Example 1> What is the decimal expression of 5AH ?
From the preceding table, 5AH = 90

<Example 2> What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?
From the preceding table, since 12H = 18 and 34H = 52
18 x 128 + 52 = 2356

<Example 3> What is the decimal expression of the nibbled value 0A 03 09 0D ?
From the preceding table, since 0AH = 10, 03H = 3, 09H = 9, 0DH = 13
((10 x 16 + 3) x 16 + 9) x 16 + 13 = 41885

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

```
16) 1258
   78 ... 10
   ---
    4 ... 14
     0 ... 4
```

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

● **Examples of actual MIDI messages**

<Example 1> 92 3E 5F

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

<Example 2> CE 49

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

<Example 3> EA 00 28

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

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

<Example 4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F

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

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

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

RPN parameter number 00 00H is Pitch Bend Sensitivity, and the MSB of the value indicates semitone units, so a value of 0CH = 12 sets the maximum pitch bend range to ±2 semitones (1 octave). (On GS sound sources the LSB of Pitch Bend Sensitivity is ignored, but the LSB should be transmitted anyway (with a value of 0) so that operation will be correct on any device.

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

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

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

* TPQN : Ticks Per Quarter Note

● **Example of an Exclusive message and calculating a Checksum**

Roland Exclusive messages (RQ1, DT1) are transmitted with a checksum at the end (before F7) to make sure that the message was correctly received. The value of the checksum is determined by the address and data (or size) of the transmitted exclusive message.

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

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

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

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

<Example 1> Setting REVERB MACRO to ROOM 3

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

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

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

Next we calculate the checksum.

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

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

<Example 2> Requesting transmission of the LEVEL for DRUM MAP 1 NOTE NUMBER 75 (D#5; Claves)

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

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

(1)Exclusive Status (2)ID (Roland) (3)Device ID (17)
 (4)Model ID (GS) (5)Command ID (R01) (6)End of Exclusive

Next we calculate the checksum.

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

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

● **About tuning**

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

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

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

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

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

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

<Example> Set the tuning of MIDI channel 3 to A4 = 442.0Hz
Send RPN#1 to MIDI channel 3. From the above table, the value is 45 03H.

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

● **The Scale Tune Feature (address : 40 1x 40)**

The scale Tune feature allows you to finely adjust the individual pitch of the notes from C through B. Though the settings are made while working with one octave, the fine adjustments will affect all octaves. By making the appropriate Scale Tune settings, you can obtain a complete variety of tuning methods other than equal temperament. As examples, three possible types of scale setting are explained below.

○ **Equal Temperament**

This method of tuning divides the octave into 12 equal parts. It is currently the most widely used form of tuning, especially in occidental music. On the SC-88ST, the default settings for the Scale Tune feature produce equal temperament.

○ **Just Temperament (Keytone C)**

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

○ **Arabian Scale**

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

Example Settings

Note name	Equal Temperament	Just Temperament (Keytone C)	Arabian Scale
C	0	0	-6
C#	0	-8	+45
D	0	+4	-2
D#	0	+16	-12
E	0	-14	-51
F	0	-2	-8
F#	0	-10	+43
G	0	+2	-4
G#	0	+14	+47
A	0	-16	0
A#	0	+14	-10
B	0	-12	-49

The values in the table are given in cents. Refer to the explanation of Scale Tuning on page 52 to convert these values to hexadecimal, and transmit them as exclusive data.

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

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

INDEX

[A]

Active Sensing	19
Aftertouch	19
All Notes Off	19
All Sounds Off	19
Apple Macintosh Series	10, 11
Attack Time	26
Audio Input	9

[B]

Bank Select	12, 16
-------------------	--------

[C]

Caf	
LFO Rate	25
LFO Pitch	25
LFO TVF	25
LFO TVA	25
Capital	12, 21
Channel	15, 21
Channel Pressure	19
Chorus Delay	29
Chorus Depth	29
Chorus Feedback	29
Chorus Level	29
Chorus Macro	28
Chorus Pre-LPF	29
Chorus Rate	29
Chorus Send Level	17
Chorus Send Level To Delay	29
Chorus Send Level To Reverb	29
Control Change	16
Computer Cable	10, 32
Computer Switch	10, 11
Cutoff Frequency	26

[D]

Data Entry	17
Decay Time	26
Delay Feedback	30
Delay Level	30
Delay Level Center	29
Delay Level Left	30
Delay Level Right	30
Delay Macro	28
Delay Pre-LPF	29
Delay Send Level	17
Delay Send Level To Reverb	30
Delay Time Center	29
Delay Time Ratio Left	29
Delay Time Ratio Right	29
Device ID	19
Double Module Mode	22
Drum Part	21, 23
Drum Set	13, 39

[E]

Effect	28
Exclusive Message	19, 46
Expression	16
EQ High Freq.	28
EQ High Gain	28
EQ Low Freq.	28
EQ Low Gain	28

[F]

Fine Tune	23
-----------------	----

[G]

General MIDI (GM) Initialize	22
General MIDI System	20
General MIDI System On	19, 46
GS Format	20
GS Initialize	22
GS Reset	19, 47

[H]

Headphones	9
Hold 1	16

[I]

IBM PC/AT	10, 11
Initialization	22
Instrument	12, 21, 33

[K]

Key Pressure	19
Key Range High	24
Key Range Low	24
Key Shift	
Master Key Shift	27
Part Key Shift	23

[L]

Level	
Master Level	27
Part Level	23

[M]



Maximum Polyphony	22
Mono/Poly Mode	23
Master Tune	27
MIDI	15
MIDI Implementation	44
MIDI Implementation chart	59
MIDI Channel	15, 21
MIDI Connector	15
Modulation	16
Modulation Depth (MOD LFO1 PITCH DEPTH)	24, 52
Mono	23
Multi-Timbral Sound Generator	21

[N]

Normal Part	21, 23
Note Message	16
Note Name	16, 39
Note Number	16, 39
NRPN	17, 18, 45

Specifications

[P]	
Pan	
Master Pan	27
Part Pan	23
Part	21
Part Parameter	23
Part Monitor Indicator	7
Pitch Bend Change	16
Pitch Bend Sensitivity	24
Poly	23
Polyphonic Key Pressure	19
Portamento	17
Portamento Control	17
Portamento Time	17
Power	8
Program Change	12, 16
[R]	
Release Time	26
Reset All Controllers	19
Resonance	26
Reverb Character	29
Reverb Delay Feedback	29
Reverb Level	29
Reverb Macro	28
Reverb Pre-Delay Time	29
Reverb Pre-LPF	29
Reverb Send Level	17
Reverb Time	29
RPN	17, 46
Rx.Bank Select	23
Rx.NRPN	23
[S]	
SC-55MAP Button	7
SFX	35, 37, 41, 43
Single Module Mode	22
Soft	17
Sostenuto	16
System Exclusive Message	19, 46
[T]	
Troubleshooting	31
Tuning	23, 27
THRU	15
THRU Function	12
[U]	
USE FOR RHYTHM PART	23
[V]	
Velocity Sense Depth	24
Velocity Sense Offset	24
Vibrato Delay	25
Vibrato Depth	25
Vibrato Rate	25
Voice	22
Volume	16
Variation	12, 21

Model :Sound Canvas SC-88ST
 (GS format  /General MIDI System )

● Number of parts

32

● Maximum Polyphony

64 (voices)

● Internal Memory

Sound map : 2 (SC-55, SC-88)

Preset sounds : 654

Drum sound set : 24 (include 2 SFX Set)

● Effects

Reverb (8types)

Chorus (8types)

Delay (10types)

2 band Equalizer

● Indicators

Power Indicator

Part Monitor Indicator x 32

● Connectors

MIDI connectors

(IN A, IN B, OUT)

Audio Input jack x 2 (L,R)

Audio Output jack x 2 (L,R)

Headphones jack

COMPUTER Connector

● Power Supply

DC 9V(AC Adaptor)

● Current Draw

900mA

● Dimensions

218 (W) x 250 (D) x 46 (H) mm

8-5/8 (W) x 9-7/8 (D) x 1-13/16 (H) inches

● Weight

1.3 kg(Excluding AC Adaptor)

2 lbs 14 oz

● Accessories

Owner's manual

AC Adaptor

* In the interest of product development, the specifications and/or appearance of this unit are subject to change without prior notice.

For the U.K.

IMPORTANT: THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE.

BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.
The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.
Under no circumstances must either of the above wires be connected to the earth terminal of a three pin plug.

For Europe



This product complies with the requirements of European Directive 89/336/EEC.

For the USA

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Unauthorized changes or modification to this system can void the users authority to operate this equipment.
This equipment requires shielded interface cables in order to meet FCC class B Limit.

For Canada

CLASS B NOTICE

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

CLASSE B AVIS

Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radioélectriques fixés dans le Règlement des signaux parasites par le ministère canadien des Communications.

 Roland®

71451690

UPC

71451690



10981

SC-8837