Rhodes
model 660

OWNER'S MANUAL
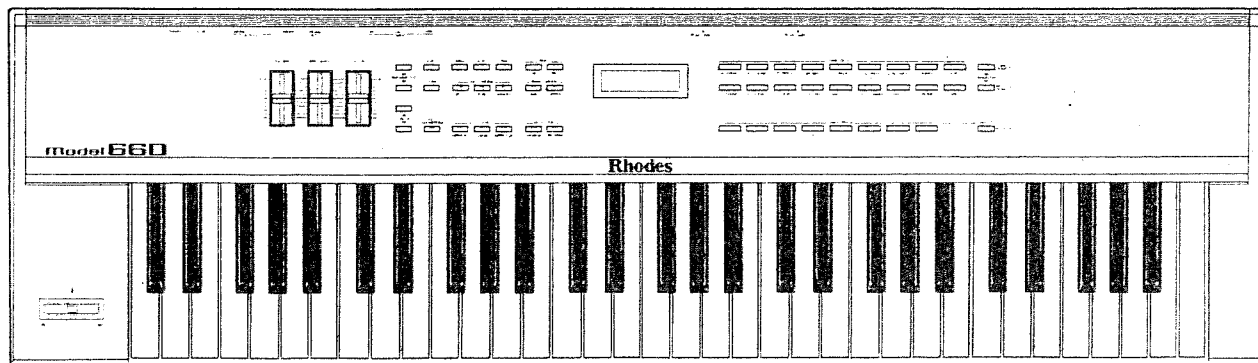
model 660   Rhodes

Information

● Please use this AC Adaptor only with the specified device.
● Please use the AC Adaptor of appropriate voltage (120, 220 or 240) depending on the voltage system in your country.
● When the device is not used for a long period, be sure to disconnect the AC Adaptor (Power Supply Unit) from the wall outlet.
● When you need repair service, call your local Roland Service Station or the authorized Roland distributor in your country as shown below.

U. S. A.

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

CANADA

Roland Canada Music Ltd.
(Head Office)
13880 Mayfield Place
Richmond B. C., V6V 2E4
CANADA
☎ (604) 270 - 6626

Roland Canada Music Ltd.
3469 rue Ashby,
St Laurent,
Quebec H4R 2C1
CANADA
☎ (514) 335 - 2009

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AUSTRALIA
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50 Garden Street
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Auckland 3
NEW ZEALAND
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Roland (UK) Ltd.
Amalgamated Drive
West Cross Centre, Brentford,
Middlesex TW8 9EZ,
UNITED KINGDOM
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WEST GERMANY

Roland Elektronische
Musikinstrumente
Handelsgesellschaft mbH.
Oststrasse 96,
2000 Norderstedt
WEST GERMANY
☎ 040 / 52 60 09 25

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Roland - Benelux N. V.
Houtstraat 1
B - 2431 Oevel - Westerlo
BELGIUM
☎ 014 - 58 45 39

DENMARK

Roland Scandinavia A/S
Langebrogade 6, 1937,
DK - 1023 Copenhagen K.
DENMARK
☎ (01) 95 31 11

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

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Benum Music A/S
Haakon den godes Vei 14
N - 0319 Oslo 3,
NORWAY
(Box 145 Vindern, N - 0319
Oslo 3 NORWAY)
☎ 02 141266

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OY Musiikki Fazer Musik AB
Takomotie 3
00380 Helsinki 38,
FINLAND
☎ 05 56551

ITALY

Roland Italy S. P. A.
Via Gallarate 58
20151 Milano
ITALY
☎ 02 - 3086849

SWITZERLAND

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

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102, Avenue Jean - Jaures
69367 Lyon Cedex 07
FRANCE
☎ (7) 858 - 54 60

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

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Vietronic S. A.
Bolivia 239
08020 Barcelona
SPAIN
☎ 34 - 307 47 12

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E. Dematte & Co.
Neu - Rum Siemens - Strasse 4
A - 6021 Innsbruck Box 591
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Athens
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☎ 3620130

Rhodes model 660

Owner's Manual

Thank you, and congratulations on your purchase of the Rhodes Model 660. The Model 660 is an electronic keyboard instrument that contains a full palette of high-quality sounds, produced by its RS-PCM process sound source, and is also capable of serving as a multi-timbral sound module. It can be used alone, for keyboard performances, or combined with a sequencer or the like for ensemble performance. In order to get a good understanding of the unit's wide range of superior functions, and assure continuing satisfaction, please read this manual in its entirety.

How to Use This Manual

This manual, in three main sections, explains the functions and procedures necessary for normal play of the instrument, and the various types of settings and how they are made. It should be read while referring to the table of contents when necessary.

Provided at the rear is an alphabetical index, which is convenient to use when you are uncertain about something during operation of the unit.

The information provided in each section is as follows:

Section I PLAYING

Here explained is how the Model 660 is played; including connection of external equipment, turning on power, selecting tones, and using the performance functions.

Section II CHANGING SETTINGS

On the Model 660 a variety of settings, such as those for sounds or performance functions, can be altered as desired. This section explains how to make such settings, and how the various functions work.

Section III USING MIDI IN PERFORMANCE

Explained here are the basic concepts behind MIDI, how MIDI is used on the Model 660 and how the settings are made, along with explanation of applications using other MIDI devices.

FEATURES

● RS - PCM Process Sound Source

Equipped with an RS - PCM sound source, the same as that which has won acclaim for the Roland U - 20. You are thus provided with easy access to realistic, dynamic, high - quality sounds.

● A Wealth of Tones Contained Internally

Starting with piano and organ, in total there are 128 different sounds (Tones) contained within the Model 660. Moreover, you can increase the number of Tones even further by adding optional PCM Cards (Rhodes SN - U01 Series).

● Keyboard Well - suited for Performance

Instantaneous changes for a variety of settings, such as selection of the tone, or whether effects are on are off can be made. The convenience can be well appreciated in live performance.

● Comprehensive Performance Functions

A variety of key effects can be used to enhance your performances, including Harmony, Chase, and Arpeggio.

● Equipped with Digital Effectors

More breadth and depth can be obtained with sounds, since the unit is provided internally with Chorus and Reverb effectors.

● Serves as Multi - Timbral Sound Module

The Model 660 is capable of being used as a multi - timbral sound module, with 6 separate parts. It provides readily for ensemble performances when connected with a sequencer.

CONTENTS

IMPORTANT NOTES

When employing an AC adaptor, make certain you use only one that has been supplied by the manufacturer. Use of any other power adaptor could result in malfunction or damage.

[Concerning the power supply]

● Whenever you make any connections with other devices, always turn off the power to all equipment first. This will help in preventing malfunction, and damage to speakers.

● Do not force the unit to share the same power outlet as one used for distortion producing devices (such as motors, variable lighting devices). Be sure to use a separate power outlet.

● Before using the AC adaptor, always make certain the voltage of the available power supply conforms to its rating.

● Do not place heavy objects onto, step on, or otherwise risk causing damage to the power cord.

● Whenever you disconnect the AC adaptor from the outlet, always grasp it by the plug, to prevent internal damage to the cord and the hazard of possible short circuits.

● If the unit is not to be used for a long period of time, unplug the cord from the socket.

[Concerning placement]

● Avoid using or storing the unit in the following places, as damage could result.
  ○ Places subject to extremes in temperature. (Such as under direct sunlight, near heating units, above equipment generating heat, etc.)
  ○ Places near water and moisture. (Baths, washrooms, wet floors, etc.) Places otherwise subject to high humidity.
  ○ Dusty environments.
  ○ Places where high levels of vibration are produced.

● Should the unit be operated nearby television or radio receivers, TV pictures may show signs of interference, and static might be heard on radios. In such cases, move the unit out of proximity with such devices.

[Maintenance]

● For everyday cleaning, wipe the unit with a soft dry cloth, or one that is dampened slightly. To remove dirt that is more stubborn, wipe using a mild, neutral detergent. Afterwards, make sure to wipe thoroughly with a soft cloth.

● Never apply benzene, thinners, alcohol or any like agents, to avoid the risk of discoloration and deformation.

[Other Precautions]

● Protect the unit from strong impact.

● Avoid getting any foreign objects (coins, wire, etc.), or liquids (water, drinks, etc.) into the unit.

● A certain small amount of heat will be radiated from the unit, and thus should not be considered abnormal.

● Before using the unit in a foreign country, check first with your local Roland Service Station.

● At any time that you notice a malfunction, or otherwise suspect there is damage, immediately refrain from using the unit. Then contact the store where bought, or the nearest Roland Service Station.

[Concerning memory backup]

● Within the unit is contained a battery which serves in maintaining the contents of memory while the main power is off. The normal life of this battery is 5 years or more, but it is strongly recommended that you change it every 5 years as a rule. When it is time to change the battery, contact a Roland Service Station.

* The first time you need to change the battery could occur before 5 years have passed.

● When the battery gets weak the following will appear in the display. By this time, it is possible that the contents of memory have already been lost.
"Check Internal Battery"

● Please be aware that the contents of memory may at times be lost; when sent for repairs or when by some chance a malfunction has occurred. Important data should be saved on *** , or written down on paper. During repairs, due care is taken to avoid the loss of data, however, in certain cases, such as when circuitry related to memory itself is out of order, we regret that it may be impossible to restore the data.

TUNE Button

Pressed to tune the unit. (☞ p. 22) Also, ROM Play is carried out by holding down [EDIT] while pressing [TUNE] (☞ p. 12)

EDIT Button

Pressed when wishing to change the Tone (sound). Also, [EDIT] is held down and used in combination with a variety of buttons to enable the mode in which changes can be made for that function. (Their indicator lights) (☞ p. 29) [EDIT] is pressed once again to return to the Play mode.

PARAMETER Button

Used to select a parameter which is to be changed.

VALUE Slider / Buttons

Used to change the values of parameters. The slider is used for making broad, approximate value changes, then the buttons are used to set exact values.

KEY TRANSPOSE Button

Toggles between On / Off for transposition. If [KEY TRANSPOSE] is held down while [KEY TRANSPOSE] is pressed, you enter the mode where setting changes can be made for Key Transpose. (☞ p. 41)

BRILLIANCE Slider

Adjusts overall tone quality. When moved upwards, sound gets brighter, and when moved downwards it gets milder.

VOLUME Slider

Adjusts the overall volume that will be output from the Output and headphone jacks.

KEY EFFECT Buttons

Provide selection of Harmony, Chase, or Arpeggio functions. (☞ p. 20) The indicator for the currently selected function lights. The function is turned off when the button is pressed again and its indicator goes out.
If [EDIT] is held down while [CHASE] is pressed, you enter the mode where settings can be made for Chase.
(☞ p. 43)
If [EDIT] is held down while [ARPEGGIO] is pressed, you enter the mode where settings can be made for Arpeggio. (☞ p. 45)

BENDER / MODULATION Lever

Used to raise or lower the pitch, or add a vibrato effect. (☞ p. 9)

MIDI Button

Pressed to change the MIDI Receive channel for each Part. If [EDIT] is held down while [MIDI] is pressed, you enter the mode where settings can be made for other MIDI parameters. (☞ p. 53)

LEVEL Button

Pressed to adjust the volume for each Part. (☞ p. 32)

PAN Button

Pressed to adjust the Pan (sound image orientation) for each Part. (☞ p. 30)

PART Buttons

Used to change Parts.

Display

PANEL MODE Buttons

When using the panel buttons to change Tone (or Part) they provide selection for whether such change is for Upper or Lower. (☞ p. 14) The indicator for the mode currently selected will light up.

KEY MODE Buttons

Provide selection of Key Mode, which determines how Tones are to be combined. (☞ p. 13) The indicator for the selected mode lights. If [EDIT] is held down while [SPLIT] is pressed, you can then make settings for Split Point. (☞ p. 40)

EFFECTOR Buttons

Used to turn Chorus and Reverb either On or Off. When On the indicator will be lit.
If [EDIT] is held down while [CHORUS] is pressed, you can then make settings for Chorus. (☞ p. 41)
If [EDIT] is held down while [REVERB] is pressed, you can then make settings for Reverb. (☞ p. 42)

VARIATION Buttons

Used to make selection of a variation from the Tone group selected by a TONE SELECT button. (☞ p. 14)

TONE SELECT Buttons

Used to choose the Tone to be used. (☞ p. 14)

USER PATCH Buttons

Used to choose a Patch, a stored collection of settings for Key mode, Effectors, etc. (☞ p. 17)

WRITE Button

Pressed when wishing to store a collection of setting changes as a Patch. (☞ p. 30) The [WRITE] is held down while pressing the USER PATCH button which is to be the destination. Additionally, the button is used for transmitting Tone or Patch settings over MIDI. (☞ p. 59)

Rhodes MODEL660

TONE DUMP
PATCH DUMP

A. PIANO   A. GUITAR   STRINGS   CHOIR   TP/TRB   MALLET/SYNTH WAVE   BASS   DRUMS
E. PIANO   E. GUITAR   BRASS   E. ORGAN   O. SOURCE   WIND   SLAP BASS   CARD 1
                                                                              CARD 2

USER PATCH

WRITE

PEDAL HOLD Jack

Accepts connection of an optionally available pedal switch (BP-2R, BOSS FS-5U, etc.) which then provides On/Off control over the Hold function. (☞ p. 20)

PCM CARD Slots

Slots which accept optionally available PCM Cards (SN-U01 Series).

MIDI Connectors

Connectors used to make connections with other MIDI equipment. (☞ p. 48)

POWER Switch

Turns power on or off.

AC Adaptor Jack

Jack to which the supplied AC Adaptor is connected.

OUTPUT Jacks

Jacks providing output for the unit. From here, connection is made to an amplifier or mixer.

PHONES Jack

Jack accepting connection of headphones (Roland RH-100, etc.). Headphones of an impedance of from 8 to 150 ohms should be used. Even with headphones connected, sound is still output from the Output Jacks.

THRU   MIDI OUT   IN   PEDAL HOLD   PHONES   OUTPUT R   L (MONO)   DC IN 9V   POWER

USE ROLAND AC ADAPTOR ONLY
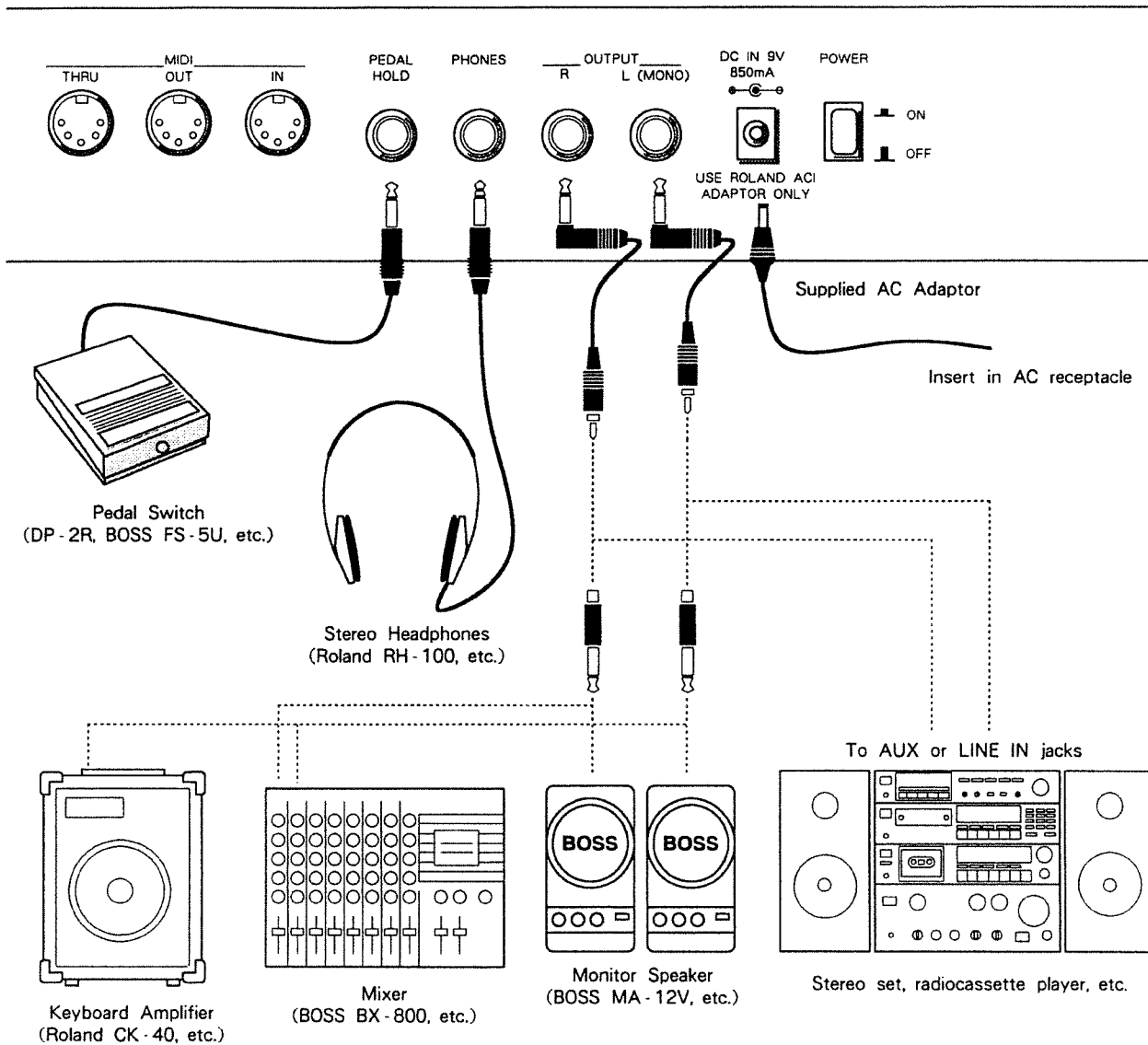
ON
OFF

MODULATION
BENDER

PCM CARD 1
PCM CARD 2

7

8

PLAYING

[1] Making Connections

Since the Model 660 does not incorporate an amplifier or speakers within the unit, you will need to have a separate amplifier and speakers.

Before making any connections, first make sure you have power off on both this unit and your amplifier or other equipment. If connections are made while power is on, you may cause damage to the speakers, or the equipment.

The supplied cable can also be connected directly with ordinary audio equipment by removing the plug adaptors, and using the phono plugs. In order to enjoy the capabilities of the unit to the full, we recommend that you use it in stereo. However, if you wish to use it in mono, connect the cord to the L (MONO) jack.

Pedal Switch
(DP-2R, BOSS FS-5U, etc.)

Stereo Headphones
(Roland RH-100, etc.)

Supplied AC Adaptor

Insert in AC receptacle

To AUX or LINE IN jacks

Keyboard Amplifier
(Roland CK-40, etc.)

Mixer
(BOSS BX-800, etc.)

Monitor Speaker
(BOSS MA-12V, etc.)

Stereo set, radiocassette player, etc.

[2] Auditioning the Unit

You should now be ready to try selecting and playing some of sounds.

1. Turning on Power

① Check once again to make sure all connections are in order, then turn on the Model 660's power switch.

```
***   Rhodes   ***
***   MODEL660  ***
```

After a brief interval, the display will show what was displayed the last time the unit was on.

```
Part1▶A.PIANO 1
Part2:AC.BASS
```

* Since the unit is equipped with a circuit protection device, it requires a brief interval after power is turned on before it can be operated.

② Turn on power to the amplifier, then adjust the volume on this unit and other external equipment.

The unit is now ready to be played. If you play the keyboard, you will notice that with middle C (C4) as the dividing line, keys to the right of it (Upper section) produce a piano sound (A. PIANO 1), and those to the left of it (Lower section) produce a bass sound (AC. BASS).

This condition is referred to as Split, and the key at the dividing line, C4, is called the Split Point. In the display, the name of the Upper Tone is shown on the upper line, and the Lower Tone's name appears on the lower line.

Part number   Tone name
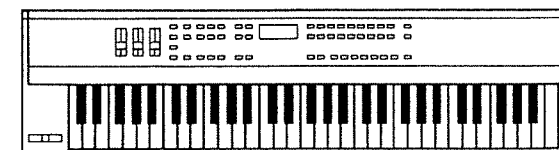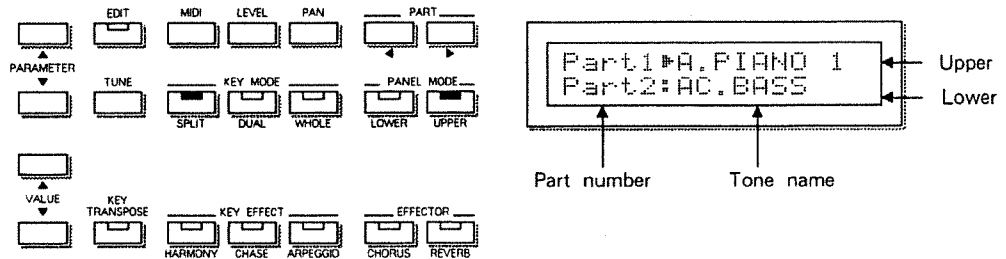
The Lower Tone ◀——|——▶ The Upper Tone
Bass sound   Piano sound

Split Point : C4

2. Listening to ROM Play

Stored inside the Model 660 are three songs which have been created to demonstrate how the internal multi - timbral sound source could be employed to the full. By listening to them you should be able to confirm the high - quality sound provided by the Model 660.

① While holding down [EDIT], press [TUNE].

③To return to the original, play mode, press [EDIT].

```
=== ROM Play ===
Chain of Songs
```

② If you wish to choose a certain song, select it using PARAMETER [▲][▼].
If making a selection is skipped, both songs will be played, starting at number 1.

③ Press either [▲] or [▼] at VALUE, and the song starts playing.
(Press either once again and play will stop.)

Song Title	Biographies of Composers
Zone 4 U Music by Mitsuru Sakaue Copyright © 1989, Roland Corporation	**Mitsuru Sakaue** Mitsuru Sakaue began composing and doing arrangements for commercials and videos while still in school. In particular, his studio work earned for him a solid reputation. Currently, as chief producer within Idecs, Inc., he produces commercial musics and jingles for FM stations. His range of activity is broad, and includes his work as an instructor and expert on musical instruments/computer music for the Roland Learning Center (Japan), as well as for other schools. In addition, he has had numerous other opportunities for displaying his talents well while serving as demonstrator/product specialist for Roland. The ROM demo, "T - Jazz # 1", in the U - 110 was also one of his creations.
Country Rhodes Music by Adrian Scott Copyright © 1989, Adrian Scott	**Adrian Scott** Adrian Scott formerly handled the vocals and keyboards for the popular group from Australia, "Air Supply". Since following the solo path, he in 1984 won the Silver Prize at the "World Song Festival Tokyo '84". Currently, he is involved as a a producer of commercial music and music for films. In addition, as a session player, he has performed along with a number of Australia's top musicians, including Jhon Farnham and Kylie Minogue. He lives in Melbourne, Australia.
Funk Patrol Music by Marvin Sanders Copyright © 1989, Marvin Sanders	**Marvin Sanders** Marvin Sanders is an accomplished composer/keyboardist and authority on creative sequencing applications. An active musical director and composer for film, television, and theatre, he lives in Los Angeles where his talents are utilized in studios and live performance. As a product specialist and clinician for the Roland Corporation, other contributions have included the "Cityslicker" ROM demo in the D - 5, and programming for the TN - Series Style Cards.

* Should you wish to have the Model 660 be played similar to ROM Play, you would need a separate unit used to play it automatically, such as a sequencer.

* During ROM Play, nothing will be heard if you play the keyboard. Also, the performance data of ROM Play is not output from MIDI OUT.

● Multi - timbral Sound Sources

A multi - timbral sound source is a device which is capable of functioning as multiple individual sound sources, all in one unit. Within the Model 660, six Parts are provided, and through assigning a different Tone to each of them, they can each be played individually. In other words, each of the Parts functions like a conventional, stand - alone sound module. With the Model 660 alone in control, only 2 Parts can be handled at the same time. In order to obtain fuller use of the multi - timbral capabilities, you will need a separate sequencer. For details, refer to Section Three (☞ p. 47).

3. Altering the Mixture of Sounds

■ Selection of a Key Mode

On the Model 660 there are many different types of sounds, 128 in total, that are contained internally. These sounds are referred to as Tones. When playing the keyboard, such Tones can be used in differing combinations to produce the sound you want. The function which determines how the Tones are to be used is called the Key Mode .

Selection for the Key Mode is made using the KEY MODE buttons. Try changing the Key Mode by pressing the buttons. You should be able to get some idea of how changes occur in the way Tones are used.

● SPLIT : The keyboard is divided at the Split Point into Upper and Lower sections.
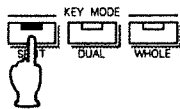
In this mode, bass can be played in the Lower section, and the melody can be played in the Upper section, for example, or the Lower section can provide accompaniment while the Upper section is used for solos. When shipped, the unit is set with the Split Point at middle C (C4).

Lower Tone   Upper Tone

Split Point : C4
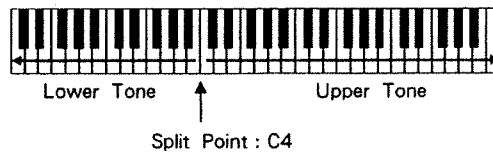
● DUAL : The Upper and Lower Tones are stacked together.
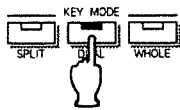
In this mode you can obtain fatter sounds by stacking together two Tones of a similar nature, such as from the strings or brass groups. In addition, you can experiment with any variety of Tone combinations.

Upper and Lower Tones are stacked together.
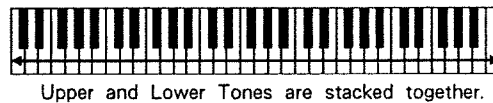
● WHOLE : The Upper Tone alone is sounded.
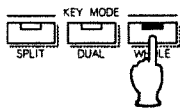
Effective to use when numerous notes need to be sounded, such as with piano. For most ordinary playing it also may be best to leave the unit set at WHOLE.

Upper Tone

13
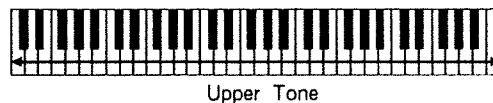
■Selection of the Panel Mode

When using the Split or Dual Key Modes, the PANEL MODE buttons are used to change to either Upper or Lower Tones. This is called the Panel Mode. You can tell which is selected, since the indicator on its button will light, and in the display, a " ▶ " will appear next to it. Note that you cannot change to Lower while set to WHOLE, since only the Upper one can be sounded.

When selectting the Upper Tone.

Part1(●)A.PIANO 1
Part2:AC.BASS

When selectting the Lower Tone.

Part1:A.PIANO 1
Part(●)AC.BASS

4. How Tones are Selected

Using TONE SELECT, choose the general type of Tone, then with VARIATION ▲ ▼ , select the variation of it you desire.

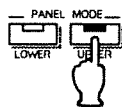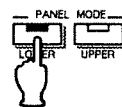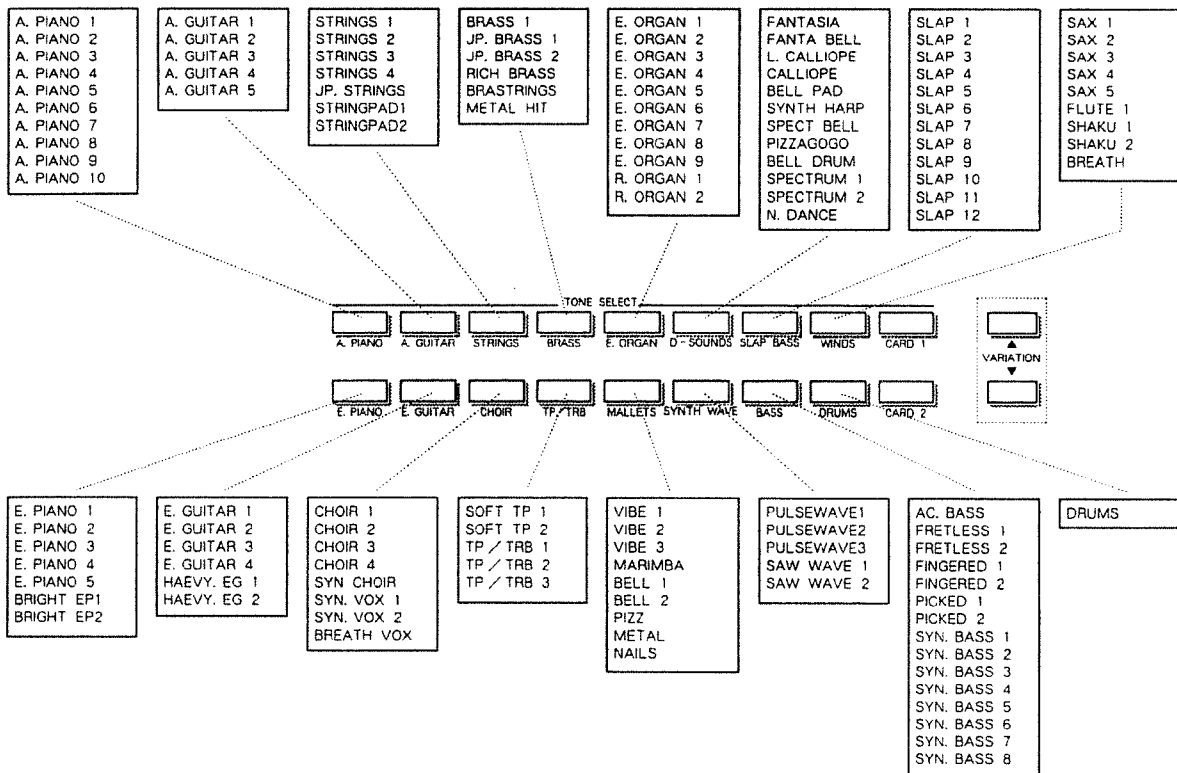| A. PIANO 1	A. GUITAR 1	STRINGS 1	BRASS 1	E. ORGAN 1	FANTASIA	SLAP 1	SAX 1
A. PIANO 2	A. GUITAR 2	STRINGS 2	JP. BRASS 1	E. ORGAN 2	FANTA BELL	SLAP 2	SAX 2
A. PIANO 3	A. GUITAR 3	STRINGS 3	JP. BRASS 2	E. ORGAN 3	L. CALLIOPE	SLAP 3	SAX 3
A. PIANO 4	A. GUITAR 4	STRINGS 4	RICH BRASS	E. ORGAN 4	CALLIOPE	SLAP 4	SAX 4
A. PIANO 5	A. GUITAR 5	JP. STRINGS	BRASTRINGS	E. ORGAN 5	BELL PAD	SLAP 5	SAX 5
A. PIANO 6		STRINGPAD1	METAL HIT	E. ORGAN 6	SYNTH HARP	SLAP 6	FLUTE 1
A. PIANO 7		STRINGPAD2		E. ORGAN 7	SPECT BELL	SLAP 7	SHAKU 1
A. PIANO 8				E. ORGAN 8	PIZZAGOGO	SLAP 8	SHAKU 2
A. PIANO 9				E. ORGAN 9	BELL DRUM	SLAP 9	BREATH
A. PIANO 10				R. ORGAN 1	SPECTRUM 1	SLAP 10	
				R. ORGAN 2	SPECTRUM 2	SLAP 11	
					N. DANCE	SLAP 12	

TONE SELECT

A. PIANO   A. GUITAR   STRINGS   BRASS   E. ORGAN   D - SOUNDS   SLAP BASS   WINDS   CARD 1

VARIATION ▲ ▼

E. PIANO   E. GUITAR   CHOIR   TP/TRB   MALLETS   SYNTH WAVE   BASS   DRUMS   CARD 2

E. PIANO 1	E. GUITAR 1	CHOIR 1	SOFT TP 1	VIBE 1	PULSEWAVE1	AC. BASS	DRUMS
E. PIANO 2	E. GUITAR 2	CHOIR 2	SOFT TP 2	VIBE 2	PULSEWAVE2	FRETLESS 1	
E. PIANO 3	E. GUITAR 3	CHOIR 3	TP / TRB 1	VIBE 3	PULSEWAVE3	FRETLESS 2	
E. PIANO 4	E. GUITAR 4	CHOIR 4	TP / TRB 2	MARIMBA	SAW WAVE 1	FINGERED 1	
E. PIANO 5	HAEVY. EG 1	SYN CHOIR	TP / TRB 3	BELL 1	SAW WAVE 2	FINGERED 2	
BRIGHT EP1	HAEVY. EG 2	SYN. VOX 1		BELL 2		PICKED 1	
BRIGHT EP2		SYN. VOX 2		PIZZ		PICKED 2	
		BREATH VOX		METAL		SYN. BASS 1	
				NAILS		SYN. BASS 2	
						SYN. BASS 3	
						SYN. BASS 4	
						SYN. BASS 5	
						SYN. BASS 6	
						SYN. BASS 7	
						SYN. BASS 8	

* A Tones List has been provided inside the front cover of this manual. It can be removed at the perforations, and for convenience placed nearby while you play. In addition, for more details on available Tones, refer to the Reference section at the rear of the manual.
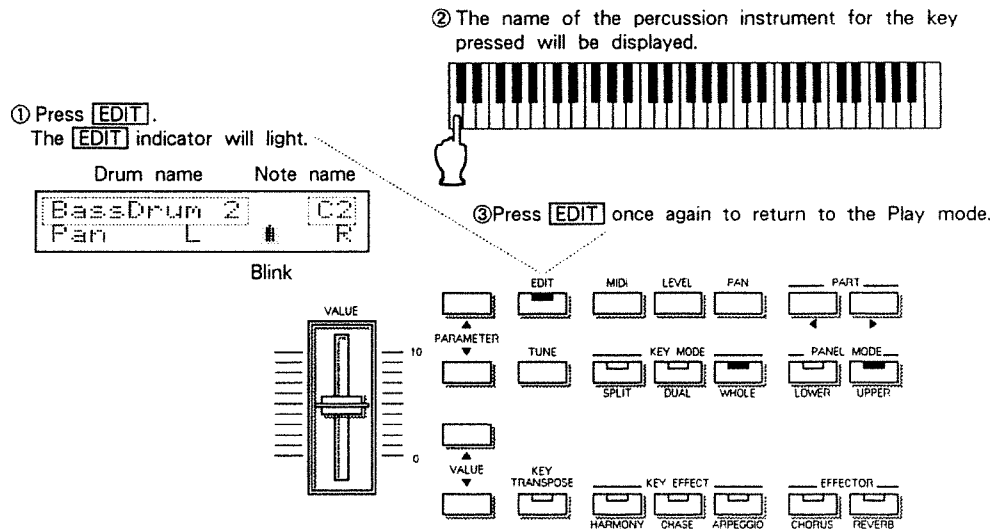
For example, if you want to change to an organ Tone, press ① E.ORGAN , then with ②
VARIATION ▲ ▼ , select the variation of it you want to use.

Name of the selected Tone

```
Part1*E.ORGAN 5
Part2:AC.BASS
```
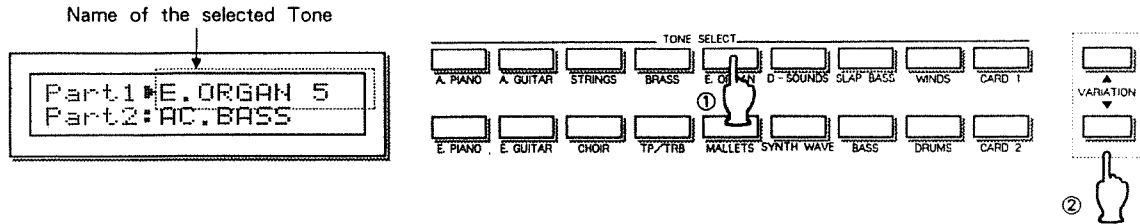
For each TONE SELECT button, the most recently selected variation of it is stored at that position in
memory. So, you can select the previously chosen variation simply by pressing the TONE SELECT
button.

Checking the Drum Sounds

When you press DRUMS and select drums, a variety of different drum sounds will be produced for
the keys. When you wish to, while playing drums, check the name of the sound being played,
perform the following steps:

② The name of the percussion instrument for the key
pressed will be displayed.

① Press EDIT .
The EDIT indicator will light.

Drum name   Note name

```
BassDrum 2        C2
Pan      L    #    R
```

Blink

③ Press EDIT once again to return to the Play mode.

* When you press a key for which no drum sound has been assigned, no sound is produced.
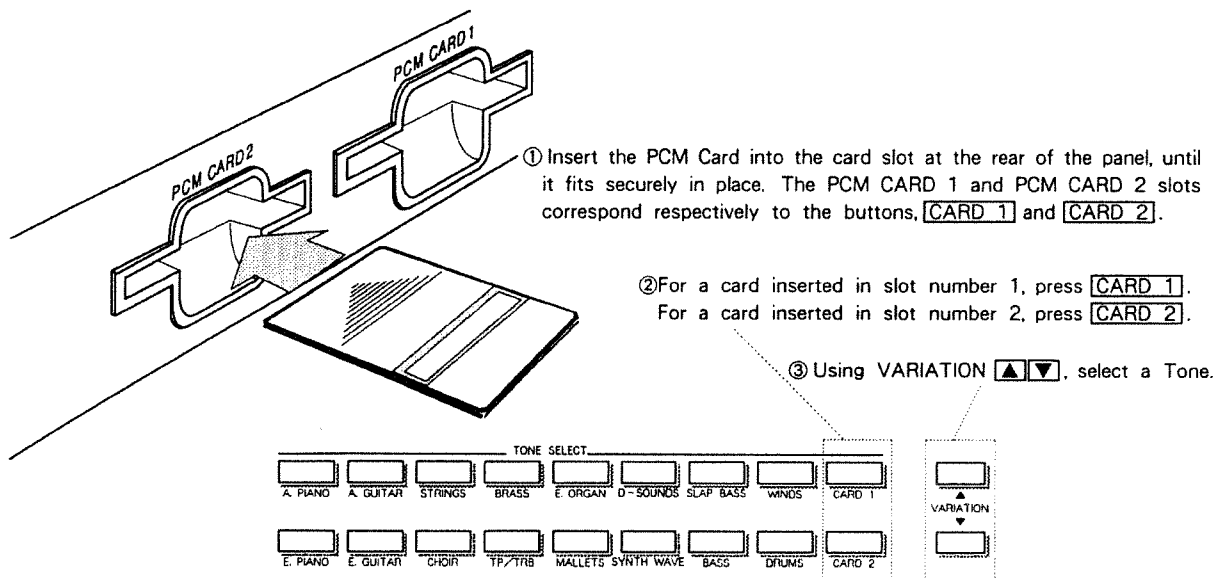In such cases, OFF will appear in the display.

* When you wish to sound those drum sounds which are assigned to keys lying beyond the
soundable range of the keyboard, use the Key Transpose function to shift the keyboard's
range.(☞ p.41)

■ Selecting Tones from a PCM Card

By employing optional PCM Cards (SN - U0l Series), you can increase even further the number of Tones you have ready for use. The PCM Cards that are available include the following:

01	Pipe Organ & Harpsi	06	Orchestral Winds
02	Latin & F. X. Percussion	07	Electric Guitars
03	Ethnic Sounds	10	Rock Drums
04	Electric Grand Piano	11	Sound Effects
05	Orchestral Strings	12	Sax & Trombone

* If you insert any cards other than those specified, Wrong Card will be displayed, and no sound will be produced. In such cases, pull out the card immediately, otherwise malfunction could result.

① Insert the PCM Card into the card slot at the rear of the panel, until it fits securely in place. The PCM CARD 1 and PCM CARD 2 slots correspond respectively to the buttons, [CARD 1] and [CARD 2].

②For a card inserted in slot number 1, press [CARD 1].
For a card inserted in slot number 2, press [CARD 2].

③ Using VARIATION [▲][▼], select a Tone.

* Each Tone on a PCM Card is numbered. When VARIATION [▲][▼] is used to select a Tone, you are offered the possible selections in that numerical order.

● A Point of Advice

On the PCM Card SN - U01 - 02, there is a Latin percussion set (LATIN 2). If you put the Key Mode at Dual, and combine this unit's internal DRUMS with the LATIN 2 tones, you can then obtain a drum sound from nearly all the keys, from B1 to C # 7.
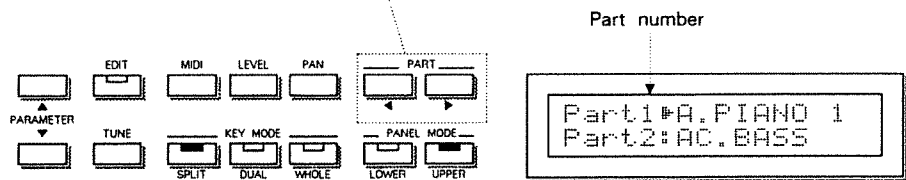
■Changing Parts

Six Parts are provided on the Model 660, allowing it to be used as a multi - timbral sound source. Parts will be explained in detail in Section Ⅲ. However, to begin with you should understand that for each Part you can make selection for its Tone.

In other words, this means that you can choose a Tone for each Part in an order convenient to use when playing, and then be able to quickly get the Tone you want simply by changing Parts.

By pressing PART ◀▶, you obtain change of Parts, in numerical order.
(When a Tone is selected, the Tone is changed for the Part currently selected.)

Part number

```
        EDIT    MIDI   LEVEL   PAN    ___ PART ___
  ☐      ☐       ☐      ☐       ☐     ☐   ☐           ┌──────────────────────┐
  ▲                                   ◀   ▶           │  Part1▶A.PIANO 1     │
PARAMETER                                             │  Part2:AC.BASS       │
  ▼      TUNE    __ KEY MODE __     __ PANEL MODE __   └──────────────────────┘
  ☐      ☐       ☐    ☐    ☐        ☐       ☐
               SPLIT DUAL WHOLE    LOWER   UPPER
```

■Changing Patches

So far, you have made selection for the Key or Panel modes, etc. by pressing the relevant buttons on the panel each time needed. Through the use of Patches, however, a whole group of such setting choices can be switched to instantaneously. Each Patch can contain the settings for how Tones are used in combination with the Key and Panel modes, as well as other settings such as those for Effectors. A total of 8 patches are possible.

Greater convenience can be had by beforehand making all the basic settings needed for use in a performance and storing them in Patches. Then each time you change songs, you can simply switch to the next Patch. If your needs involving Tone changes and effects are simpler, it is probably best to simply press the panel buttons while playing.

Patches are changed by pressing the USER PATCH buttons. For the time being, you may want to try the various settings that already been made for the patches, and listen to and compare them.

```
  .................. USER PATCH ....................
  ☐    ☐    ☐    ☐    ☐    ☐    ☐    ☐
  1    2    3    4    5    6    7    8
```

☝
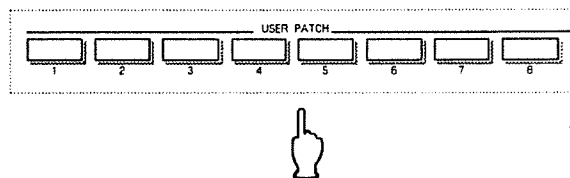
* For information on creation of Patches, refer to Section Ⅱ. (☞ p. 23)

● Concerning RS - PCM Sound Sources

The Model 660 incorporates an RS - PCM Sound Source. RS - PCM stands for "Re - Synthesized Pulse Code Modulation", and is a process for the digital recording of a sound's waveforms. The sounds of a musical instrument are not simply recorded digitally and used as is, but are modelled and re - synthesized using proprietary signal processing technology in order to obtain the utmost in realism for use in performance. On the Model 660, the fundamental elements constituting sounds in the RS - PCM Sound Source are referred to as "Tones." Such Tones are of course good enough to be used alone, but you can also easily make changes in the pitch or how vibrato is used, and alter the volume to suit your preferences.

● Tone Types and Maximum Simultaneously Producible Notes

There are 5 different types of Tones, with each being constructed differently in order to obtain the most suitable changes in timbre. In addition there are Tones such as those for drums which produce a different sound for each key on the keyboard.

If the Tone is composed of one voice, a maximum of 30 notes can be produced simultaneously, but if composed of 2 voices, only 15 notes can be produced at the same time. When using a sequencer or the like to play the unit automatically, you need to take into consideration the number of voices making up the various tones.

Type	Number of Voices	Composition
Single	1	Tone composed of 1 voice.
V – SW (Velocity Switch)	1	Change between 2 voices obtained depending on strength key is played.
V – Mix (Velocity Mix)	2	The volume balance for 2 voices changes depending on strength key is played.
Dual	2	Combination of 2 different voices.
Detune	2	Combination of 2 voices shifted slightly in pitch from each other.

● Upper Limits of Soundable Range

With certain Tones, no sound will be produced above a certain limit. This is due to the fact that the recording/modelling of the Tone is carried out based on the range the original acoustic instrument is capable of producing. When playing it is perhaps best to keep in mind the personality of the instrument sounds being used.

*To check which type each of the Tones is, refer to the Tones List (☞ p. 66). Concerning Tones on PCM Cards, refer to the instructions provided with the PCM Card.

[3] Using the Performance Functions

The Model 660 is equipped with a range of functions that enhance the expressive capabilities of the unit. These performance functions are explained in the following. For information on making settings for them, turn to Section II . (☞ p. 39)

■ Keyboard Effects (Velocity/Aftertouch)

Velocity refers to the changes in volume that are obtained as a result of the differences in the strength (speed) with which the keys are played. Changes in volume ranging from pianissimo to fortissimo can be obtained. In addition, the Aftertouch function allows you to hold down a key firmly to obtain changes in pitch, volume, or vibrato.

Velocity   Aftertouch
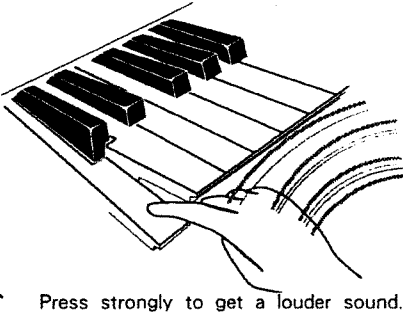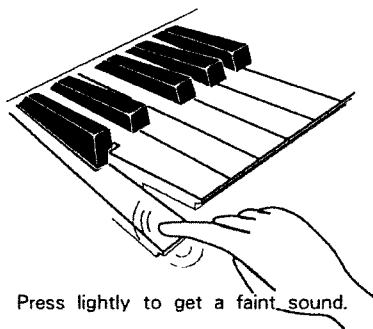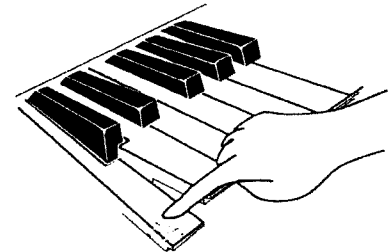
Press lightly to get a faint sound.   Press strongly to get a louder sound.   The stronger you continue to press, the greater the change obtained.

* The sensitivity for Velocity can be adjusted using Velocity Sens (☞ p. 36).
  The way in which changes are obtained using Aftertouch is determined by the settings for Aftertouch Bend (☞ p. 35), Aftertouch Sens for Vibrato (☞ p. 36), Aftertouch Sens for Level (☞ p. 36), and Arpeggio Aftertouch Sens (☞ p. 45).

■ Using the Bender/Modulation Lever

Vibrato gets deeper
Pitch is lowered   Pitch is raised
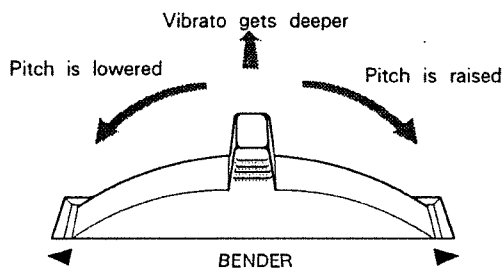
BENDER

The Bender/Modulation lever can be used to raise or lower the pitch, or to add a vibrato effect. It can be effective for expressing the choking technique with guitar or the nuances of the breath with flute sounds.

* The amount of pitch change obtainable is set by means of Bender Range (☞ p. 35), and the manner in which vibrato is obtained is set using Modulation Lever Sens (☞ p. 35).

■ Adjusting the Tone with the Brilliance Control

BRILLIANCE
Sound gets brighter

Sound becomes milder
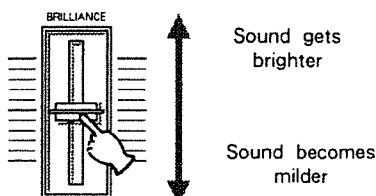
Overall tone quality can be adjusted by moving the Brilliance control up or down.

19

■ On/Off of Effectors

The Model 660 is equipped with Effectors providing Chorus, which adds depth and fatness to sounds, and Reverb, which adds ambience, so what you play can sound like it is played in a spacious hall. To use an Effector, press its button and the indicator will light, showing that it is on. Whether the Effectors are On or Off can be set with respect to each Part.

* The manner in which the effects are applied can be set for each Patch. (☞ p. 41)
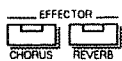* When Chorus is turned on, the Pan (sound image orientation) for that Part will automatically move to the center position. Note that the Chorus effect cannot be applied to any Drum Tones.

■ Using a Hold Pedal

Hold Off

If you connect an optional foot switch (DP - 2R, etc.) to the PEDAL HOLD Jack, notes played can be sustained for as long as you depress the pedal. This function is referred to as "Hold", and provides an effect similar to that of the damper pedal on a piano.

When shipped, the unit is set so that the Upper Tone will respond to the Hold function. Also, the result obtained when using Hold may differ depending on how the Key Effects are used.

Hold On

* A setting which determines whether the Upper or Lower Tone responds to Hold can be made for each patch. (☞ p. 46)
* When drums or other non - sustaining type tones are selected, the Hold effect will not be obtained if you depress the pedal.

■ Selection of Key Effects
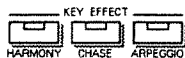
Harmony, Chase, and Arpeggio are other functions convenient for playing that are provided on the Model 660. Turn on the function you wish to use by pressing its button. Its indicator will light. The effect you obtain will vary depending on the settings for Key mode and whether a hold pedal is used or not.

* More than one Key Effect cannot be used at the same time.

● Harmony
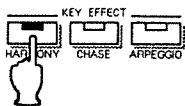
The Harmony function, with the Split Point as the dividing line, adds the notes of a chord pressed in the Lower section so that they underlie the notes played (top note) in the Upper section. You can thus conveniently add harmony (chords) to the melodies you play in the Upper section. If you play only in the Upper section, only one note at a time sounds. Thus, it is suitable for solos. Playing something in the Lower section alone, however, produces no sound.

[Example]   While continuing to press a C major chord in the Lower section, if you play the notes in order in the Upper section, you will get the results shown below.
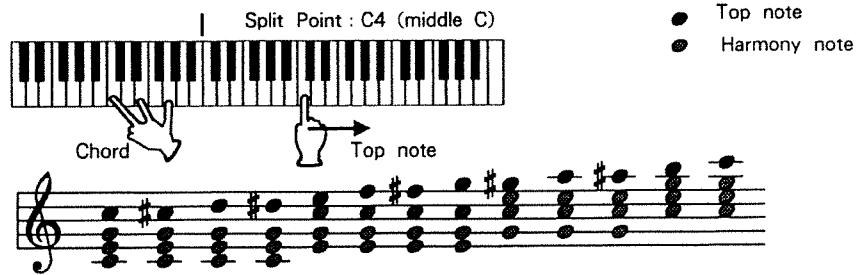
* With the Key mode at Split, top note is sounded using the Upper Tone, and harmony notes sound using the Lower Tone.
* The volume balance for top note and harmony notes can be adjusted using Level for the Part. (☞ p.32)

[Using the Hold Pedal]

If you depress the Hold pedal while you have a chord pressed in the Lower section, you can remove your fingers from the Lower section and the chord notes will be sustained. You can then play only the Upper section, and keep the pedal depressed to achieve the harmony effect.

However, if the pedal is still depressed when you change the chord, notes can get congested, and start to sound strangely. When changing the chord, you should release the pedal for a moment, then press the next chord.

● Chase
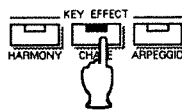
Chase provides an effect similar to an echo, with sound repeating and gradually fading away. Depending on the settings made, you can obtain effects similar to a single delay, or interesting effects where the pitch gradually changes. The interval between chase sounds (Chase Rate) can be adjusted even while playing, using the VALUE slider or VALUE [▲][▼].

Adjusting the Chase Rate
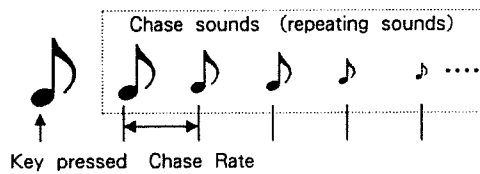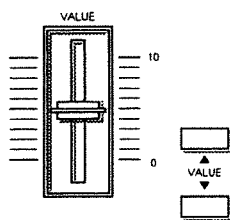
* Concerning settings for Chase, see page 43.
* When the Key mode is at Split, the effect is obtained only with respect to what is played in the Upper section.

● Arpeggio
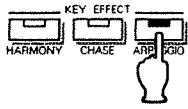
You can obtain an arpeggiation of a chord simply by pressing the chord. The pattern used by Arpeggio can be selected by means of the setting for it. The speed of the arpeggiation (Arpeggio Rate) can be adjusted even while playing, using the VALUE slider or VALUE $\boxed{\blacktriangle}\boxed{\blacktriangledown}$. In addition, aftertouch can used to adjust the arpeggio rate.

Adjusting Arpeggio Rate
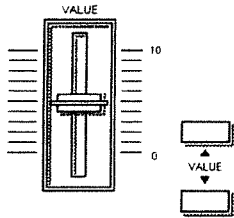
* Concerning settings for Arpeggio, see page 45.
* When the Key mode is at Split, the effect is obtained only with respect to what is played in the Lower section.

[Using the Hold Pedal]

If you depress the Hold pedal while you have a chord pressed, the arpeggiation will continue to play without you having to continue pressing the chord.

However, if the pedal is still depressed when you change the chord, notes can get congested, and start to sound strangely. When changing the chord, you should release the pedal for a moment, then press the next chord.

■ Transposition (Key Transpose)
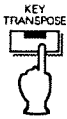
The Key Transpose function is convenient to use when there are numerous sharps and flats in the music, making it more difficult. Key Transpose allows you to shift the range of the keyboard in semitone units. You can thus shift the key to one eliminating the sharps and flats to make playing easier. It is also useful for changing key in the course of a song.

Press $\boxed{\text{KEY TRANSPOSE}}$ to turn it on. The button's indicator will light.

* Settings for Key Transpose can be made with respect to each Patch. (☞ p. 41)

● Tuning

When wishing to match the pitch of this instrument to another, carry out Tuning as follows :
This setting will be remembered even when the power is turned off.

① Press $\boxed{\text{TUNE}}$.
   The $\boxed{\text{EDIT}}$ indicator will light, and the frequency of the middle A (A4) key's pitch will be displayed.

```
Master Tune
        440.0Hz
```

③ Press $\boxed{\text{TUNE}}$ or $\boxed{\text{EDIT}}$ to return to the Play mode.

② Carry out tuning.
   Setting range : 427.4 to 452.9 Hz
   (in 0.1 Hz steps)
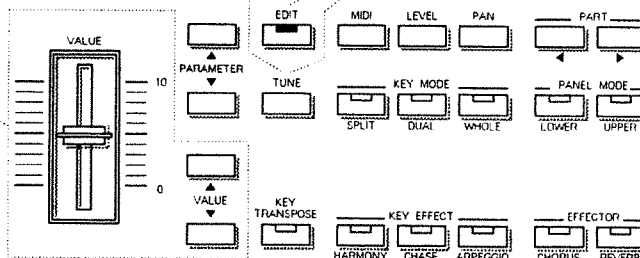
CHANGING SETTINGS

[1] Before Changing Any Settings

First, before making any setting changes, the following should be read so that you get a good understanding of how sounds are organized on the Model 660.

1. Model 660 Organization

On the Model 660 there are 6 Parts available, and to each of them a Tone can be assigned. A complete settings profile; including the pan and level settings for each part, the tone assigned to each part, and settings for key mode, effectors, and key effects, can be stored as what is referred to as a Patch.

When playing on the Model 660's keyboard, two parts (or one) from among the six can be used to produce sound, depending on the key mode.
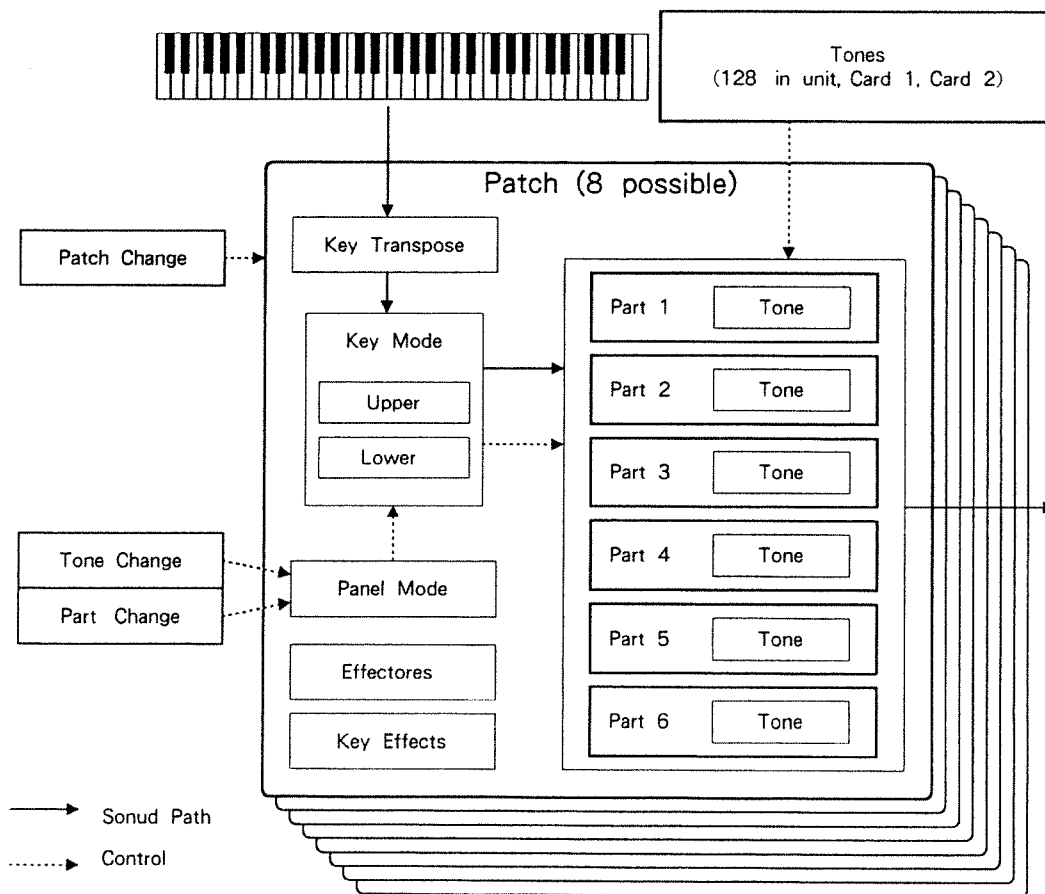
■ Concerning Parameters

The various items involved in making settings are referred to as parameters. On the Model 660 each function is broken down into several parameters, and the settings for them are stored within the unit.

● **Tone Parameters**

With ordinary Tones, the settings for the Tone Parameters allow you to control pitch, how vibrato is to be applied, various volume changes, and other factors which determine how the Tone will sound.

With tone for DRUMS, unlike other tones, you can make settings for Reverb On/Off and Pan with respect to each key (drum sound).

Ordinary Tones

Pitch	Level
Pitch Coarse	Level
Pitch Fine	Velocity Sens
Bender Range	Aftertouch Sens
Aftertouch Bend	Attack Rate
Vibrate	Decay Rate
Rate	Sustain Level
Depth	Release Rate
Modulation Lever Sens	
Aftertouch Sens	

DRUMS Tone

Reverb On/Off
Pan

Whenever changes are made in any settings for each of the tones, the settings are stored in the unit's internal memory. This applies for DRUMS Tone as well.

[Concerning PCM Cards]

Contained within a PCM card are both ordinary Tones, and Drum Tones.

With ordinary Tones, the settings for each Tone (not the contents of the card) are stored into the Model 660's internal memory, respective to the [CARD 1] and [CARD 2] buttons. Further, such settings for the Tones on a card are not specific to a particular card; in the unit's internal memory, only information such as "CARD 1, number this or that" is stored. For this reason, if you afterwards change to a different card, you will need to make the Tone settings again.

Likewise, with Drum Tones on a card, the settings for the drums are stored in internal memory with respect to the [CARD 1] and [CARD 2] buttons. Therefore, if you take out a card and insert a different one, sound will be produced in accord with the drum settings that were stored for either [CARD 1] and [CARD 2]. Settings determining whether Reverb will be on or off, and Pan settings, can be made for Drum Tones on a card, on a per key basis, in the same manner as that for the internal Drum Tone. Moreover, depending on the card, there may be certain tones other than those for drums which can produce a different sound for each key. They as well will sound in accord with the drum settings. For information on which Tones will use the drum settings when sounding, refer to the Tone Chart that accompanies the PCM card.

Ordinary Tones

CARD 1

Pitch
Pitch Coarse
Pitch Fine
Bender Range
Aftertouch Bend
Vibrate
Rate
Depth
Modulation Lever Sens
Aftertouch Sens

Level
Level
Velocity Sens
Aftertouch Sens
Attack Rate
Decay Rate
Sustain Level
Release Rate

Drums - related Tones

Reverb On/Off
Pan

Ordinary Tones

CARD 2

Pitch
Pitch Coarse
Pitch Fine
Bender Range
Aftertouch Bend
Vibrate
Rate
Depth
Modulation Lever Sens
Aftertouch Sens

Level
Level
Velocity Sens
Aftertouch Sens
Attack Rate
Decay Rate
Sustain Level
Release Rate

Drums - related Tones

Reverb On/Off
Pan

As has been explained so far, the settings made for Drum Tones are different than those made for ordinary Tones. For the internal Drum Tone, there are 37 percussion sounds forming one assortment, each of which are assigned to individual keys. For each, settings for Reverb On/Off and Pan can be made.

With Drum Tones on cards, the settings for two such assortments can be stored in internal memory, for CARD 1 and for CARD 2. Depending on the card, there may be numerous such assortments available as Drum Tones. However, since the drum settings can be made for only one assortment on the card, no matter which Drum Tone is selected, sound will be produced in accord with the same settings.

● Parameters that can be stored in a Patch

Included in each of the 8 patches, the parameter settings shown below can be stored. Any changes made in the settings for the parameters are stored internally on a temporary basis, so they will be retained even if power is turned off. However, once another patch is selected, the settings will change to reflect the newly selected patch, so any previously made setting changes will be lost.

Should you wish to retain a group of setting changes you have made, they need to be stored, while they are current, to one of the patches (USER PATCH buttons). Storing settings as a patch in this way is referred to as the Write Procedure.

Patches :
Eight Possible

Patch 1

Performance parameters

Key Mode
Split Point

Panel Mode
Upper Part
Lower Part

Chorus Rate
Chorus Depth
Chorus Level

Reverb Type
Reverb Time
Reverb Level
Delay Feedback

Key Effect Selection

Chase Mode
Chase Rate
Chase Sift
Chase Level

Arpeggio Mode
Arpeggio Rate
Arpeggio Aftertouch
Arpeggio Style

Key Trabspose On/Off
Key Transpose

Hold Mode

Part parameters
Tone Select
Chorus On/Off
Reverb On/Off
Level
Pan

Tone parameters

Part 1
Part 2
Part 3
Part 4
Part 5
Part 6

Performance Parameters These parameters determine how the unit will perform, and include Key Mode, Effectors, and information on how Key Effects are to be used.

Part Parameters These parameters are those which are set on a per Part basis. For each Part, settings can be made for the Tone Selection, whether Effectors are On or Off, for Pan (orientation of sound image), and for the Level. Reverb On/Off and Pan for drums are set within the Tone Parameters.

Tone Parameters Any settings changes which have been made for a Tone are stored in the unit's memory even without performing the write procedure. However, setting changes made in tones can be stored along with each patch. When the write procedure is performed for a patch, the settings accompanying each Tone selected for each Part are stored together with it. Since there are 6 Parts, for each Patch there will be stored the settings for 6 Tones.

For example, you could store two separate, edited versions of A. PIANO 1 to Patches 1 and 2. Then, even though using the same A. PIANO 1, it will sound differently depending on the patch selected. The same thing came be done with Drum Tones.

Thus, by using patches when playing, you can make use of a variety of settings for certain tones.

| Patch 1
A. PIANO 1' | | For Patch 1, the A. PIANO 1' version will sound. |
| Patch 2
A. PIANO 1" | | For Patch 1, the A. PIANO 1" version will sound. |

● MIDI Parameters These parameters determine how MIDI messages will be handled. Settings should be made to suit the circumstances, when the unit is to be used in combination with other MIDI devices. Changes made in the settings for the MIDI Parameters, except for a few, are stored in internal memory. For details, refer to "MIDI Settings" (☞ p. 53).

■ Usage of Patches

Ordinarily, when performing with the Model 660, you would basically only need to use the buttons to select tones, and turn effects on or off. However, changes in the variety of performance functions, settings for effectors, etc., cannot be quickly and easily made during performance. It is for this reason that it is convenient to use patches. By making the fundamental settings which will provide what you have in mind for the songs to be played, and storing them as a patches, you can later switch instantaneously to those settings simply by changing patches.

You may want to try out a variety of patches, depending on the way you use the Model 660. Offered below are several common examples of how patches can be used, and how they are made.

● Quick changes of tone during performance

If beforehand you assign tones to the parts in the order in which they will be used when playing, you can quickly change tones simply by changing parts. This method is particularly effective when wishing to use numerous tones from a PCM card.

● Changing settings for the effectors

Even though the same tone is used, you can obtain quite a range of change in the sound simply through changes in the settings for the effectors. If you store along with patches the settings for effectors most appropriate for your songs, you can obtain the effects simply by changing patches. You could also try including settings for key effects or key transpose as well.

● Sound creation through tone combinations

Try creating patches which combine two tones, using either the split or dual modes. A great range of combinations are possible. You could shift two tones so they are slightly different in pitch, and play them using the dual mode, to get a fatter sound. Or, you could use two tones for which you have made changes in their envelope settings.

[Care to be taken after changing Tones]

Whenever you have made far - ranging changes in the settings for a tone, you should always restore it to its original settings, after those setting changes have been stored within the patch being created. Otherwise, if a tone which has been changed is left as is, whenever you change to other patches, those changes will affect the way such other patches sound.

To restore all tone settings, as a whole, to their original values, perform the Initialize procedure. (☞ p. 31)

2. Basic Procedures for Making Changes

The steps taken in making changes for the various parameters can be seen together below. For further details, refer to the explanation provided for each parameter.

Press the specified button.

While holding down [EDIT], press the specified button.
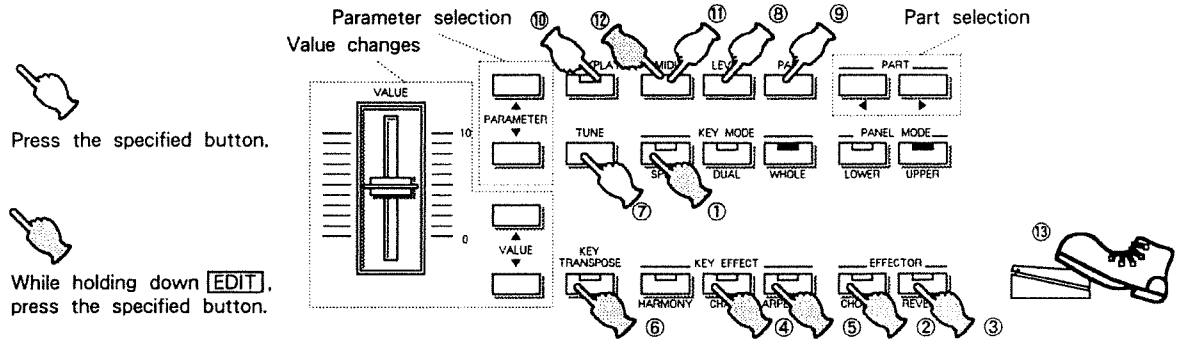
Setting for Performance functions		Choice of the Item (Play mode → Edit mode)	Value change
Selection of Key Mode			Setting made directly, using the panel buttons. (During performance ; setting accepted regardless of the status of the edit mode for other items)
Selection of Panel Mode			
Selection of Upper Part			
Selection of Lower Part			
Selection of Key Effect			
Key Transpose On/Off			
Split Point	①	While holding [EDIT] down, press [SPLIT]	VALUE slider, or VALUE [▲][▼]
Chorus	♥②	While holding [EDIT] down, press [CHORUS]	
Reverb	♥③	While holding [EDIT] down, press [REVERB]	
Chase	♥④	While holding [EDIT] down, press [CHASE]	
Arpeggio	♥⑤	While holding [EDIT] down, press [ARPEGGIO]	
Key Transpose	⑥	While holding [EDIT] down, press [KEY TRANSPOSE]	
Hold Mode	⑬	While holding [EDIT] down, press Pedal Switch	
Tuning	⑦	Press [TUNE]	

Setting for each Part		Selection of the Part	Choice of the Item (Play mode → Edit mode)	Value change
Tone Select		PART [◄][►]		Setting made directly, using the panel buttons. (During performance ; setting accepted regardless of the status of the edit mode for other items. Tone Select is available only from the Play mode.)
Chorus On/Off				
Reverb On/Off				
Level	⑧		Press [LEVEL]	VALUE slider, or VALUE [▲][▼]
Pan	⑨		Press [PAN]	
Tone	♥⑩		Press [EDIT]	

Setting for MIDI		Selection of the Part	Choice of the Item (Play mode → Edit mode)	Value change
MIDI Channel for the Part ⑪		PART [◄][►]	Press [MIDI]	VALUE slider, or VALUE [▲][▼]
Other MIDI	♥⑫		While holding [EDIT] down, press [MIDI]	

Those marked with ♥ have a number of parameters, which are selected using PARAMETER ▲ ▼.

While in the process of making settings, the EDIT indicator will be lit. To leave the state in which settings are made, and return to the play mode, press EDIT. Likewise, from the state where settings have been made for Master Tuning, and Level/Pan/MIDI Channel for a Part, the relevant button can be pressed a second time to return to the play mode.

■ How to Store Patches

When you wish to retain the setting changes you have made, and store them as a patch, perform the Write procedure, as follows. It stores the current settings to the memory location for one of the patches (USER PATCH button).
It is not necessary to perform the Write procedure for each parameter that you change. All setting changes made will be stored together when the Write procedure is carried out.

To store the changes made in settings, hold down the WRITE while pressing the USER PATCH button that you wish to be the location for the patch.
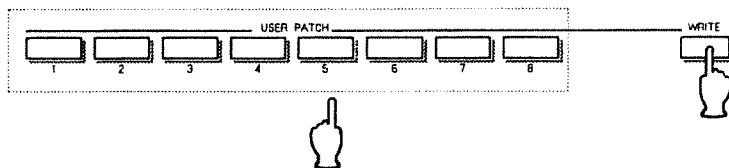
Once the write has been completed, the following is displayed. You are then returned to the original screen.

```
Write User Patch
#5      Completed
```

↑
Number of the USER PATCH button specified.

■Restoring the Unit to the Factory Presets

Whenever changes in the settings for patches or tones have been made, and you wish to restore them to their original factory settings, you should perform what is referred to as "Initialize." You may wish to Initialize the settings at times when you no longer obtain the sounds you expect, due to the numerous changes that have been made. Also, if you have made setting changes while using one PCM card, then switch to another, tones may not sound the way they should. In such cases, you should carry out Initialize to put all settings back to their original settings.

Be aware that through Initialize, any setting changes you have made will be lost, so the procedure should be performed only after making sure there is nothing there you wish to save.

Initialize can be carried out in terms of certain units, shown below. Initialize should be performed only for the unit needed.

TONE	Initializes the Tone selected by the PANEL MODE button. (Pitch, Vibrato, Level)
INT	Initializes all internal Tones (all 128). (Pitch, Vibrato, Level)
CARD1, 2	Initializes all Tones on CARD 1 (or CARD 2). (Pitch, Vibrato, Level)
PATCH 1 ⋯ 8	Initializes the Patch specified. (Tones, Parts, Performance Parameters)
All	Initializes everything contained in internal memory. (Tones, Patches, MIDI parameters, Master tuning)

①While holding down [EDIT], press [WRITE].

④Once the initialization has completed, press [EDIT] to return to the play mode.

```
Initialize Sure?
CARD1      [WRITE]
```

②Select the type of unit to be initialized.

③Press [WRITE] and Initialize is carried out. To cancel the procedure, press [EDIT].
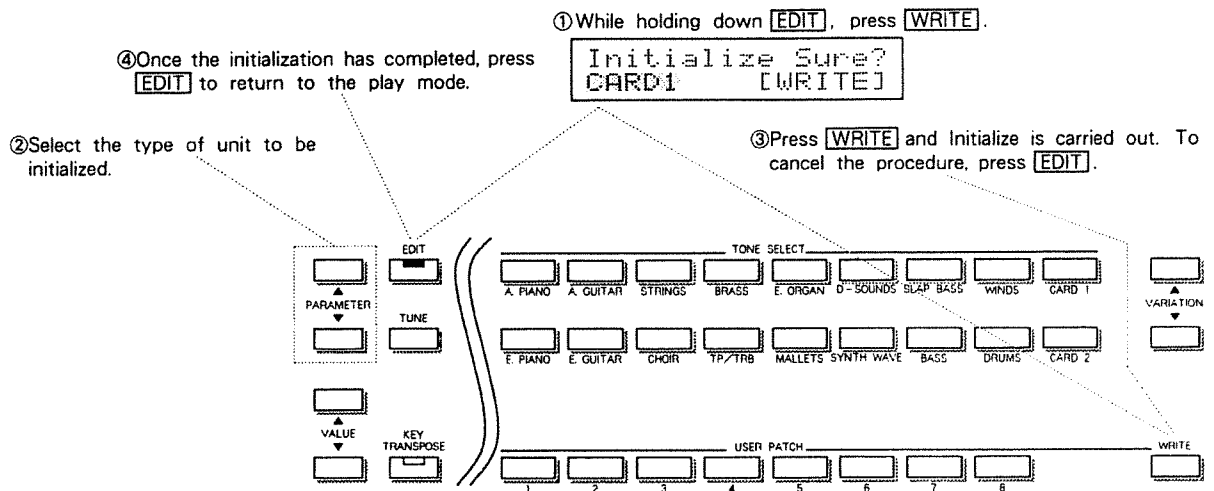
[2] How to Make the Changes

While reading the following, you can if you wish actually make changes in the parameters, and create a patch. You do not need to make changes in every parameter, but only in those you feel necessary. Once the setting changes have been made, they can be stored as a patch by carrying out the Write procedure, explained previously.

1. Settings for Parts

Using PART ◄ ► , select the part which is to be changed. Refer to the display to check which Part is actually selected before editing it.

Parameter	Value
Tone Select	— — — — — — — — — — — —
Chorus On/Off	On, Off
Reverb On/Off	On, Off
Level	0 ⋯ 100
Pan	L	⋯	⋯	R, RND

● Selection of Tones

Selection is made using the TONE SELECT buttons and VARIATION ▲ ▼ .
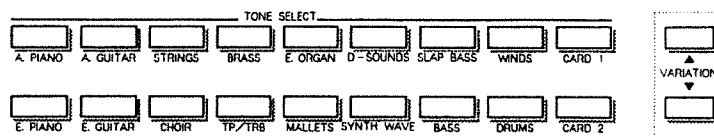
● Chorus On/Off

Press CHORUS to toggle between the two.
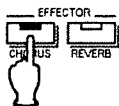
* The manner in which Chorus takes effect is set in common for all Parts. (☞ p. 41)
* Pan for any Part for which Chorus is turned on is automatically set to the center position.
* Chorus cannot be placed on when a Drum Tone is selected.

● Reverb On/Off

Press REVERB to toggle between the two.
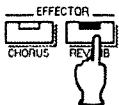
* The manner in which Reverb takes effect is set in common for all Parts. (☞ p. 42)
* With Drum Tones, a setting for whether Reverb is on or off can be made with respect to each key (drum sound). (☞ p. 38)
When Reverb is turned "Off" for the Part, reverb will not be obtained regardless of settings made for each key. When Reverb is turned "On" for the Part, reverb will be obtained, in accord with settings made for each key.

● Adjustment of Level   Value : 0 ⋯ 100

This adjusts the volume balance for each Part obtained when playing in the Split or Dual modes, or when the unit is used as a multi - timbral sound module. Additionally, it adjusts the volume balance respective to the top note and harmony sounds when using the Harmony function.

① Press [LEVEL].
The [EDIT] indicator will light.

```
Level
Part1          100
```

② Adjust the volume while listening to the sound as you play.

③ Once the adjustment has been completed, press [LEVEL] or [EDIT] to return to the Play mode.
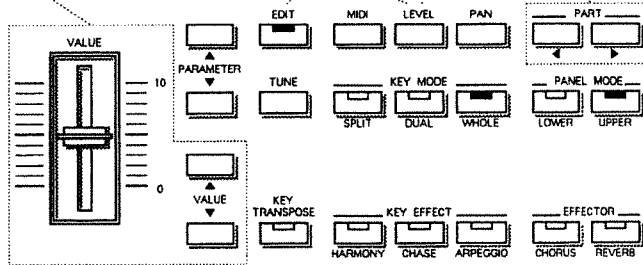
Use to switch to the Part for which setting is to be made.

● Changing the Pan (orientation of sound image)   Value : L | ⋯ | ⋯ | R, RND

Pan determines the orientation of the sound image obtained when the output is in stereo. 15 different positions (excluding RND) are available as settings. When set at RND (Random), the orientation will change randomly as the keyboard is played.

L (Left)   Center   R (Right)
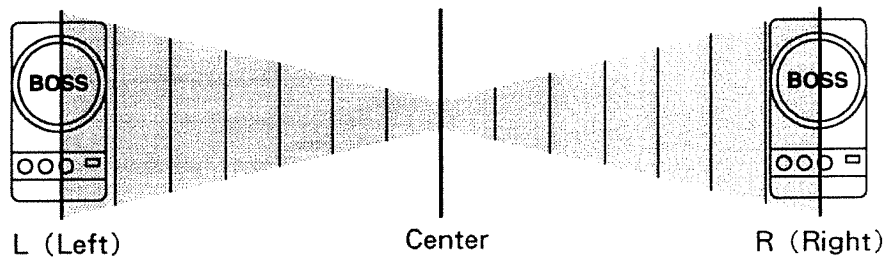
① Press [PAN].
The [EDIT] indicator will light.

```
Pan
Part1   L    ▮    R
```

② Adjust Pan while listening to the sound as you play.
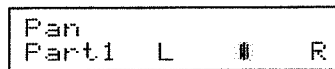
③ Once the adjustment has been completed, press [PAN] or [EDIT] to return to the Play mode.
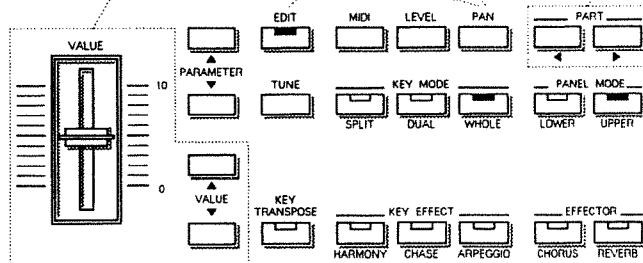
Use to switch to the Part for which setting is to be made.

* If you press [PAN] when Chorus for the Part is "On", CHORUS ON will be displayed, and no setting changes can be made. Before making changes in Pan, Chorus needs to be set at "Off."

* If you press [PAN] when a Drum Tone is selected for the Part, DRUMS TONE will be displayed, and no setting changes can be made. In order to make changes in Pan for each drum sound, refer to page 38.

2. Settings for Tones

The following explains how to make changes in the settings for Tones. The relevant procedure should be carried out after first selecting the Tone to be changed from within the Part specified using the Panel mode. When the setting for Drum Tone, refer to page 38.

Parameter		Value
Pitch	Coarse	− 24 ⋯ + 24
	Fine	− 50 ⋯ + 50
	Bender Range	0 ⋯ 12
	Aftertouch Bend	− 36, − 24, − 12 ⋯ + 12
Vibrato	Rate	0 ⋯ 100
	Depth	0 ⋯ 100
	Modulation Lever Sens	0 ⋯ 100
	Aftertouch Sens	0 ⋯ 100
Level	Level	0 ⋯ 100
	Velocity Sens	− 10 ⋯ + 10
	Aftertouch Sens	− 10 ⋯ + 10
	Attack Rate	− 10 ⋯ + 10
	Decay Rate	− 10 ⋯ + 10
	Sustain Level	− 10 ⋯ + 10
	Release Rate	− 10 ⋯ + 10

① Press [EDIT].
The [EDIT] indicator will light.

② Select the parameter.

Tone Edit: Pitch
Fine   -50

③ Alter the values for the various parameters while listening to the sound as you play.

④ Once the settings have been completed, press [EDIT] to return to the Play mode.
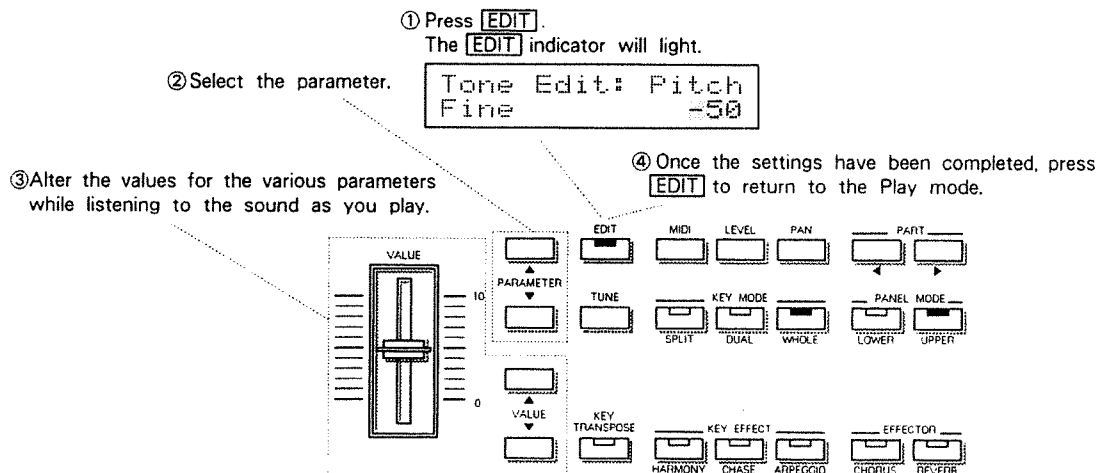
■ Altering the Pitch

● Pitch Coarse   Value : − 24 ··· + 24 (semitone steps ; ± 2 octaves)

```
Tone Edit: Pitch
Coarse        -12
```

Provides for adjustment of the base pitch for tones, in units of a semitone. Can be employed when wishing to match the pitch of tones used when playing in the Split mode. or for fattening sounds by slightly shifting the pitches of tones used when playing in Dual mode.

In addition it can be used when wishing to play exactly as shown in sheet music. For example, with the trumpet which uses B ♭ as the fundamental note, it could be set at − 2. thus providing a transposition effect.

● Pitch Fine   Value : − 50 ··· + 50 (approx. ± 50 cents)

```
Tone Edit: Pitch
Fine          -50
```

Provides for fine adjustment of the base pitch for tones. Useful for matching the pitch with tones in other Parts, or to fatten a sound by slightly shifting pitches (about 3 cents).

● Bender Range   Value : 0 ··· 12 (semitone steps ; 1 octave)

```
Tone Edit: Pitch
Bender Range   12
```

Determines the amount of pitch change obtained when the bender level is moved to either left or right extremes.

● Aftertouch Bend   Value : − 36, − 24, − 12 ··· + 12 (− 3, − 2, − 1 ··· + 1 octaves)

```
Tone Edit: Pitch
After Bend    -36
```

Adjusts the amount of change obtained when aftertouch is used to change the pitch. The value represents the amount of change occurring when a key is pressed with the maximum force. When set to − 36 or − 24, you can obtain an effect similar to that when the arm is down on a guitar.

■ Changing the Vibrato Effect

● Vibrato Rate   Value : 0 ··· 100

```
Tone Edit: Vib
Rate           80
```

Adjusts the speed of the vibrato pulsation. The higher the value, the faster the pulsation becomes.

● Vibrato Depth   Value : 0 ··· 100

```
Tone Edit: Vib
Depth          10
```

Adjusts the depth of the vibrato obtained when the keyboard is played. The higher the value, the deeper the vibrato becomes.

● Modulation Lever Sens   Value : 0 ··· 100

```
Tone Edit: Vib
Mod Lever      10
```

Adjusts the sensitivity that will pertain when the Modulation Lever is used to control Vibrato. The higher the value is set, the deeper will become the vibrato obtained when the lever is pushed.

● **Aftertouch Sens**   **Value : 0 ⋯ 100**

```
Tone Edit: Vib
After           10
```

Adjusts the sensitivity that will pertain when Aftertouch is used to control Vibrato Depth. The higher the value is set, the deeper will become the vibrato obtained when keys are firmly depressed. Effective for expressing the nuances of breath techniques for solo instrument sounds such as the saxophone.

■ Changes in Volume

● **Level**   **Value : 0 ⋯ 100**

```
Tone Edit: Level
Level          100
```

Adjusts the volume for tones. Setting is made when adjusting the volume balance respective to other tones.

● **Velocity Sens**   **Value : − 10 ⋯ + 10**

```
Tone Edit: Level
Velocity       +10
```

Adjusts the sensitivity that will pertain when velocity is used to control volume. The higher the value, the larger will be the change in volume. When set in the + range, volume becomes greater as you play harder. The reverse happens when set in the − range. Could be set to about +8 to +10 for the piano, or other instruments with which you wish to obtain a great deal of change in volume respective to whether keys are played softly or strongly.

● **Aftertouch Sens**   **Value : − 10 ⋯ + 10**

```
Tone Edit: Level
After          +10
```

Adjusts the sensitivity that will pertain when aftertouch is used to control volume. The higher the value, the larger will be the change in volume. When set in the + range, volume becomes greater as keys are pressed with more force. The reverse happens when set in the − range. Can be used to apply changes in volume while a sustained sound, such as lead or organ, is sounding.

● **Attack Rate**   **Value : − 10 ⋯ + 10**

```
Tone Edit: Level
Attack         +10
```

Adjusts the attack rate (speed of the attack) for the envelope (changes in volume over time). In the + range the attack is more rapid, whereas it becomes slower in the − range.
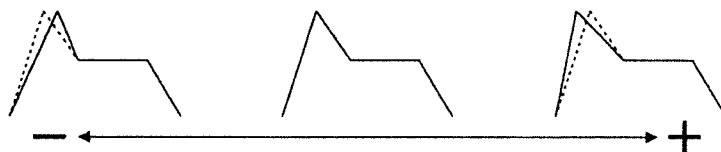
● **Decay Rate**   **Value : − 10 ⋯ + 10**

```
Tone Edit: Level
Decay          +10
```

Adjusts the envelope's decay rate (speed of the descent to the sustained sound level). In the + range, the descent is more rapid, whereas it becomes slower in the − range.
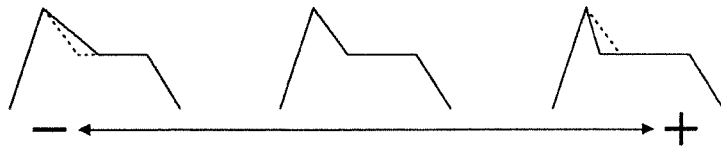
● **Sustain Level**   Value : − 10 ⋯ + 10

```
Tone Edit: Level
Sustain      +10
```

Adjusts the envelope's sustain level (level of the sustained sound). In the + range, the level of the sustained sound becomes higher, whereas in the − range it is lowered.
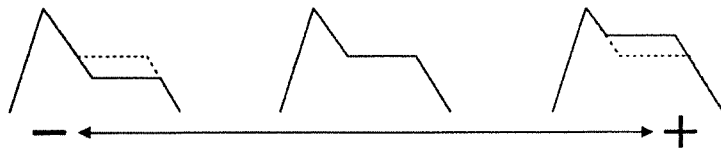
● **Release Rate**   Value : − 10 ⋯ + 10

```
Tone Edit: Level
Release      +10
```

Adjusts the envelope's release rate (speed of the attenuation). In the + range, the level attenuates rapidly, whereas in the − range it fades more slowly.
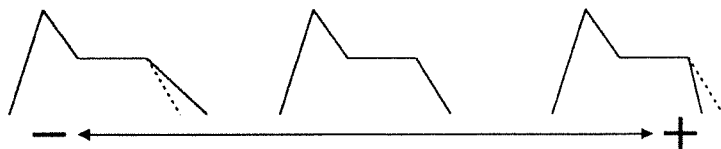
● **Concerning the Tone's Envelope**

The envelope is what determines the changes that occur in volume over time, from the sound's attack until it fades away. Every real acoustic instrument has its own envelope, and it plays a role in giving the instrument its distinctive personality.

On the Model 660 as well, each Tone has an individual, unique envelope. The envelope for each tone can be altered in any way you please using its four parameters. When values for an envelope are changed, the changes take place relatively, based on the particular envelope for the tone selected. For this reason, the values you set and the actual changes to the envelope may relate differently depending on the tone, or the change may at times not occur as expected.

37
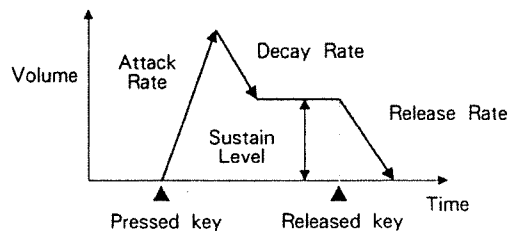
■ Settings for Drum Tones

With Drum Tones, settings for Reverb On/Off can be made for each key (drum sound). First, from the Panel mode, with a Part specified, select the Drum Tone for which changes are to be made. Then carry out the following steps.

Parameter	Value
Reverb On/Off	On, Off
Pan	L │ ⋯ │ ⋯ │ R, RND
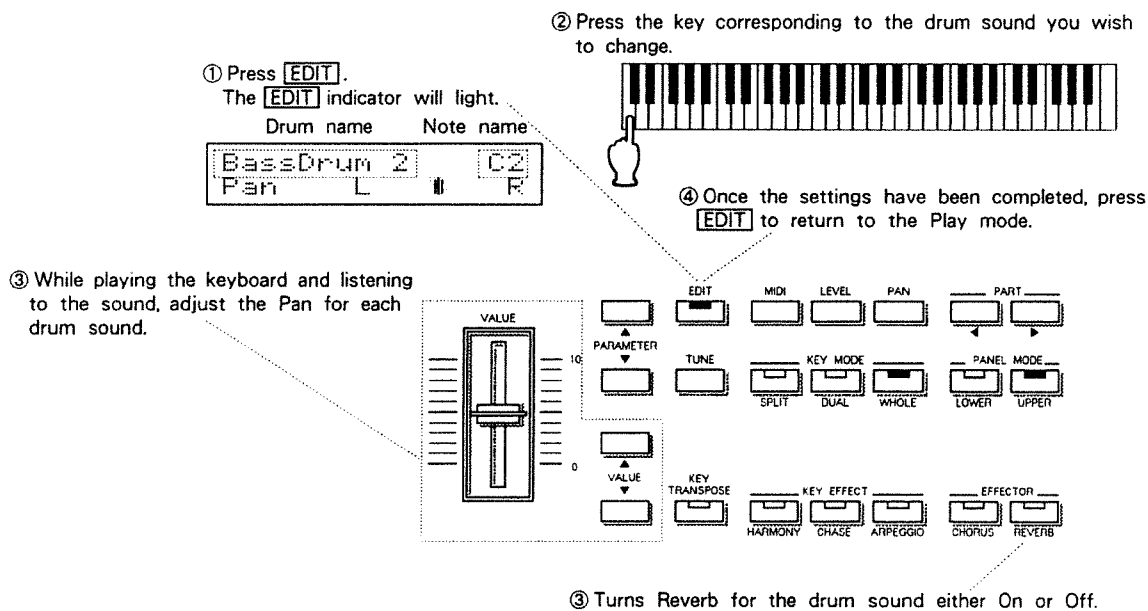
② Press the key corresponding to the drum sound you wish to change.

① Press [EDIT].
The [EDIT] indicator will light.
Drum name   Note name

    BassDrum 2   C2
    Pan   L   ⏘   R

④ Once the settings have been completed, press [EDIT] to return to the Play mode.

③ While playing the keyboard and listening to the sound, adjust the Pan for each drum sound.

③ Turns Reverb for the drum sound either On or Off.

* When Reverb is turned "Off" for the Part, reverb will not be obtained regardless of settings made for each key. Before making the Reverb On/Off setting, Reverb should be turned "On" for the part.

* ☐FF will be displayed when you press any key to which a drum sound has not been assigned. In such cases, no changes in the parameters can be made.

* When you wish to change drum settings for keys located beyond the range sounded by the the keyboard, use the Key Transpose function to shift the keyboard's range.(☞ p.41)

[Care to be Taken When Using PCM Cards]

Regarding drum settings for PCM cards, only one group of settings can be stored for each button, [CARD 1] and [CARD 2] .(☞ p.25) For that reason, whenever any Drum Tone of PCM card is selected and changes are made in the drum settings, this results in a change in the settings for [CARD 1] or [CARD 2] .

Should you wish to have each Drum Tone produce sound using the optimum drum settings, you should store the drum settings along with the individual Patches.

3. Settings for the Performance Functions

The settings made here include those for Key and Panel Modes, for Key Effects, and those determining how Chorus and Reverb are to be applied.

Parameter		Value
Key Mode	☆	Split, Dual, Whole
Split Point		C2 ⋯ C # 7
Panel Mode	☆	Lower, Upper
Upper Part	☆	1 ⋯ 6
Lower Part	☆	1 ⋯ 6
Key Transpose On/Off	☆	On, Off
Key Transpose		− 12 ⋯ + 12
Chorus Rate		0 ⋯ 100
Chorus Depth		0 ⋯ 100
Chorus Level		0 ⋯ 100
Reverb Type		ROOM - 1 ⋯ 3, HALL - 1, 2, GATE, DELAY - 1, 2
Reverb Time		0 ⋯ 100
Reverb Level		0 ⋯ 100
Delay Feedback		0 ⋯ 100
Key Effect	☆	Off, Harmony, Chase, Arpeggio
Chase Mode		SINGLE, REPEAT, ALTERNATE
Chase Rate		0 ⋯ 100
Chase Shift		− 12 ⋯ + 12
Chase Level		0 ⋯ 100
Arpeggio Mode		UP, DOWN, UP & DOWN, RANDOM
Arpeggio Rate		0 ⋯ 100
Arpeggio Aftertouch Sens		− 5 ⋯ + 5
Arpeggio Style		STACCATO, PORTATO, LEGATO
Hold Mode		UPPER, LOWER, BOTH

* For the parameters marked with ☆, selection is made using the button on the panel.

■ Selection for Key Mode/Panel Mode

● Selection of Key Mode (Split, Dual, Whole)
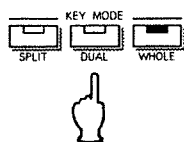
Choose by pressing the appropriate KEY MODE button.

● Selection of the Panel Mode (Lower, Upper)
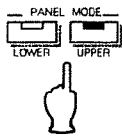
Choose by pressing the appropriate PANEL MODE button.

● Selection of the Upper Part (Part 1…6)
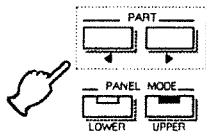
Press ⌈UPPER⌋, then make the selection using PART ⌈◀⌋⌈▶⌋.

● Selection of the Lower Part (Part 1…6)
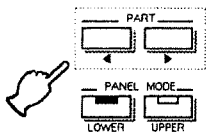
Press ⌈LOWER⌋, then make the selection using PART ⌈◀⌋⌈▶⌋.

■ Setting a Split Point

The following shows how to set the Split Point, the point at which the keyboard's sound range is divided into upper and lower sections. The setting can be made within the range of C2 to C#7. When playing using the Harmony or Arpeggio key effects, the sound range will be divided at the Split Point, regardless of any settings that exist for Key Mode.

① While holding down ⌈EDIT⌋, press ⌈SPLIT⌋.
The EDIT indicator will light.

```
Split Point
                C#4
```
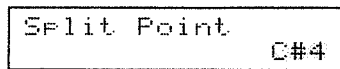
③ Once the setting has been completed, press ⌈EDIT⌋ to return to the Play mode.

② Use to set the Split Point.
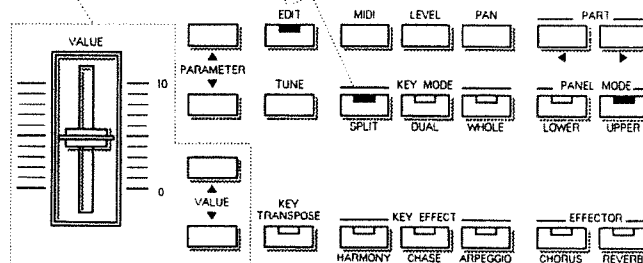
■Setting Key Transpose

●Key Transpose On/Off

KEY
TRANSPOSE

Press KEY TRANSPOSE , which acts as a switch.

●Key Transpose   Value : − 12 ··· + 12 (semitone steps, 1 octave)

Accepts setting determining the amount of transposition over the keyboard's sound range.

① While holding down EDIT , press KEY TRANSPOSE .
The EDIT indicator will light.

Key Transpose
                                    +12

③ Once the setting has been completed, press EDIT
to return to the Play mode.
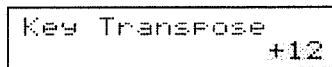
② Use to make the setting for Key Transpose.
Check the results by playing something, and turning
Key Transpose on and off.
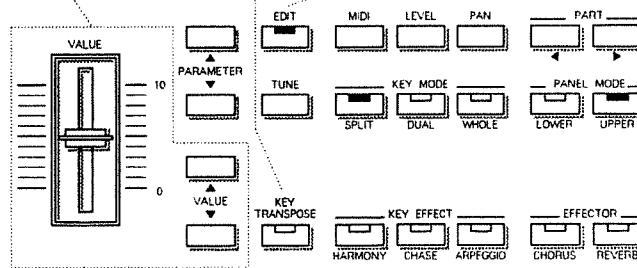
■Settings for Chorus

Here, settings which determine the results obtained with the Chorus effect are made.

④ Once the desired settings have been made,
press EDIT to return to the Play mode.

① While holding down EDIT , press CHORUS .
The EDIT indicator will light.

② Select the parameter.

③ Make the alterations in the various
parameters, while also checking the resulting
sound by playing something, and turning
Chorus on and off.

Chorus Edit
Rate   100
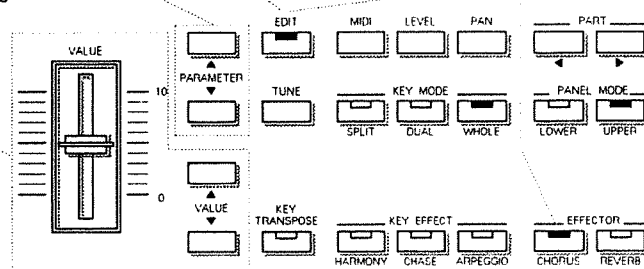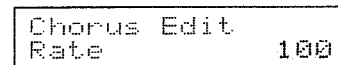
● **Chorus Rate**   Value : 0 ··· 100

```
Chorus Edit
Rate        100
```
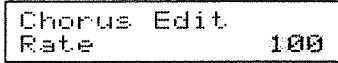
Adjusts the rate of the chorus sweep. As the value is set higher, the pulsations become faster.

● **Chorus Depth**   Value : 0 ··· 100

```
Chorus Edit
Depth        30
```
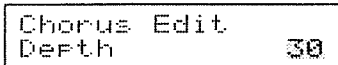
Adjusts the depth (extent to which it is applied) of the chorus. The higher the value, the deeper the effect becomes.

● **Chorus Level**   Value : 0 ··· 100

```
Chorus Edit
Level        30
```
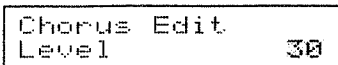
Provides adjustment of the volume balance respective to the chorus sound and original sound.
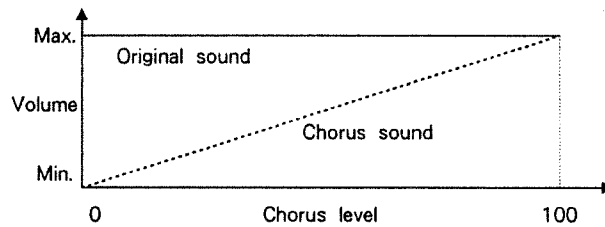
■ Settings for Reverb／Delay

Here settings determining how Reverb and Delay are to be applied are made.

④ Once the desired settings have been made, press [EDIT] to return to the Play mode.

② Select the parameter.

③ Make the changes in the values for the various parameters, while also checking the resulting sound by playing something, and turning Reverb／Delay on and off.

① While holding down [EDIT], press [REVERB]. The [EDIT] indicator will light.

```
Reverb Edit
Type      ROOM-1
```


● **Reverb Type**   Value : ROOM - 1 ··· 3, HALL - 1, 2, GATE, DELAY - 1, 2

```
Reverb Edit
Type      ROOM-1
```
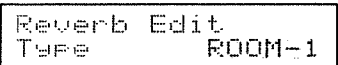
Selection of one type is made from the 6 types of Reverb and 2 types of Delay provided.

ROOM - 1 ··· 3	Sharply - defined, spacious reverb.
HALL - 1, 2	Provides a more relaxed sound, and reverb that has more depth than ROOM.
GATE	Provides reverberation that is sharply muted.
DELAY - 1	An ordinary delay.
DELAY - 2	A delay with reflected sounds that pan left to right.

● **Reverb Time   Value : 0 ⋯ 100**

```
Reverb Edit
Time          30
```
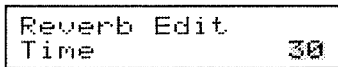
Adjusts the time for the reverberation. The higher the value, the longer the reverberating time becomes. When Delay has been selected, the setting becomes that for Delay Time.

● **Reverb Level   Value : 0 ⋯ 100**

```
Reverb Edit
Level         30
```
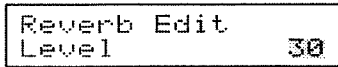
Provides adjustment of the volume balance respective to the reverberated sound (or delayed sound) and original sound.
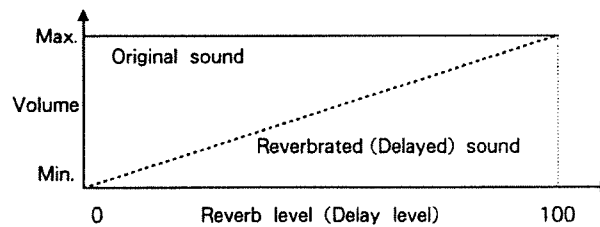
● **Delay Feedback   Value : 0 ⋯ 100**

```
Reverb Edit
Delay FB      30
```
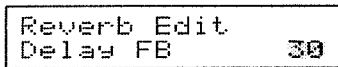
Setting which determines the number of times the delayed sound will be repeated (fed - back). The higher the value set, the greater the number of repetitions. Valid only when Delay has been selected.

■ Selection of Key Effects (Off, Harmony, Chase, Arpeggio)
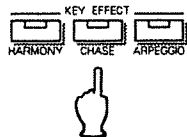
Press the desired KEY EFFECT button.

■ Settings for Chase

Settings determining the effects obtained by the Chase function are set as follows.

④ Once the desired settings have been made, press [EDIT] to return to the Play mode.

② Select the parameter.
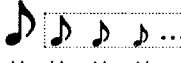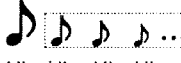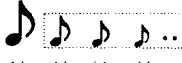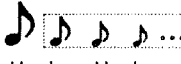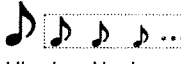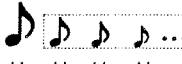
③ Make the changes in the values for the various parameters, while also checking the resulting sound by playing something, and turning Chase on and off.

① While holding down [EDIT], press [CHASE]. The EDIT indicator will light.

```
Chase Edit
Mode     ALTERNATE
```

● Chase Mode   Value : SINGLE, REPEAT, ALTERNATE

```
Chase Edit
Mode    ALTERNATE
```

Here the manner in which the Chase sounds (repeating sounds) will be produced is set. Chase will act as follows, relative to combinations of Chase Mode and Key Mode.

Chase mode \ Key mode	Split		Dual	Whole
	Lower section	Upper section		
SINGLE	♪ L	♪ ♪ U U	♪ ♪ UL UL	♪ ♪ U U
REPEAT	♪ L	♪ ♪ ♪ ♪ ⋯ U U U U	♪ ♪ ♪ ♪ ⋯ UL UL UL UL	♪ ♪ ♪ ♪ ⋯ U U U U
ALTERNATE	♪ L	♪ ♪ ♪ ♪ ⋯ U L U L	♪ ♪ ♪ ♪ ⋯ UL L U L	♪ ♪ ♪ ♪ ⋯ U U U U

▱ Chase sound   L : Lower tone   U : Upper tone   UL : Upper tone & Lower tone

● Chase Rate   Value : 0 ⋯ 100

```
Chase Edit
Rate        30
```

Adjusts the speed of the repetitions of the Chase sounds. The higher the value, the more rapid will be the pace of the repeated sounds.

* If Chase has been selected, adjustment of the rate can be made even during performance, using the VALUE slider or VALUE ▲ ▼.

● Chase Shift   Value : − 12 ⋯ + 12 (semitone steps)

```
Chase Edit
Shift      -12
```

Adjusts the amount of alteration in the pitch of Chase sounds. When set in the + range, the pitch rises, whereas in the − range the pitch will fall. At "0" there will be no change. Also, notes falling beyond the soundable range (C - 1 ... G9) will not sound.

[Example] The C4 key is played after being set to + 2.

● Chase Level   Value : 0 ⋯ 100

```
Chase Edit
Level       30
```

Adjusts the amount by which the Chase sound will attenuate. The higher the value, the greater the Chase sound, and the longer the attenuation period becomes.

■ Settings for Arpeggio

Settings determining the effects obtained by the Arpeggio function are set as follows.

④Once the desired settings have been made, press [EDIT] to return to the Play mode.

②Select the parameter.

③Make the changes in the values for the various parameters, while also checking the resulting sound by playing something, and turning Arpeggio on and off.

① While holding down [EDIT], press [ARPEGGIO]. The [EDIT] indicator will light.

```
Arpeggio Edit.
Mode       UP&DOWN
```

● Arpeggio Mode　　Value : UP, DOWN, UP & DOWN, RANDOM

```
Arpeggio Edit.
Mode       UP&DOWN
```
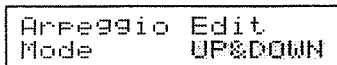
Provides selection of the type of pattern played by Arpeggio. When the Key mode is set at Split, arpeggiation is obtained only in the lower section.

[Example] When a C Major chord has been played.

UP　　　　　DOWN　　　　　UP & DOWN　　　　　RANDOM
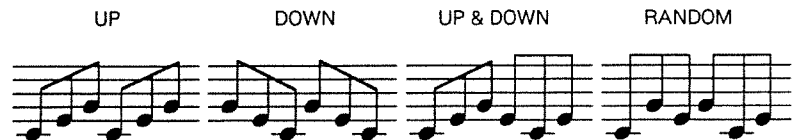
● Arpeggio Rate　　Value : 0 ⋯ 100

```
Arpeggio Edit.
Rate          30
```
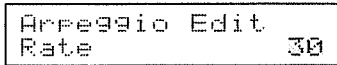
Adjusts the speed of the arpeggiation. The higher the value the faster it becomes.

* If Arpeggio has been selected, adjustment of the rate can be made even during performance, using the VALUE slider or VALUE [▲][▼].

● Arpeggio Aftertouch Sens　　Value : − 5 ⋯ + 5

```
Arpeggio Edit.
After        -05
```
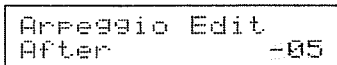
Adjusts the sensitivity that will pertain when Aftertouch is used to control the Arpeggio Rate. With values in the + range, the arpeggiation becomes faster when keys are firmly depressed. The reverse happens when set in the − range.

● Arpeggio Style　　Value : STACCATO, PORTATO, LEGATO

```
Arpeggio Edit.
Style    STACCATO
```
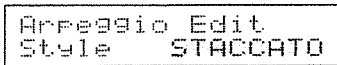
Provides for selection of the type of arpeggiation.

STACCATO	Played with sharp emphasis.
PORTATO	Ordinary.
LEGATO	Played in a smooth flowing manner.

■Setting for Hold Mode

This setting determines what Hold will act upon, either the Upper or Lower Tone, or both. Before the setting can be made, you need to connect a pedal switch to the PEDAL HOLD Jack.

UPPER	Only the Upper Tone is held.
LOWER	Only the Lower Tone is held.
BOTH	Both the Upper and Lower Tones are held.

① While holding down [EDIT], depress the pedal. The [EDIT] indicator will light.

③ Once the setting has been made, press [EDIT] to return to the Play mode.

```
Hold Edit
Mode      UPPER
```

② Select the desired Hold Mode.

* At times when you have Harmony or Arpeggio set to "On", the Hold effect will be obtained with respect to the Lower Tone only, regardless of the setting made here.

USING MIDI IN PERFORMANCE

[1] ABOUT MIDI

MIDI stands for the "Musical Instrument Digital Interface." It is an international standard that allows for data such as that for the music played, or for changes in sounds used, to be exchanged among various different instruments. As long they are MIDI compatible, all devices, regardless of differences in model or manufacturer, can exchange whatever performance data they are equipped to understand.

With MIDI, events such as playing on a keyboard, or depressing a pedal are handled as MIDI data.

1. The Exchange of MIDI Data

The exchange of MIDI data is carried out as explained in the following.

About MIDI Connectors

In carrying out the exchange of MIDI data, the 3 types of connectors shown below are used. MIDI cables are connected to these connectors in various ways depending on the method they are to be used.
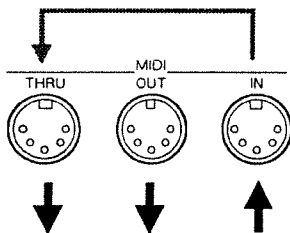
MIDI IN: Receives data from another MIDI device.

MIDI OUT: Transmits data originating in the unit.

MIDI THRU: Sends out an exact copy of the data received at MIDI IN.

* In theory, any number of MIDI devices could be connected together using MIDI THRU connectors, but it is best to consider 4 to 5 devices as being the practical limit. This is because the further down the line a device is located, the more delay there is that could occur, and the chance of error due to deterioration in signal quality increases.

MIDI Channels

With MIDI, a single cable can be used for carrying differing sets of performance information, for a number of MIDI devices. This is possible thanks to the concept of a MIDI channel.

MIDI channels are in some ways similar to the channels on a television set. On a T.V., a variety of programs broadcast from different stations can be viewed by switching channels. This is because the information on any particular channel is conveyed only when the receiver is set to the same channel that is being used for transmission.

Station A

Station B

Station C

The cable coming from the antenna carries the T. V. signals for a variety of broadcasts.

On a T.V., the channel is selected to watch the station you want.
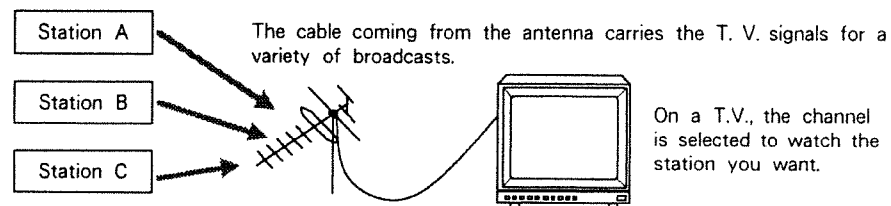
The channels available with MIDI range from 1 to 16. When a musical instrument (the receiver) is set so its channel matches the MIDI channel used by the transmitting device, the MIDI data is conveyed. When the MIDI channels are set as illustrated below, and you play the keyboard, sound will be produced by only sound module B.

MIDI OUT   MIDI IN   MIDI THRU

Transmit channel : 1   Receive channel : 2

Sound module A

Receive channel : 1   MIDI IN

Sound module B
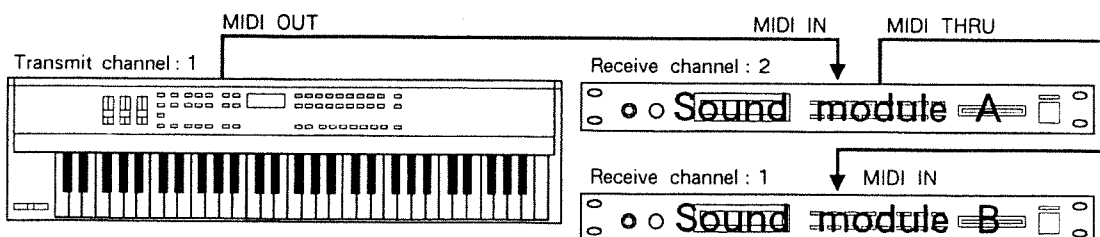
2. MIDI Messages Recognized by the Model 660

In order to convey the great variety of expression possible with music, MIDI has been provided with a large range of data types (messages). MIDI messages can be divided into two main types: Messages that are handled on each channel (Channel messages); and messages that are handled independently of channels (System messages).

■Messages Handled for Each MIDI Channel (Channel Messages)

These messages are used to convey the events of a performance. In most circumstances they alone are sufficient for providing the necessary control. The specific results obtained by the various types of MIDI message are determined by the settings on the sound source receiving them.

● Note Messages

These messages convey what is played on the keyboard. Some Note messages are as follows:

Note number	Number representing the position of the key.
Note on	Key is pressed.
Note off	Key is released.
Velocity	Strength (speed) with which the key is depressed.

* Note Numbers use the numbers 0 through 127 and correspond to the positions of keys. Middle C (C4) is number 60.
* With Drum Tones, each different Note Number causes sounding of a different drum sound.

●Pitch Bender Messages

Messages which convey the action of the bender lever (pitch).

● Aftertouch Messages

These messages convey the functioning of aftertouch. There are two types of aftertouch, Channel and Polyphonic.

Channel Aftertouch provides control based on each MIDI channel. No matter which key it is that is pressed more firmly, the effect is applied equally to all notes on the same MIDI channel. In most cases Channel Aftertouch is what is meant when "aftertouch" is referred to.

Polyphonic Aftertouch provides control on an individual key (note) basis. Even though it may share the same MIDI channel with other notes, any particular key that has more pressure put on it will produce a different effect.

The Model 660 can transmit only Channel Aftertouch. However, it is capable of responding to both types of Aftertouch messages when received from an external device.

● Program Change Messages

These messages are used for conveying information about changes to another sound. Sounds are changed using Program Numbers, from 1 to 128. On the Model 660, both Tones and Patches can be changed. Tones are changed using the Part's MIDI channel, and Patches are changed using the Control Channel. For details, refer to page 52.

● Contorl Change Messages

These messages are used to enhance the expressiveness of a performance, and include Vibrato, Hold, Volume, and Pan. Each function is identified by a Control Number, and the functions which can be controlled will vary depending on the MIDI device.

On the Model 660, the action of the modulation lever can be used to transmit Modulation messages, and the action of the hold pedal can be used to transmit hold messages. Upon reception from an external source, control over Vibrato, Hold, Volume, and Pan can be obtained.

■Messages Handled Independently of MIDI Channels (System Messages)

System Messages include Exclusive messages, the information necessary for synchronized play, as well as diagnostic - use data. On the Model 660 it is mainly Exclusive messages that are handled.

● Exclusive Messages

Exclusive messages handle information such as that related to a device's unique tones. Generally, such messages can be exchanged only between devices of the same model and by the same manufacturer. Exclusive messages can be employed instead of Program Change Numbers to save sound data to a sequencer, or can be used for transferring sound data to another Model 660.

Whenever Exclusive messages are to be used for communication, both musical instruments need to be set to the same Unit Number. (☞ p. 55)

● MIDI Implementation Chart

MIDI has made it possible for a wide range of musical instruments to communicate with each other, but that doesn't mean that the many types of data will all be understood.

For example, you may try to use the keyboard to provide control of aftertouch, but if the sound module you have connected doesn't respond to aftertouch, no effect will be obtained. Thus, the only communication possible between MIDI devices that are connected together deals with data that both of the MIDI devices understand. It is for this reason that every owner's manual, for all kinds of MIDI devices, always includes a MIDI Implementation Chart, as a quick reference to the types of MIDI messages it is capable of handling. You can compare the MIDI Implementation Charts for both devices in order to find out which types of data can be communicated between them. Also, since the size of the chart is standardized, you can place them so they overlap, and more easily compare the receiving device with the transmitting device.

MIDI Device A   Fold   MIDI Device B

Function	Transmitted	Reconsnized	Remarks
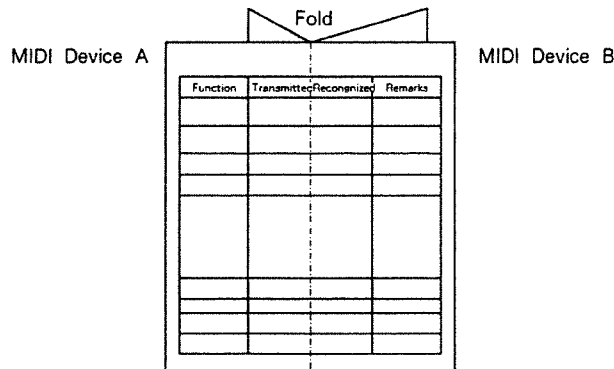
[2] MIDI ON THE MODEL 660

By employing MIDI, the Model 660 can be used as a multi - timbral sound module, or it can be used as the controller along with external equipment. The following explains the MIDI configuration on the Model 660, and how settings are made.

1. The MIDI Data Flow

Let's take a look inside the Model 660 and see how MIDI data is routed. Internally, the unit can be divided into two parts: the Keyboard Controller section, which provides for play of the keyboard and other panel operations such as use of the bender lever; and the Sound Source section, which produces the sound. When the keyboard is played, that information is relayed to the sound source section, causing sound to be produced. The internal sound source can thus be considered as being much like an external sound module connected to MIDI OUT.
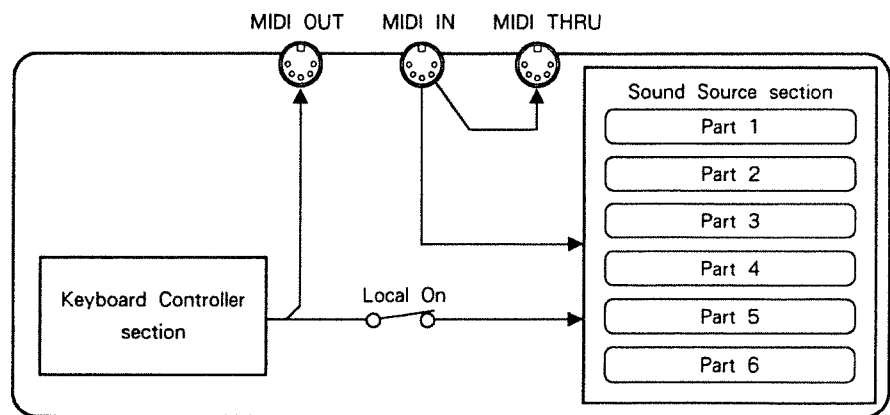
* There is a Local Control switch (☞ p. 54) which determines whether the keyboard controller and sound source are connected with each other or not. Ordinarily, it is set to Local On. However, it is sometimes convenient to switch to Local Off, such when you wish to record what is played on the keyboard into a sequencer.

The Sound Source section is divided into 6 Parts. Each Part is capable of receiving separate streams of MIDI data, since each can have its own MIDI channel. In other words, each one of the Parts can perform as an independent sound module.

In addition, the keyboard controller has a MIDI channel which it uses to transmit its performance information. When shipped, the unit is set so that it will match the channel used by the currently selected Part. In other words, simply by changing the Part being used for play, the Model 660 automatically selects the channel used for transmission of performance information.
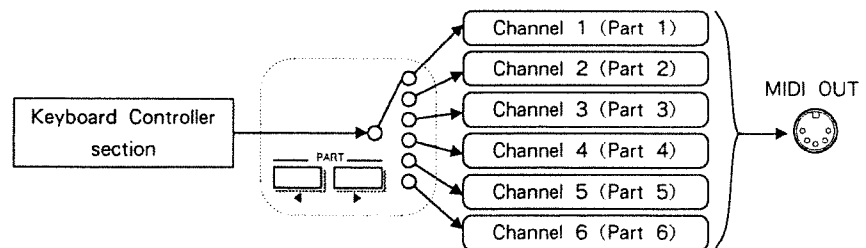
2. Changing Tones/Patches Using MIDI

On the Model 660 Program Change messages can be used to change patches or tones.

■ Changing Tones

The exchange of Program Change messages, used to change Tones, involves the Transmit Channel or each Part's MIDI Channel. Which Program Change number will cause a change to which Tone is determined beforehand for each Tone. (see the Tones List)

When the TONE SELECT button, or VARIATION [▲][▼] are used to change to a different tone, the Program Change Number that corresponds to that tone is transmitted on the Transmit channel.

[Program Change Numbers and the buttons used to transmit them]

1~10   18~22   29~35   44~49   55~65   75~86   92~103   119~127   1~128

11~17   23~28   36~43   50~54   66~74   87~91   104~118   128   1~128
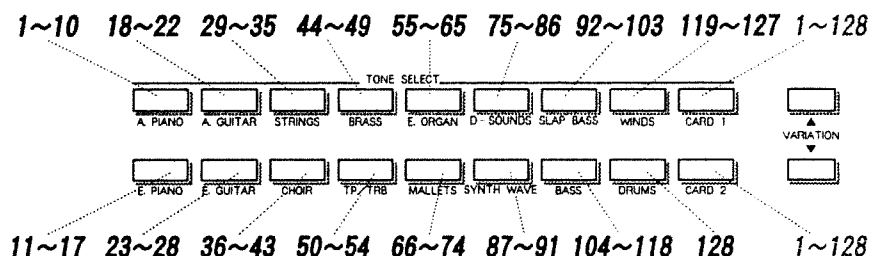
* On PCM cards, each Tone's number corresponds to the Program Number.

When Program Change messages are received on a Part's MIDI channel, a change is made to the specified Part's Tone. If an internal Tone has been assigned to the Part, change will be made to an internal Tone. If a Tone on a PCM Card has been assigned, change will be made to a PCM Card Tone. When Program Changes are received from an external device, the change from "Internal Tone" to "PCM Card Tone" cannot be done.

■ Changing Patches

The Program Change messages used to change Patches are communicated using the Control Channel. Program Numbers relate directly to the numbers of the USER PATCH buttons.

1   2   3   4   5   6   7   8   Program number
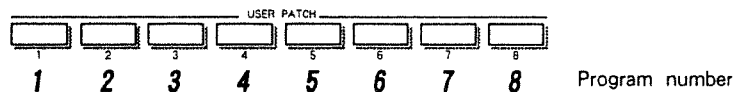
When a USER PATCH button is pressed to change patches, the corresponding Program Number is transmitted. When Program Change messages are received on the Control Channel, a change in the patch is made. However, Program Numbers other than 1 through 8 are ignored.

3. Settings for MIDI

The following explains how the various MIDI parameters function, and how settings for them are made. Settings for the MIDI parameters (all of them except Local Control and Unit Number) are retained in memory even if you change patches, or turn power off.

■ Setting the MIDI Channel for the Part

The MIDI channel for each Part is set as follows. If the Transmit channel (☞ p. 54) is set at "PART", then the Model 660's performance information will be transmitted on the MIDI channel used by the currently selected Part.

① Press [MIDI].
The [EDIT] indicator will light.

```
MIDI RxCH
Part1          01
```

② Set the MIDI channel.

③ Once the setting has been made, press [MIDI] or [EDIT] to return to the Play mode.

Use to change Parts.

■ Settings for Other MIDI Parameters

Other settings, such as how reception/transmission is to take place are made as follows.

Parameter	Value
Transmit Channel	PART, 1 ⋯ 16
Control Channel	1 ⋯ 16
Local Control	ON, OFF
Program Change (transmission/reception)	ON, OFF
Aftertouch (transmission/reception)	ON, OFF
Breath (reception)	OFF, VOL, MOD, AFT V & M, V & A, M & A, ALL
Volume (reception)	ON, OFF
Exclusive (reception)	OFF, ON-1, ON-2
Unit Number	CTRL, 17 ⋯ 32
Bulk Dump	— — — — — — — — —

④ Once completed with the settings, press [EDIT] to return to the Play mode.

② Select the parameter.

③ Make the desired change in the parameter's value.

① While holding down [EDIT], press [MIDI]. The [EDIT] indicator will light.

```
MIDI Function
TxCH            PART
```
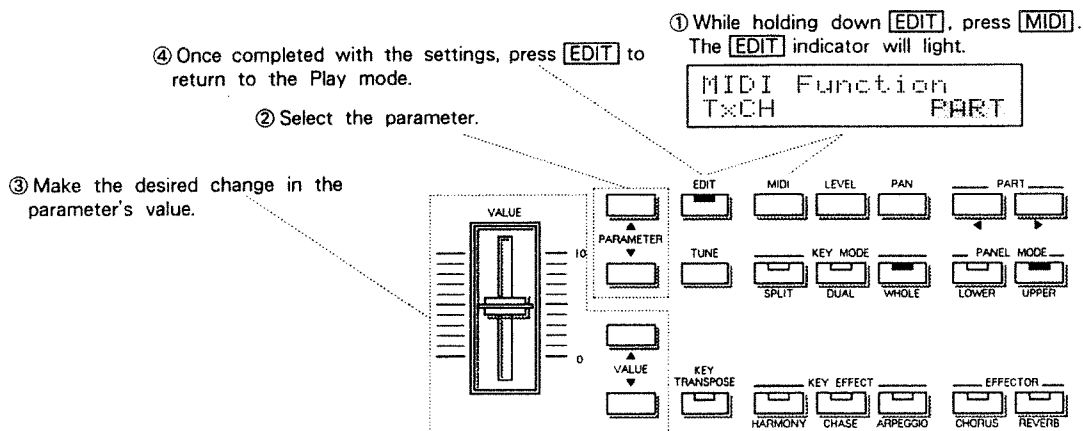
● Transmit Channel   Value : PART, 1 … 16

```
MIDI Function
TxCH            PART
```
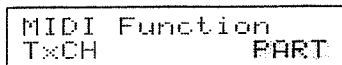
Setting which determines the MIDI channel which the Model 660 will use to transmit its performance information. When set to PART transmission takes place on the MIDI channel set for the currently selected Part (see previous page). If left at PART, each time you make selection using PART [◄][►] , the unit automatically selects the transmit channel that corresponds to the Part. This is convenient for times when you wish to record what you play on the Model 660 into a sequencer.

In addition, when playing using Dual or Split, performance data is transmitted separately on both MIDI channels (those used by the Parts for Upper and Lower sections). For example, if you connect two external sound modules, and the Key mode is set to Split, you could play one module using the Upper section and the other with the Lower section.

When set to from 1 to 16, all performance information sent from the keyboard will be transmit on that channel, regardless of the part that is selected.

● Contorl Channel   Value : 1 … 16

```
MIDI Function
Control CH       16
```
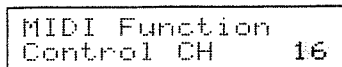
Sets the Transmit/Receive channel to be used when Program Change messages are to be used to change patches. When patches are changed on the Model 660, a Program Number corresponding to that button is transmitted on the Control Channel. Also, when Program Changes messages are received from an external device on the Control Channel, they cause change of patches on the Model 660.

● Local Contorl   Value : ON, OFF

```
MIDI Function
Local           ON
```
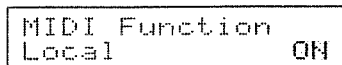
Local Control acts as a switch which determines whether the Keyboard Controller and Sound Source are connected with each other or not. Ordinarily, it is set to Local On (ON). When set to Local Off (OFF), no sound will be heard when the keyboard is played, but the performance information will be transmitted from MIDI OUT. Regardless of the setting for Local Control, performance information from an external MIDI device can be received, and it will sound the internal sound source.

Also, in the interest of preventing confusion about situations when the unit doesn't produce sound, it is always set to Local On each time power is turned on.

● **Reception/Transmission of Program Change messages   Value : ON, OFF**

```
MIDI Function
Prog Change    ON
```

Setting which determines whether Reception/Transmission of Program Change messages is ON or OFF. Ordinarily it is set to ON.

● **Reception/Transmission of Aftertouch messages   Value : ON, OFF**

```
MIDI Function
After          ON
```

Setting which determines whether Reception/Transmission of Aftertouch messages is ON or OFF. Ordinarily it is set to ON.

● **Reception of Breath messages (Control number : 2)**
Vlaue : OFF, VOL, MOD, AFT, V & M, V & A, M & A, ALL

```
MIDI Function
Rx Breath      OFF
```

Setting made to select what will be controlled by Breath messages, when a breath controller is to be used for control.

OFF	Reception ignored
VOL	Volume
MOD	Modulation (Vibrato Depth)
AFT	Aftertouch
V & M	Volume and Modulation
V & A	Volume and Aftertouch
M & A	Modulation and Aftertouch
ALL	Volume, Modulation and Aftertouch

● **Reception of Volume messages (Control number : 7)   Value : ON, OFF**

```
MIDI Function
Rx Volume      ON
```

Setting determines whether reception for Volume messages is ON or OFF. Ordinarily it is set to ON.

● **Reception of Exclusive messages   Value : ON - 1, ON - 2, OFF**

```
MIDI Function
Rx Exclu      ON-1
```

Setting which determines how Exclusive messages will be received.

ON - 1	Reception of Exclusive messages for the specified Unit Number only takes place.
ON - 2	Reception of all Exclusive messages takes place, regardless of the MIDI channel or Unit Number.
OFF	Reception is ignored.

● **Unit Number   Value : CTRL, 17 ⋯ 32**

```
MIDI Function
Unit#         CTRL
```

The Unit Number (17 ... 32) is a number used for identification, for the purposes of transmission/reception of Exclusive messages without relying on any particular settings for the channels on the respective MIDI devices. When set to CTRL, Exclusive messages can be received on the Control Channel.

Note that even when the Unit Number has been changed, upon power - up the next time it always will be set at "17."

[3] MIDI APPLICATIONS

Here explained are some of the applications made possible when you connect the Model 660 with other MIDI devices.

1. Use as a Multi-Timbral Sound Module

The Model 660 can also be used as a multi-timbral sound module, having 6 Parts. To use these 6 Parts effectively, it is best to use the unit as the sound source for a sequencer or other unit capable of automatic play.

For our purposes here, it is assumed that a sequencer (Roland MC-500 MKII, MC-300, or the like) is used for recording and playback. For details on the use of the sequencer, refer to its owner's manual.

● Before starting recording

First, connect the sequencer with the Model 660, then turn on power first to the Model 660, then the sequencer. Next, in order that you may be able to simultaneously hear both what is played on the keyboard, and what is recorded into the sequencer, set Soft Thru on the sequencer to "On", and the Model 660 to "Local Off" (☞ p. 54). If the sequencer does not have a Soft Thru function, the Model 660 should be left at "Local On."

Soft Thru On   Local On
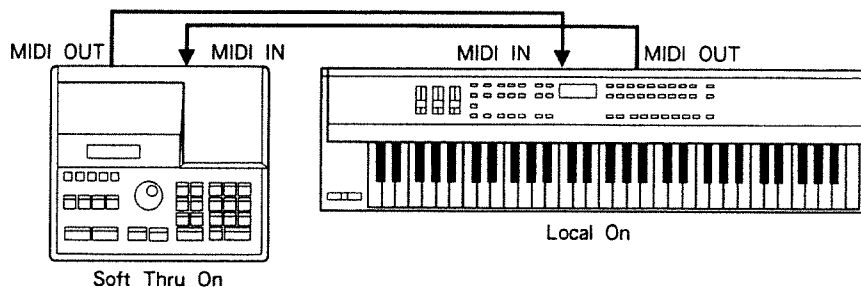
* When Soft Thru is set to "On", all MIDI data arriving at the sequencer's MIDI IN is output without change from its MIDI OUT.
* When the sequencer is capable of transmitting Local On/Off information, it can be used to automatically change the Local On/Off setting on the Model 660.

As the default setup, the Model 660's performance data will be transmitted on the MIDI channel for the Part selected with PART [◀][▶] . Moreover, the MIDI channel for each Part is in direct correspondence with the Part number. For producing sound using only the Model 660, there should be no need for changing any MIDI settings.

Finally, select a Tone for each Part that is suitable for the music you intend to play. For example, if you are planning on a jazz number, the Tone selection below might be suitable.

Part	Receive Channel	Tone
1	1	A. PIANO 1
2	2	AC. BASS
3	3	STRINGS 1
4	4	BRASS 1
5	5	SAX 1
6	6	DRUMS

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● Recording

Once ready, you can begin recording one part at a time. Though it is most common to have the key mode at Whole when recording, you could set it at Split, and record two parts at the same time. In addition, if you use the bender lever or aftertouch during recording, such information will also be included in the recording.

Since it is difficult to play a good drum performance on the keyboard, you could use step input to put it in the sequencer, or you could play it using a separate rhythm machine (Roland R - 8, R - 5, etc.) that is synchronized with the sequencer. When wishing to use what is played on a rhythm machine to sound the Model 660's drum sounds, you should set the rhythm machine so each of its drum sounds (note numbers) match up with the Model 660's drum sounds (note numbers), and have both units set to the same MIDI channel.

● Creation of the most suitable Patch

Once you have finished the recording of the whole piece, try playing it back. While listening, try selecting other tones; and similar to using a mixer, adjust the overall balance by changing level or pan settings. As finishing touches, make adjustments for chorus and reverb. When completed, store it as a patch.

If you then record the program number (control channel) for the patch created at the beginning of the song, you can obtain automatic change to the patch when the sequencer is played.

● Changing Tones in the course of a song

Each tone always has a Program Change number which is assigned to it (see Tones List). If you make a change in the tone while recording, the program change number which corresponds to it is transmitted, and will be recorded. At the same time, the tone on the Model 660 is changed as a result of that program change number.

Since the timing of tone changes may not be quite exact if the changes are made while recording, it is often better to overdub afterwards.

● Changing Tones or Patches using Exclusive messages

If instead of program numbers, you record the settings for patches or tones using Exclusive messages, you will be assured that the same settings are used when played back, even if settings for patches or tones on the Model 660 have been changed since.

To use Exclusive messages to transmit patch settings, carry out the Patch Dump procedure; and to transmit tone settings, perform the Tone Dump procedure. (☞ p. 59)

2. Using Sound Modules

● **Connections**

When the unit is to be used in combination with other sound modules (Roland U - 110, D - 110, etc.) connections are made as follows.

MIDI OUT / MIDI IN / MIDI THRU / MIDI IN
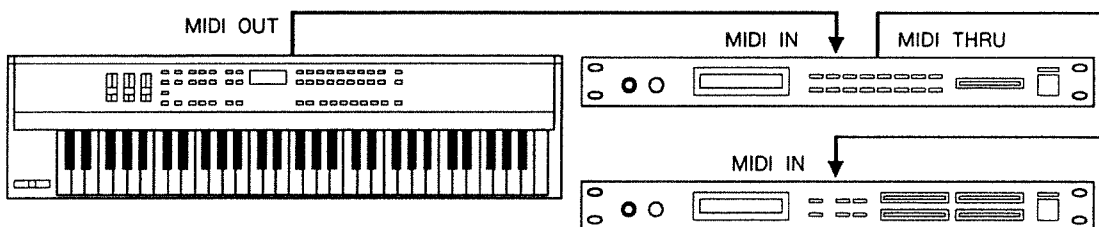
● **MIDI Settings**

When you wish the Model 660 to be sounded along with sounds in a sound module, the MIDI parameters for both devices are set as follows.

First, the Transmit channel for the Model 660 is set to PART. Next, set the receive channels on the sound module so they correspond to the MIDI channels that the Parts on the Model 660 are using.

If the sound module you are using is also a multi - timbral unit, set both units so that the MIDI channels for their Parts match. When using multiple sound modules, the MIDI channels for the Model 660's Parts can be set to match receive channels on the sound modules.

Part	Model 660's MIDI Channel	Receive Channel on Sound Module
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6

If the Key mode is set at Split or Dual, the Upper and Lower sections can each be used to play separate Parts (sound modules).

● **Combinations of Sounds**

There are many possible ways of combining sound modules and sounds. Here, a few representative examples are given.

●A fatter sound can be obtained by layering two similar sounds which have their pitch shifted slightly with respect to each other. You could also try layering sounds an octave apart. This is most effective with sounds such as strings, brass, or organ.

●Another possibility is to set the velocity sensitivity on the Model 660 in the - range, and in the + range on the sound module. Then, when keys are played strongly the sound module will sound, and when played lightly, the Model 660 will sound. In the same way, if you alter the way changes in volume are obtained based on velocity, you can get different sounds depending on the way keys are played. Aftertouch can also be used to obtain similar effects.

●If you make changes in envelopes on both units, attack portions could be sounded by the Model 660, whereas the sustained portions could be played by the sound module.

3. Transfer of Data Using Exclusive Messages

Through employing Exclusive messages, a variety of data (parameter settings) can be transferred to a sequencer or another Model 660.

■ Connections

When wishing to transmit data to another Model 660, a MIDI cable should be connected as shown below. For transfer of data with a sequencer, the same setup as on page 56 will do.

| Transmitter | MIDI OUT | MIDI IN ↓ | Receiver |
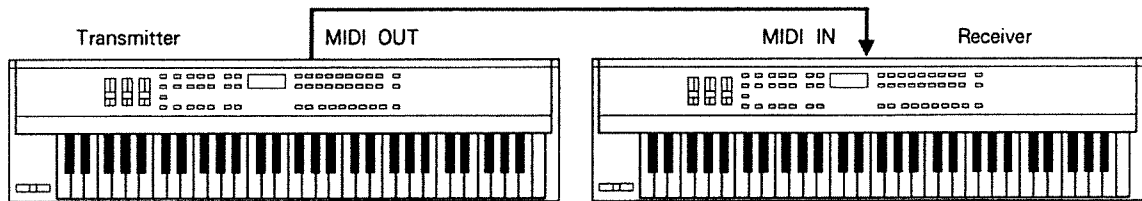
* When wishing to receive Exclusive messages on the Model 660, set the "Rx Exclu" MIDI parameter to either ON - 1 or ON - 2, then have the unit in the Play mode. It is then ready to receive at any time. When the receiver has been set to ON - 1, you need to match the Unit Numbers on both transmitter and receiver. (☞ p. 55)

■ Carrying out Transmission

Perform the following procedure when wishing to transmit data from the Model 660. The method in which transmission is performed differs depending on the type of data you wish to transmit.

● Tone Dump

Transmission of the Tone data for the Part selected by a PANEL MODE button is referred to as Tone Dump. Tone data is transmitted using the Unit Number. Rather than using a tone's Program Change number, if you record this data into a sequencer, you will be assured that the same tone settings are used when played back, even if settings on the Model 660 have since been changed.

While holding down WRITE , press VARIATION ▲ .
Once the data transmission has finished, "Completed" will be displayed, and you are returned to the play mode.

● Patch Dump

Transmission of the currently selected Patch data is referred to as Patch Dump. Patch data is transmitted using the Unit Number. Instead of using a patch's Program number, if you record this data into a sequencer, you will be assured that the same patch settings are always used when played back, even if settings on the Model 660 have since been changed.

While holding down WRITE , press VARIATION ▼ .
Once the data transmission has finished, "Completed" will be displayed, and you are returned to the play mode.

● Bulk Dump

Bulk Dump refers to the process of transmitting as a whole all the data contained within the Model 660. It allows you to store settings for the Model 660 in a sequencer, or to set another Model 660 to exactly the same settings.

①While holding down EDIT press MIDI. Then, select the following screen using PARAMETER ▲▼.

```
MIDI Bulk Dump
Sure ?    [WRITE]
```

②Press WRITE.

Once the data transmission has finished, "Completed" will be displayed briefly.

③Press EDIT to return to the play mode.

REFERENCE

TROUBLESHOOTING

In cases such as when for some reason no sound is produced, or you think that the unit is not operating as it should, first check the items below. Then, if you should still be unable to achieve normal operation, contact the store where bought, or the nearest Roland Service Station.

No sound produced / sound too low

● Are you sure you don't have volume set too low?
Recheck the volume settings you have on this unit, and any amplifier or mixer you have connected.

● Can sound be heard through headphones?
If so, then you may have a cord that is damaged, or the amplifier or mixer you have connected is the source of the problem.
Check the equipment you have connected, and you connection setup. (☞ p. 10)

● Are you sure settings for Level for Parts and Tones are not too low?
Level of Parts (☞ p. 32); Level of Tones(☞ p. 36).

● Are you sure you are not set at Local Off?
Set it to Local On. (☞ p. 54)

● Are you sure the unit's Transmit channel matches the MIDI channel for the Part?
Transmit channel (☞ p. 54); MIDI channel for the Part (☞ p. 53).

● Do you possibly have settings for Velocity Sens and Aftertouch Sens set inappropriately?
Velocity Sens / Aftertouch Sens (☞ p. 36).

● Is it possible that the volume for Parts is being set too low as a result of Volume messages received from an external MIDI device?
Try changing Patches.

The sound seems strange

● Are you sure you don't have settings for Tones left in their revised form after changing them for use in another Patch?
Initialize the settings for Tones. (☞ p. 31)

● Have you made changing in the Tone settings with respect to one PCM card, and now have a different card inserted?
Initialize the settings for Tones on PCM Cards. (☞ p. 31)

The pitch is not right

● Are you sure you don't have Key Transpose set at "On"?
Turn it Off. (☞ p. 22)

● Has Tuning been shifted?
Carry out tuning. (☞ p. 22)

● Is the pitch for the Tones set properly?
Pitch Coarse (☞ p. 35); Pitch Fine (☞ p. 35).

● Is it possible that Bender messages are being continually received?

Try moving the bender lever, or changing patches.

Patches/Tones don't change properl

● Is the [EDIT] indicator lit?

Press [EDIT] to return to the Play mode.

MIDI messages aren't received correctly.

● Have you checked to make sure settings for each Part's MIDI channel, and settings for how MIDI data is to be received are set as they should be?

MIDI settings. (☞ p. 53)

■ Error Messeges

When a mistake in an operational procedure has been made, or the unit is unable to carry out a procedure properly, an Error Message will appear in the display. In such cases refer to the information below, then perform the indicated remedy.

While making changes in Pan for Parts

```
Pan      CHORUS ON
Part1    L    ▮    R
```

Cause: Chorus for the Part is "On."

Remedy: Turn Chorus off.

```
Pan      DRUMS TONE
Part1    L    ▮    R
```

Cause: A Drum Tone is selected.

Remedy: In order to change Pan for drums, see page 38.

In changing Pan for the Parts, always select Tones other than drums.

While using a PCM Card

```
Wrong Card
           Pull Out
```

Cause: A card other than one specified has been inserted.

Remedy: Immediately pull out the card.

```
Card Not Ready
```

Cause: No PCM card is inserted, or it is not properly inserted.

Remedy: Check that the card is inserted properly, then try again.

```
Part1 ▮ - - - - - - - - -
```

Cause: A different PCM card has been inserted.

Remedy: By pressing TONE SELECT button or VARIATION [▲][▼], redo the selection of Tones for the PCM card.

When using other MIDI devices

```
MIDI Error
```

Cause: Too large an amount of MIDI messages have been received, making correct processing difficult.

Remedy: Reduce the amount of MIDI messages being transmitted.

Condition: Exclusive messages not received correctly.

Remedy: Check MIDI cable connections, and the data to be transmitted, then try the procedure again.

When battery is depleted

```
Check
Internal Battery
```

Cause: The unit's backup - use battery has been depleted.

Remedy: Contact you nearest Roland Service Station.

OPERATION MAP

Part selection

Tone selection

EDIT MIDI LEVEL PAN PART ◄ ►

TONE SELECT

A. PIANO A. GUITAR STRINGS BRASS E. ORGAN D-SOUNDS SLAP BASS WINDS CARD 1

TONE DUMP

VARIATION ▲ ▼

TUNE KEY MODE PANEL MODE
SPLIT DUAL WHOLE LOWER UPPER

E. PIANO E. GUITAR CHOIR TP/TRB MALLETS SYNTH WAVE BASS DRUMS CARD 2

PATCH DUMP

Key Mode selection Panel Mode selection

KEY TRANSPOSE KEY EFFECT EFFECTOR
HARMONY CHASE ARPEGGIO CHORUS REVERB

USER PATCH
1 2 3 4 5 6 8

WRITE

Effector selection (each Part)

Key Effect selection

Key Transpose On/Off

Write procedure of Patch

While holding down Button

Press the specified button.

While holding down EDIT press the specified button.

Play mode ◄——— EDIT ——— Edit mode

To edit mode

Split Point — SPLIT

Chorus — CHORUS

Reverb — REVERB

Parameter selection

PARAMETER ▲ ▼

Chase — CHASE

Arpeggio — ARPEGGIO

Key Transpose — KEY TRANSPOSE

Value Change

VALUE

Tuning — TUNE

Tone — EDIT

Parameter selection

PARAMETER ▲ ▼

With Drum Tones, specify the Drum sound.

10

0

VALUE ▲ ▼

Level — LEVEL

Pan — PAN

MIDI Channel — MIDI

Part selection

PART ◄ ►

Other MIDI parameters — MIDI

Hold Mode — EDIT

While holding down EDIT, press Pedal Switch.

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PARAMETERS LIST

Parameter	Value
Tuning	427.4 … 452.9Hz

MIDI parameter	Value
MIDI Channel of part	1 … 16
Transmit Channel	PART, 1 … 16
Control Channel	1 … 16
Local Cotorol	ON, OFF
Program Change (Rx & Tx)	ON, OFF
Aftertouch (Rx & Tx)	ON, OFF
Breath (Rx)	OFF, VOL, MOD, AFT V & M, V & A, M & A, ALL
Volume (Rx)	ON, OFF
Exclusive (Rx)	OFF, ON - 1, ON - 2
Unit Number	CTRL, 17 … 32
Bulk Dump	– – – – – – – – –

Part parameter	Value
Tone Select	– – – – – – – –
Chorus On/Off	On, Off
Reverb On/Off	On, Off
Level	0 … 100
Pan	L	…	…	R, RND

[ ] Set by means of the panel buttons.

Tone parameter		Value
Pitch	Coarse	– 24 … + 24
	Fine	– 50 … + 50
	Bender Range	0 … 12
	Aftertouch Bend	– 36, – 24, – 12 … + 12
Vibrato	Rate	0 … 100
	Depth	0 … 100
	Modulation Lever Depth	0 … 100
	Aftertouch Sens	0 … 100
Level	Level	0 … 100
	Velocity Sens	– 10 … + 10
	Aftertouch Sens	– 10 … + 10
	Attack Rate	– 10 … + 10
	Decay Rate	– 10 … + 10
	Sustain Level	– 10 … + 10
	Release Rate	– 10 … + 10

Drums Tone

Tone parameter	Value
Reverb On/Off	On, Off
Pan	L	…	…	R, RND

Performance parameter	Value
Key Mode	Split, Dual, Whole
Split Point	C2 … C # 7
Panel Mode	Lower, Upper
Upper Part	1 … 6
Lower Part	1 … 6
Key Transpose On/Off	On, Off
Key Transpose	– 12 … + 12
Chorus Rate	0 … 100
Chorus Depth	0 … 100
Chorus Level	0 … 100
Reverb Type	ROOM - 1 … 3, HALL - 1, 2, GATE, DELAY - 1, 2
Reverb Time	0 … 100
Reverb level	0 … 100
Delay Feedback	0 … 100
Key Effect	Off, Harmony, Chase, Arpeggio
Chase Mode	SINGLE, REPEAT, ALTERNATE
Chase Rate	0 … 100
Chase Sift	– 12 … + 12
Chase Level	0 … 100
Arpeggio Mode	UP, DOWN, UP & DOWN, RANDOM
Arpeggio Rate	0 … 100
Arpeggio Aftertouch Sens	– 5 … + 5
Arpeggio Style	STACCATO, PORTATO, LEGATO
Hold Mode	UPPER, LOWER, BOTH

TONES LIST

Tone name	Prog #	Tyep	Number of Voices	Remaks	Upper limit of soudable range
A. PIANO 1	1	V - Mix	2	Soft	
A. PIANO 2	2	V - Mix	2		
A. PIANO 3	3	V - Mix	2	Brigt	
A. PIANO 4	4	V - Mix	2	Honky - tonk	
A. PIANO 5	5	Single	1	Soft	
A. PIANO 6	6	Detune	2		
A. PIANO 7	7	Single	1	Hard	
A. PIANO 8	8	Detune	2		
A. PIANO 9	9	Single	1	Hard and bright	
A. PIANO 10	10	Detune	2		
E. PIANO 1	11	V - Mix	2	Soft + Hard	
E. PIANO 2	12	Single	1	Soft	
E. PIANO 3	13	Detune	2		
E. PIANO 4	14	Single	1	Hard	
E. PIANO 5	15	Detune	2		
BRIGHT EP1	16	Single	1		G # 7
BRIGHT EP2	17	Detune	2		
A. GUITAR 1	18	Single	1		A6
A. GUITAR 2	19	Detune	2		
A. GUITAR 3	20	Dual	2		
A. GUITAR 4	21	Dual	2	Added lower octave	
A. GUITAR 5	22	V - SW	1	Slow attack / fast attack (V = 100)	
E. GUITAR 1	23	V - SW	1	Muted / unmuted (V = 100)	F6
E. GUITAR 2	24	Single	1	Muted	
E. GUITAR 3	25	Single	1		
E. GUITAR 4	26	Detune	2		
HAEVY. EG 1	27	Single	1	Combination fifths	E7
HAEVY. EG 2	28	Detune	2		
STRINGS 1	29	Single	1	Long release	B7
STRINGS 2	30	Single	1	Short release	
STRINGS 3	31	Dual	2	Long release, Added lower octave	
STRINGS 4	32	Dual	2	Short release, Added lower octave	
JP. STRINGS	33	Single	1		
STRINGPAD1	34	Single	1		
STRINGPAD2	35	Dual	2		

A. PIANO

E. PIANO

A. GUITAR

E. GUITAR

STRINGS

Prog # : Program number   V : Velocity threshold (The value for velocity at which sound will change. The maximum value for velocity is 127.)

CHOIR

Tone name	Prog #	Type	Number of Voices	Remarks	Upper limit of soudable range
CHOIR 1	36	Single	1	Long release	G # 6
CHOIR 2	37	Single	1	Short release	
CHOIR 3	38	Dual	2	Long release, Added lower octave	
CHOIR 4	39	Dual	2	Short release, Added lower octave	
SYN CHOIR	40	Single	1		
SYN. VOX 1	41	Single	1		
SYN. VOX 2	42	Single	1		
BREATH VOX	43	Dual	2		G7

BRASS

Tone name	Prog #	Type	Number of Voices	Remarks	Upper limit of soudable range
BRASS 1	44	Single	1		G # 7
JP. BRASS 1	45	Single	1		
JP. BRASS 2	46	Single	1		
RICH BRASS	47	Single	1		
BRASTRINGS	48	Dual	2		
METAL HIT	49	Dual	2		

TP / TRB

Tone name	Prog #	Type	Number of Voices	Remarks	Upper limit of soudable range
SOFT TP 1	50	Single	1		B7
SOFT TP 2	51	Detune	2		
TP / TRB 1	52	Single	1		
TP / TRB 2	53	Single	1	Soft	
TP / TRB 3	54	Single	1	Bright	

E. ORGAN

Tone name	Prog #	Type	Number of Voices	Remarks	Upper limit of soudable range
E. ORGAN 1	55	Single	1		A6
E. ORGAN 2	56	Detune	2		
E. ORGAN 3	57	Single	1		B6
E. ORGAN 4	58	Detune	2		
E. ORGAN 5	59	Single	1		E7
E. ORGAN 6	60	Detune	2		
E. ORGAN 7	61	Single	1		G # 6
E. ORGAN 8	62	Detune	2		
E. ORGAN 9	63	Dual	2		A6
R. ORGAN 1	64	Dual	2		
R. ORGAN 2	65	Dual	2		

Prog # : Program number

MALLETS

Tone name	Prog #	Tyep	Number of Voices	Remarks	Upper limit of soudable range
VIBE 1	66	Single	1	Soft	
VIBE 2	67	Detune	2	Soft	
VIBE 3	68	V - Mix	2	Soft + Hard	F # 7
MARIMBA	69	Single	1		D7
BELL 1	70	Single	1	Long release	
BELL 2	71	Detune	2	Short release	
PIZZ	72	Single	1		
METAL	73	Single	1		
NAILS	74	Single	1		

D – SOUNDS

Tone name	Prog #	Tyep	Number of Voices	Remarks	Upper limit of soudable range
FANTASIA	75	Dual	2		
FANTA BELL	76	Single	1		
L. CALLIOPE	77	Dual	2		G7
CALLIOPE	78	Single	1		
BELL PAD	79	Dual	2		
SYNTH HARP	80	Single	1		
SPECT BELL	81	Dual	1		
PIZZAGOGO	82	Dual	2		
BELL DRUM	83	Dual	2		
SPECTRUM 1	84	Single	1		
SPECTRUM 2	85	Single	1		
N. DANCE	86	Single	1		

SYNTH WAVE

Tone name	Prog #	Tyep	Number of Voices	Remarks	Upper limit of soudable range
PULSEWAVE1	87	Single	1		
PULSEWAVE2	88	Single	1		
PULSEWAVE3	89	Single	1		
SAW WAVE 1	90	Single	1		
SAW WAVE 2	91	Single	1		

Prog # : Program number

	Tone name	Prog #	Type	Number of Voices	Remarks	Upper limit of soudable range
SLAP BASS	SLAP 1	92	Single	1	Thumped / Pulled (S = E2, H = F # 4)	G7
	SLAP 2	93	Detune	2		
	SLAP 3	94	Single	1	Thumped / Pulled (S = B2, H = F # 4)	
	SLAP 4	95	Detune	2	Thumped / Pulled (S = E2, H = F # 4)	
	SLAP 5	96	V - SW	1	Thumped / Pulled (V = 100, H = F # 4)	
	SLAP 6	97	V - SW	1	Slow attack / fast attack (V = 100, H = F # 4)	
	SLAP 7	98	Single	1	Thumped / Pulled (S = E2, H = C # 4)	
	SLAP 8	99	Detune	2		
	SLAP 9	100	Single	1	Thumped / Pulled (S = B2, H = C # 4)	
	SLAP 10	101	Detune	2	Thumped / Pulled (S = E2, H = C # 4)	
	SLAP 11	102	V - SW	1	Thumped / Pulled (V = 100, H = C # 4)	
	SLAP 12	103	V - SW	1	Slow attack / fast attack (V = 100, H = C # 4)	
BASS	AC. BASS	104	V - Mix	2	Added fret noise	F4
	FRETLESS 1	105	Single	1	(H = D # 6)	G7
	FRETLESS 2	106	Detune	2	(H = D # 6)	
	FINGERED 1	107	Single	1	(H = C # 5)	
	FINGERED 2	108	Detune	2	(H = C # 5)	
	PICKED 1	109	Single	1		A4
	PICKED 2	110	Detune	2		
	SYN. BASS 1	111	V - Mix	2	Soft + Hard	B4
	SYN. BASS 2	112	Single	1	Soft	C # 5
	SYN. BASS 3	113	Single	1	Hard	B4
	SYN. BASS 4	114	Single	1		
	SYN. BASS 5	115	Single	1		
	SYN. BASS 6	116	Single	1		
	SYN. BASS 7	117	Single	1		
	SYN. BASS 8	118	Single	1		
WINDS	SAX 1	119	Single	1		E7
	SAX 2	120	Single	1	Soft	
	SAX 3	121	Single	1	Bright	
	SAX 4	122	Detune	2		
	SAX 5	123	Dual	2	Added lower octave	
	FLUTE 1	124	Single	1		A # 7
	SHAKU 1	125	Single	1		F7
	SHAKU 2	126	Detune	2		
	BREATH	127	Single	1		

Prog # : Program number   V : Velocity threshold

S : Split point (Position on keyboard at which change in voice occurs.)

H : Harmony point (Position on keyboard at which harmony elements are added.)

Tone name	Prog #	Type	Number of Voices	Remarks	Upper limit of soudable range
DRUMS	128	Single	1	See chart below	

DRUMS

DRUMS (Factory settings)

	Note number	Drum name	Pan		Reverb
	35	Bass Drum 1	L	R	Off
C2	36	Bass Drum 2	L	R	Off
	37	Rim Shot	L	R	On
	38	Snare Drum 1	L	R	On
	39	Hand Clap	L	R	On
	40	Snare Drum 2	L	R	On
	41	Low Tom Tom 1	L	R	On
	42	Closed High Hat 1	L	R	On
	43	Low Tom Tom 2	L	R	On
	44	Open High Hat 2	L	R	On
	45	Middle Tom Tom 1	L	R	On
	46	Open High Hat 1	L	R	On
	47	Middle Tom Tom 2	L	R	On
C3	48	High Tom Tom 1	L	R	On
	49	Crash Cymbal 1	L	R	On
	50	High Tom Tom 2	L	R	On
	51	Ride Cymbal 1	L	R	On
	52	China Cymbal 1	L	R	On
	53	Cup (Mute)	L	R	On
	54	Off	L	R	Off
	55	Off	L	R	Off
	56	Cowbell	L	R	On
	57	Crash Cymbal 2	L	R	On
	58	Snare Drum 3	L	R	On
	59	Ride Cymbal 2	L	R	On
C4	60	Off	L	R	Off
	61	Off	L	R	Off
	62	Off	L	R	Off
	63	Off	L	R	Off
	64	Off	L	R	Off
	65	Off	L	R	Off
	66	Off	L	R	Off
	67	Off	L	R	Off
	68	Off	L	R	Off
	69	Cabasa	L	R	On
	70	Off	L	R	Off
	71	Off	L	R	Off
C5	72	Off	L	R	Off
	73	Off	L	R	Off
	74	Off	L	R	Off
	75	Off	L	R	Off
	76	Off	L	R	Off
	77	Off	L	R	Off
	78	Off	L	R	Off
	79	High Pitch Tom Tom 2	L	R	On
	80	Off	L	R	Off
	81	High Pitch Tom Tom 1	L	R	On
	82	Off	L	R	Off
	83	Off	L	R	Off
C6	84	Bass Drum 3	L	R	Off
	85	Bass Drum 4	L	R	Off
	86	Snare Drum 4	L	R	On
	87	Snare Drum 5	L	R	On
	88	Snare Drum 6	L	R	On
	89	Low Tom Tom 3	L	R	On
	90	Closed High Hat 2	L	R	On
	91	Middle Tom Tom 3	L	R	On
	92	China Cymbal 2	L	R	On
	93	High Tom Tom 3	L	R	On
	94	Ride Cymbal 3	L	R	On
	95	Off	L	R	Off
C7	96	Off	L	R	Off

Off : No Sound

BLANK CHARTS

The blank charts could be photocopied and used whenever needed.

Patch #	

Key Mode	Split Point	Panel Mode	Part #		Chorus			Reverb			
			Lower	Upper	Rate	Depth	Level	Type	Time	Level	Delay FB

Key Transpose		Key Effect Select	Chase				Arpeggio				Hold mode
On/Off	Transpose		Mode	Rate	Shift	Level	Mode	Rate	After	Style	

	Tone Name	Level	Pan	Effector On/Off	
				Chorus	Reverb
Part 1			L ||||||||||||||| R		
Part 2			L ||||||||||||||| R		
Part 3			L ||||||||||||||| R		
Part 4			L ||||||||||||||| R		
Part 5			L ||||||||||||||| R		
Part 6			L ||||||||||||||| R		

	Pitch				Vibrate				Level						
	Coarse	Fine	Bender	After	Rate	Depth	Lever	After	Level	Velocity	After	Attack	Decay	Sustain	Release
Part 1															
Part 2															
Part 3															
Part 4															
Part 5															
Part 6															

Roland Exclusive Messages

1 Data Format for Exclusive Messages

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

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

MIDI status : F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufacturer-ID immediately after F0H (MIDI version 1.0).

Manufacturer-ID : 41H

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

Device-ID : DEV

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

Model-ID : MDL

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

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

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

Command-ID : CMD

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

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

Main data : BODY

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

2 Address mapped Data Transfer

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

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

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

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

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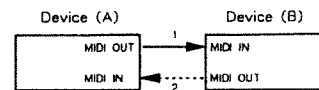
Connection at point 2 is essential for "Request data" procedures. (See Section 3.)

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

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

Connection Diagram
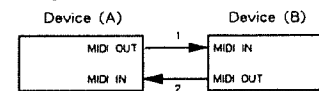
Connection at points 1 and 2 is essential.

Notes on the above two procedures

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

3 One-way Transfer Procedure

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

Types of Messages

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

Request data #1 : RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.
On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.

If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will send out nothing.

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

*The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.

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

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

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

Data set 1 : DT1 (12H)

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

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

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

*A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.

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

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

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

Example of Message Transactions

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

● Device B requesting data from Device A
Device B sends an RQ1 message to Device A. Checking the message, Device A sends a DT1 message back to Device B.

4 Handshake-Transfer Procedure

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

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

Types of Messages

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

Want to send data : WSD (40H)

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

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

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

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

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

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

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

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

≠ Request data : RQD (41H)

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

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

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

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

≠ Data set : DAT (42H)

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

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

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

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

≠ Acknowledge : ACK (43H)

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

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

≠ End of data : EOD (45H)

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

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

≠ Communications error : ERR (4EH)

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

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

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

≠ Rejection : RJC (4FH)

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

● a WSD or RQD message has specified an illegal data address or size.
● the device is not ready for communication.
● an illegal number of addresses or data has been detected.
● data transfer has been terminated by an operator.
● a communications error has occurred.

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

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

#Example of Message Transactions

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

Device (A)	Device (B)

[Want to send data] ───────▶

◀─────── [Acknowledge]

[Data set] ───────▶

◀─────── [Acknowledge]

[Data set] ───────▶

◀─────── [Acknowledge]

⋮

[End of data] ───────▶

◀─────── [Acknowledge]
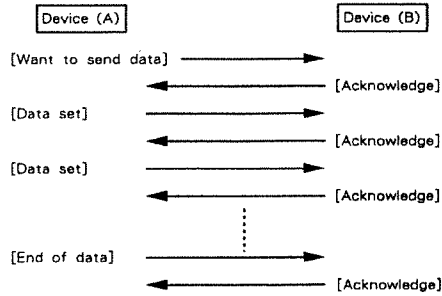
● Device (A) requests and receives data from device (B).

Device (A)	Device (B)

[Request data] ───────▶

◀─────── [Data set]

[Acknowledge] ───────▶

◀─────── [Data set]

[Acknowledge] ───────▶

⋮

◀─────── [End of data]

[Acknowledge] ───────▶
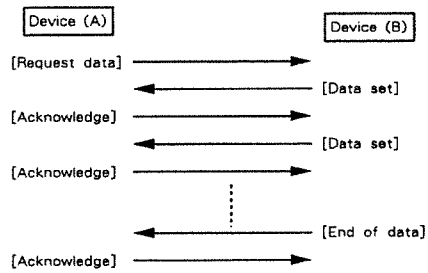
● Error occurs while device (A) is receiving data from device (B).

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

Device (A)	Device (B)

⋮

◀─────── [Data set]

[Acknowledge] ───────▶

(Error) × ◀─────── [Data set]

[Communication error] ───────▶

◀─────── [Data set]
(the same data
[Acknowledge] ───────▶ as above)

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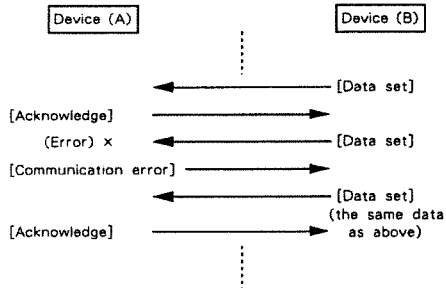
2) Device (B) rejects the data re-transmitied, and quits data transfer.

Device (A)	Device (B)

⋮

◀─────── [Data set]

[Acknowledge] ───────▶

(Error) × ◀─────── [Data set]

[Communication error] ───────▶

(Quit) ◀─────── [Rejection]
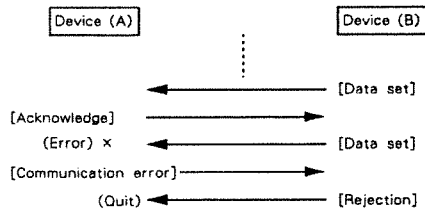
3) Device (A) immediately quits data transfer.

Device (A)	Device (B)

⋮

◀─────── [Data set]

[Acknowledge] ───────▶

(Error) × ◀─────── [Data set]

[Rejection] ───────▶ (Quit)

MIDI Implementation
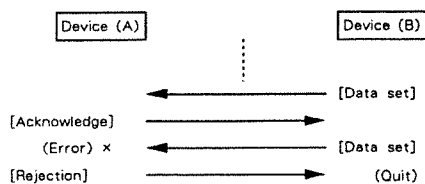
1. RECOGNIZED RECIEVE DATA

Following messages are always recognized except for ROM Play.

■ Channel voice messages

The message is recognized through the MIDI channel for each part. (p.53)

● Note event

○ Note off

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

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
kk = Note number   : 00H – 7FH (0 – 127)   0 = C – 1 – 127 = G9
vv = Velocity   : Ignored

○ Note on

Status	Second	Third
9nH	kkH	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
kk = Note number   : 00H – 7FH (0 – 127)   0 = C – 1 – 127 = G9
vv = Velocity   : 01H – 7FH (1 – 127)

● Aftertouch
This message is recognized when MIDI After function (p.55) is on.

○ Polyphonic Aftertouch

Status	Second	Third
AnH	kkH	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
kk = Note number   : 00H – 7FH (0 – 127)   0 = C – 1 – 127 = G9
vv = Value   : 00H – 7FH (0 – 127)

○ Channel Aftertouch

Status	Second
DnH	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 – ch.1 – 15 = ch.16
vv = Value   : 00H – 7FH (0 – 127)

● Control change

○ Modulation depth

Status	Second	Third
BnH	01H	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Modulation depth   : 00H – 7FH (0 – 127)

○ Breath
This message is recognized as volume/modulation/aftertouch according to MIDI Rx Breath fuction. (p.55)

Status	Second	Third
BnH	02H	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Breath   : 00H – 7FH (0 – 127)

○ Volume
This message is recognized when MIDI Rx Volume fuction is on. (p.55)
The value (vvH) corresponds to the Level of Part. (p.32)

Status	Second	Third
BnH	07H	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Volume value   : 00H – 7FH (0 – 127)

○ Pan
This message is recognized as the Part's Pan, and 15 different positions are available as settings. (p.33)

Status	Second	Third
BnH	0AH	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Pan value : 00H – 7FH (0 – 127)   00H = Left – 40H = Center – 7FH = Right

L7 .. L6 .. L5 .. L4 .. L3 .. L2 .. L1 .. Center .. R1 .. R2 .. R3 .. R4 .. R5 .. R6 .. R7

L7 : 0H – 8H (0 – 8)		R1 : 45H – 4AH (69 – 76)	
L6 : 9H – 11H (9 – 17)		R2 : 4BH – 55H (77 – 85)	
L5 : 12H – 19H (18 – 25)		R3 : 56H – 5DH (86 – 93)	
L4 : 1AH – 22H (26 – 34)		R4 : 5EH – 66H (94 – 102)	
L3 : 23H – 2AH (35 – 42)		R5 : 67H – 6EH (103 – 110)	
L2 : 2BH – 33H (43 – 51)		R6 : 6FH – 77H (111 – 119)	
L1 : 34H – 3BH (52 – 59)		R7 : 78H – 7FH (120 – 127)	
Center : 3CH – 44H (60 – 68)			

○ Hold 1

Status	Second	Third
BnH	40H	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Hold   : 00H – 7FH (0 – 127)   0 – 63 = OFF,
     64 – 127 = ON

○ RPN LSB

Status	Second	Third
BnH	64H	llH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
ll = LSB of the patameter number controlled by RPN

○ RPN MSB

Status	Second	Third
BnH	65H	mmH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
mm = MSB of the patameter number controlled by RPN

✳✳✳ RPN description ✳✳✳
Using MIDI RPN, parameters can be changed by Control change messages. RPN MSB and LSB specify the parameter to be controlled, while Data entry shows the parameter value.

Pitch bend sensitivity and Fine tune are controllable by RPN on Model 660.

RPN # 0 : Pitch bend sensitivity
BnH 64H 00H	BnH 65H 00H	BnH 06H mmH
(RPN LSB)	(RPN MSB)	(Data Entry MSB)

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
mm = Bender range   : 00H – 0CH (0 – 12)   1 octave by semitone
✳ Data Entry LSB is ignored.

RPN # 1 : Fine tune
BnH 64H 01H   BnH 65H 00H   BnH 26H llH   BnH 06H mmH
(RPN LSB)   (RPN MSB)   (Data Entry LSB)   (Data Entry MSB)

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
ll = LSB data of the Fine tune   : 00H – 7FH
mm = MSB data of the Fine tune   : 1FH – 60H
mm, ll = 1FH, 00H – 40H, 00H – 60H, 18H   (– 50.5cent – 0cent –   + 50.3cent)
                    ↑
             A = 440.0Hz

○ Data entry LSB

Status	Second	Third
BnH	26H	llH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
ll = Value of RPN   : 00H – 7FH (0 – 127)

○ Data entry MSB

Status	Second	Third
BnH	06H	mmH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
mm = Value of RPN   : 00H – 7FH (0 – 127)

✳✳✳ Data entry description ✳✳✳
RPN # 0 : Pitch bend sensitivity
Data Entry MSB (Data Entry LSB)

BnH 06H mmH	(BnH 26H llH)	Pitch bend sensitivity
00H	ignored	0 cent
01H	"	100 cent (semitone)
.	"	.
0CH	"	1200 cent (1 Octave)
0DH	"	ignored
.	"	"
7FH	ignored	ignored

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16

RPN # 1 : Fine tune
Data Entry MSB Data Entry LSB

BnH 06H mmH	BnH 26H llH	Fine tune
1FH	58H	– 50.5 cent
.	.	.
.	.	.
40H	00H	0 cent (A4 = 440.0Hz)
.	.	.
. .	.	.
60H	18H	+ 50.3 cent

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16

● Program change
The message is recognized when MIDI Program Change function is on.(p.55)
However, it is not recognized in Edit mode.

Status	Second
CnH	ppH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
pp = Program change number   : 00H – 7FH (0 – 127)

○ Tone change
This message is recognized through the MIDI channel for each part, and Program
change number (ppH) corresponds to the Internal or Card 1/2 Tones.
See the Tones list (p.66) for details.

CnH ppH	Tone # : Tone Name
00H	1 : A.PIANO 1
.	.
.	.
7FH	128 : DRUMS

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16

○ Patch change
This message is recognized through the Control Channel, and Program change number
(ppH) corresponds to the USER PATCH #.

CnH ppH	Patch #
00H	USER PATCH 1
.	.
.	.
07H	USER PATCH 8
08H	ignored
.	"
7FH	ignored

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16

● Pitch bend Change

Status	Second	Third
EnH	llH	mmH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
ll = LSB of Pitch bend change : 00H – 7FH (0 – 127)
mm = MSB of Pitch bend change : 00H – 7FH (0 – 127)
mmH, llH = 00H, 00H – 40H, 00H – 7FH, 7FH (– 8192 – 0 –   + 8191)

mmH	llH	Relative value of Pitch
00H	00H	– 8192
.	.	.
.	.	.
40H	00H	0
.	.	.
.	.	.
7FH	7FH	+ 8191

■ Channel mode messages
The message is recognized through the MIDI channel for each part.(p.53)

● Reset all controllers

Status	Second	Third
BnH	79H	00H

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16

When Reset all controllers is recognized, each of the controller is set as follows.

Controller	Setting
Pitch bender	± 0 (center)
Hold 1	0 (off)
Modulation	0 (min)
Channel aftertouch	0 (min)
Polyphonic aftertouch	0 (min)

● Local control
This message is recognized through the Control Channel.

Status	Second	Third
BnH	7AH	vvH

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Value   : 00H, 7FH (0, 127)   0 = OFF, 127 = ON

● All notes off
When All notes off is recognized, all the notes which have been turned on by MIDI
Note on message are turned off.

Status	Second	Third
BnH	7BH	00H

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16

■ System real time messages

● Active sensing

Once recieving this message, the Model 660 expects to accept status or data in sequence, at last within about 400 msec intervals.
If the unit fails to recieve a message 400 msec after previous one, it judges there is a problem somewhere in MIDI path, muting the current sound, then stopping 400 msec – interval monitoring of incoming signal.

Status
FEH

■ System exclusive messages

A set of various parameter is received using MIDI Exclusive messages on Model 660. Refer to section 3 and 'Roland Exclusive Messages' for details.

Status
F0H .... ddH F7H

F0H = System exclusive
ddH = data   : 00H – 7FH
F7H = EOX (End of Exclusive)

2. TRANSMITTED DATA

■ Channel voice messages

The message is transmitted through the MIDI Tx Channel.(p.54) When set to PART transmission takes place on the MIDI channel set for the currently Part.

● Note event

○ Note off

Status	Second	Third
8nH	kkH	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
kk = Note number   : 00H – 7FH (0 – 127)   0 = C – 1 – 127 = G9
vv = Velocity   : 01H – 7FH (1 – 127)

○ Note on

Status	Second	Third
9nH	kkH	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
kk = Note number   : 00H 7FH (0 – 127)   0 = C – 1 – 127 = G9
vv = Velocity   : 01H – 7FH (1 – 127)

● Control change

○ Modulation depth

This message is transmitted when the Modulation Lever is used.

Status	Second	Third
BnH	01H	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Modulation depth   : 00H 7FH (0 – 127)

○ Hold 1

This message is transmitted when the Hold Pedal is depressed.

Status	Second	Third
BnH	40H	vvH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
vv = Hold   : 00H, 7FH (0, 127)   OFF – 0, ON = 127

* * * Transmission of RPN * * *

While setting Tuning (p.22), press the [WRITE] button then the Fine tune (RPN # 1) is transmitted through the Control Channel.

RPN # 1 : Fine tune
BnH 64H 01H   BnH 65H 00H   BnH 26H llH   BnH 06H mmH
(RPN LSB)   (RPN MSB)   (Data LSB)   (Data MSB)

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
ll = LSB data of the Fine tune   : 00H – 7FH
mm = MSB data of the Fine tune : 1FH 60H
mmH, llH = 1FH, 00H – 40H, 00H – 60H, 18H   (– 50.5cent – 0cent – + 50.3cent)

A = 440.0Hz

○ RPN LSB

Status	Second	Third
BnH	64H	01H

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
01 = LSB of the Fine tune

○ RPN MSB

Status	Second	Third
BnH	65H	00H

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
00 – MSB of the Fine tune

○ Data entry LSB

Status	Second	Third
BnH	26H	llH

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
ll = LSB data of the Fine tune   : 00H 7FH (0 – 127)

○ Data entry MSB

Status	Second	Third
BnH	06H	mmH

n = Control channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 – ch.16
mm = MSB data of the Fine tun: 1FH – 60H (31 – 96)

● Program change

This message is transmitted when MIDI Program Change function is on.(p.55)

Status	Second
CnH	ppH

n = MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 = ch.16
pp = Program change number   : 00H – 7FH (0 – 127)

○ Tone change number

When the TONE SELECT or VARIATION button are pressed, the Tone change number corresponds to that tone is transmitted through the MIDI Tx Channel. Refer to TONE LIST (p.66) for program number.

Tone # : Tone Name	CnH ppH
1 : A.PIANO 1	00H
.	.
.	.
128 : DRUMS	7FH

n – MIDI channel No.   : 0H – FH (0 – 15)   0 = ch.1 – 15 – ch.16

○ Patch change number

When the USER PATCH button is pressed, the patch change number corresponds to that patch is transmitted through the Control Channel.

Patch #	CnH ppH
USER PATCH 1	00H
.	.
.	.
USER PATCH 8	07H

n – Control channel No.   : 0H – FH (0 15)   0 – ch.1 15 – ch.16

● Channel Aftertouch
This message is transmitted when holding down the key by the MIDI After function is on.

Status	Second
DnH	vvH

n = MIDI channel No.   : 0H ~ FH (0 ~ 15)   0 = ch.1   15 = ch.16
vv = Value   : 00H ~ 7FH (0 ~ 127)

● Pitch bend Change
This message is transmitted when the Bender Lever is used.

Status	Second	Third
EnH	llH	mmH

n = MIDI channel No.   : 0H ~ FH (0 ~ 15)   0 = ch.1 ~ 15 = ch.16
ll = LSB of Pitch bend change   : 00H ~ 7FH (0 ~ 127)
mm = MSB of Pitch bend change : 00H ~ 7FH (0 ~ 127)
mmH, llH = 00H, 00H ~ 40H, 00H ~ 7FH, 7FH (-8192 ~ 0 ~ +8191)

mmH	llH	Relative value of Pitch
00H	00H	- 8192
.	.	.
.	.	.
.	.	.
40H	00H	0
.	.	.
.	.	.
7FH	7FH	+ 8191

■ Channel mode messages
The message is transmitted through the MIDI Tx Channel.(p.54)

● Reset all controllers
This message is transmitted to external equipments when used to change Part or MIDI receive channel.

Status	Second	Third
BnH	79H	00H

n = MIDI channel No.   : 0H ~ FH (0 ~ 15)   0 = ch.1 ~ 15 = ch.16

■ System real time messages

● Active sensing
This message is transmitted for checking MIDI connection between Model 660 and external equipments at an interval of 250msec.

Status
FEH

■ System exclusive messages

Status
F0H .... ddH F7H

F0H = System exclusive
ddH = data   : 00H ~ 7FH
F7H = EOX (End of Exclusive)

A set of various parameter is transmitted using MIDI Exclusive messages on Model 660. Refer to section 3 and 'Roland Exclusive Messages' for details.

3. EXCLUSIVE COMMUNICATIONS

A set of parameters of a tone or patch or bulk can transmit to Model 660 by using one way MIDI exclusive message. This message is always received except for ROM Play, if Rx Exclu of MIDI function is set to ON - 1 or ON - 2.
However, when Rx Exclu is set to ON - 1, you need to match the Unit Numbers on both equipments.(p.55)

Model - ID # in the exclusive message is used "35H" on Model 660.
Device - ID # is set to "Unit Number less 1", upon power - up the next time it always Unit Number will be set at "17". Then Device - ID # is used 10H (16 - 17 - 1).

■ One - way communication
Refer to Section 3. One - way Transfer Procedure (p.72) and Section 4. Parameter Address Map (p.80) for details.

● Request data RQ1 (11H)

Byte	Comments
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID (Unit # - 1)
35H	Model ID (Model 660)
11H	Command ID (RQ1)
aaH	Address MSB
bbH	Address
ccH	Address LSB
ssH	Size MSB
ssH	Size
ssH	Size LSB
sum	Check sum
F7H	EOX (End Of eXclusive)

When receiving RQ1 in case of Rx Exclu of MIDI function is set to ON - 1 or ON - 2, contains start address listed in the Parameter base address table, and the address size is 1 or moreover in the block of the same value of address MSB, sends the data stored in that address location and the subsequent locations, if any, using DT1 format. So that cannot be taken out the data of plural block at once.

Model 660 never sends this message.

● Data set DT1 (12H)

Byte	Comments
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID (Unit # - 1)
35H	Model ID (Model 660)
12H	Command ID (RQ1)
aaH	Address MSB
bbH	Address
ccH	Address LSB
ddH	Data
: :	
eeH	Data
sum	Check sum
F7H	EOX (End Of eXclusive)

○ Receiving DT1
When receiving DT1 in case of Rx Exclu of MIDI function is set to ON - 1 or ON - 2, and if the address specified in the message corresponds to the Parameter base address table, stores the data into that and subsequent address locations.
However, the plural data of DT1 is received at the same time, Model 660 cannot manage the data. Then make intervals at about 400msec during DT1 messages.

○ Transmission DT1
Exclusive messages are transmitted under following conditions by DT1.

1) Tone dump
While holding down the [WRITE] button, press VARIATION [▲] button then the Tone data of the current part is transmitted. Refer to *4 - 2 of Parameter Addres Map for details.

2) Patch dump
While holding down the [WRITE] button, press VARIATION [▼] button then the Patch data of the current patch is transmitted. Refer to *4 - 3 of Parameter Address Map for details.

3) Bulk dump
While displaying on MIDI function "MIDI Bulk Dump Sure ?", press [WRITE] button then all the data within Model 660 is transmitted. Refer to *4 - 3, *4 - 4, *4 - 5 of Parameter Address Map for details.

4) Recognized RQ1
When receiving RQ1 in case of Rx Exclu of MIDI function is set to ON - 1 or ON - 2, parameter corresponding to the address is transmitted.

4. PARAMETER ADDRESS MAP

Address are shown in 7 - bit hexadecimal.

```
+-----------------+-----------------+-----------------+-----------------+
|   Address       |      MSB        |                 |      LSB        |
+-----------------+-----------------+-----------------+-----------------+
|   Binary        |   0aaa aaaa     |   0bbb bbbb     |   0ccc cccc     |
|   7 - bit hex   |      AA         |      BB         |      CC         |
+-----------------+-----------------+-----------------+-----------------+
```

■ Parameter base address

Parameter base address is explained on each blocks.(* 4 - 1, * 4 - 2 etc.)

Start address	Description		Command
			RQ1 / DT1
00 00 00H	System Temporary Area	*4-1	○ / ○
01 00 00H	Part Temporary Area (Part 1)	*4-2	
01 00 06H	Part Temporary Area (Part 2)	:	
01 00 0CH	Part Temporary Area (Part 3)	:	○ / ○
01 00 12H	Part Temporary Area (Part 4)	:	
01 00 18H	Part Temporary Area (Part 5)	:	
01 00 1EH	Part Temporary Area (Part 6)	:	
08 00 00H	Patch Memory (User Patch #1)	*4-3	
08 04 20H	Patch Memory (User Patch #2)	:	
08 08 40H	Patch Memory (User Patch #3)	:	
08 0C 60H	Patch Memory (User Patch #4)	:	○ / ○
08 11 00H	Patch Memory (User Patch #5)	:	
08 15 20H	Patch Memory (User Patch #6)	:	
08 19 40H	Patch Memory (User Patch #7)	:	
08 1D 60H	Patch Memory (User Patch #8)	:	
09 00 00H	Tone Modify Area (Internal #1)	*4-4	
09 00 10H	Tone Modify Area (Internal #2)	:	
:	:		
09 07 70H	Tone Modify Area (Internal #64)	:	○ / ○
:	:		
09 0F 50H	Tone Modify Area (Internal #126)	:	
09 0F 60H	Tone Modify Area (Internal #127)	:	
0A 00 00H	Tone Modify Area (Card 1 #1)	*4-4	
0A 00 10H	Tone Modify Area (Card 1 #2)	:	
:	:		
0A 07 70H	Tone Modify Area (Card 1 #64)	:	○ / ○
:	:		
0A 0F 60H	Tone Modify Area (Card 1 #127)	:	
0A 0F 70H	Tone Modify Area (Card 1 #128)	:	
0B 00 00H	Tone Modify Area (Card 2 #1)	*4-4	
0B 00 10H	Tone Modify Area (Card 2 #2)	:	
:	:		
0B 07 70H	Tone Modify Area (Card 2 #64)	:	○ / ○
:	:		
0B 0F 60H	Tone Modify Area (Card 2 #127)	:	
0B 0F 70H	Tone Modify Area (Card 2 #128)	:	
0C 00 00H	Drums Modify Area (Internal)	*4-5	
0C 01 00H	Drums Modify Area (Card 1)	:	○ / ○
0C 02 00H	Drums Modify Area (Card 2)	:	
10 00 00H	Display Area	*4-6	× / ○

○ : available   × : unavailable

The actual address of a parameter in a block is the sum of the start address of each block and one or more offset address.
And Device - ID # is set "10H (Unit # = 17)" for an example of RQ1/DT1 application.

* Inner Process on Model 660 *

When one Patch is selected, the data of System memory (* 4 - 3 - 1) and Part memory (* 4 - 3 - 2) is once transfered to the each Temporary area (* 4 - 1, * 4 - 2), and sound generate for refering to the data of those temporary and tone memory of the Patch (* 4 - 3 - 3 or * 4 - 3 - 4).
If changed the data of current tone, that data is automatically written to the Tone modify area (* 4 - 4, * 4 - 5), and sound generate for refering to that tone modify data.
For example, when the data of current tone is changed by exclusive messages, there is the possibility that the data of tone memory (* 4 - 3 - 3, * 4 - 3 - 4) is rewrited incorrectly. So that, you must be done either of following ways before transmit the exclusive messages of tone data.

1. Specify the tone to transmit the program change number of the tone that wish to change.

2. Specify the tone to transmit the exclusive message of the tone group/variation # from Part temoporary area (* 4 - 2).

* 4 - 1 Seystem Temporary Area

Temporary system data for sound generation is setting in this area.

Offset address		Description	
00 00H	0000 000a	Key Transpose SW	0 - 1 (OFF, ON)
00 01H	000a aaaa	Key Transpose Value	0 - 24 (-12 - +12)
00 02H	0000 00aa	Key Mode	0 - 2 (WHOLE, DUAL, SPLIT)
00 03H	0aaa aaaa	Split Point	0 - 127 (C-1 - G9)
00 04H	0000 00aa	Hold Mode	0 - 2 (UPPER, LOWER, BOTH)
00 05H	0aaa aaaa	Chorus Rate	0 - 100
00 06H	0aaa aaaa	Chorus Depth	0 - 100
00 07H	0aaa aaaa	Chorus Level	0 - 100
00 08H	0000 0aaa	Reverb Type	0 - 7 (ROOM-1, 2, 3, HALL-1, 2, GATE, DELAY-1, 2)
00 09H	0aaa aaaa	Reverb Time	0 - 100
00 0AH	0aaa aaaa	Reverb Level	0 - 100
00 0BH	0aaa aaaa	Delay Feedback	0 - 100
00 0CH	0000 00aa	Key Effect Select	0 - 3 (OFF, HARMONY, CHASE, ARPEGGIO)
00 0DH	0000 00aa	Chase Mode	0 - 2 (SINGLE, REPEAT, ALTERNATE)
00 0EH	0aaa aaaa	Chase Rate	0 - 100
00 0FH	000a aaaa	Chase Shift	0 - 24 (-12 - +12)
00 10H	0aaa aaaa	Chase Level	0 - 100
00 11H	0000 00aa	Arpeggio Mode	0 - 3 (UP, DOWN, UP&DOWN, RANDOM)
00 12H	0aaa aaaa	Arpeggio Rate	0 - 100
00 13H	0000 aaaa	Arpeggio After	0 - 10 (-05 - +05)
00 14H	0000 00aa	Arpeggio Style	0 - 2 (STACCATO, PORTATO, LEGATO)
Total size		00 00 15H	

/Example of RQ1 application/
When Model 660 recieve following messages, it sends data from System temporary area.

F0 41 10 35 11 00 00 00 00 00 15 6B F7

/Example of DT1 application/
When the current Key Mode set as "DUAL", transmit to the Model 660 following messages.

F0 41 10 35 12 00 00 00 02 01 7D F7

* 4 - 2 Part Temporary Area (Part1 - Part6)

Temporary Part data for sound generation is setting in this area.
When execute Tone dump operation, temporary part data and tone memory data (* 4 - 4) at current part is transmitted.

Offset address		Description	
00 00H	000a aaaa	Tone Group	0 - 17
			(A.PIANO, E.PIANO, ..., CARD1, CARD2)
00 01H	0aaa aaaa	Tone Variation	0 - 127(Max.)
			(Variation #)
00 02H	0aaa aaaa	Part Level	0 - 100
00 03H	0000 aaaa	Part Pan	0 - 15
			(L7 - 0 - R7, RND)
00 04H	0000 000a	Chorus SW	0 - 1
			(OFF, ON)
00 05H	0000 000a	Reverb SW	0 - 1
			(OFF, ON)
Total size		00 00 06H	

／Example of RQ1 application／
When Model 660 recieve following messages, it sends data of "Part 3" from Part temporary area.

F0 41 10 35 11 01 00 0C 00 00 06 6D F7

／Example of DT1 application／
When the Tone of Part 5 set as "BRIGHT EP1", transmit to the Model 660 following messages.

F0 41 10 35 12 01 00 18 01 05 61 F7

*4 - 3 Patch Memory (#1 ~ #8)

The data of USER PATCH is memorized.
When execute Patch dump operation, whole data of one patch in this area is transmitted.

Offset address	Description	
00 00 00H	System Memory	*4-3-1
00 00 18H	Part Memory (Part 1)	*4-3-2
00 00 1EH	Part Memory (Part 2)	:
00 00 24H	Part Memory (Part 3)	:
00 00 2AH	Part Memory (Part 4)	:
00 00 30H	Part Memory (Part 5)	:
00 00 36H	Part Memory (Part 6)	:
00 00 3CH	Tone Memory (Part 1)	*4-3-3
00 00 4CH	Tone Memory (Part 2)	:
00 00 5CH	Tone Memory (Part 3)	:
00 00 6CH	Tone Memory (Part 4)	:
00 00 7CH	Tone Memory (Part 5)	:
00 01 0CH	Tone Memory (Part 6)	:
00 01 1CH	Dummy	
:	:	
00 01 1FH	Dummy	
00 01 20H	Drums Memory (Internal)	*4-3-4
00 02 20H	Drums Memory (Card 1)	:
00 03 20H	Drums Memory (Card 2)	:
Total size	00 04 20H	

／Example of RQ1 application／
When Model 660 recieve following messages, it sends data of "USER PATCH #5" from Patch Memory area.
This data is same as Patch dump operation of "USER PATCH #5".

F0 41 10 35 11 08 11 00 00 04 20 43 F7

*4 - 3 - 1 System Memory

The data of Performance paremeter is memorized.

Offset address		Description	
00 00H	0000 000a	Key Transpose SW	0 - 1
			(OFF, ON)
00 01H	000a aaaa	Key Transpose Value	0 - 24
			(-12 - +12)
00 02H	0000 00aa	Key Mode	0 - 2

Offset address		Description	
			(WHOLE, DUAL, SPLIT)
00 03H	0aaa aaaa	Split Point	0 - 127
			(C-1 - G9)
00 04H	0000 000a	Panel Mode	0 - 1
			(UPPER, LOWER)
00 05H	0000 0aaa	Upper Part #	0 - 5
			(1 - 6)
00 06H	0000 0aaa	Lower Part #	0 - 5
			(1 - 6)
00 07H	0000 00aa	Hold Mode	0 - 2
			(UPPER, LOWER, BOTH)
00 08H	0aaa aaaa	Chorus Rate	0 - 100
00 09H	0aaa aaaa	Chorus Depth	0 - 100
00 0AH	0aaa aaaa	Chorus Level	0 - 100
00 0BH	0000 0aaa	Reverb Type	0 - 7
			(ROOM 1, 2, 3, HALL-1, 2, GATE, DELAY-1, 2)
00 0CH	0aaa aaaa	Reverb Time	0 - 100
00 0DH	0aaa aaaa	Reverb Level	0 - 100
00 0EH	0aaa aaaa	Delay Feedback	0 - 100
00 0FH	0000 00aa	Key Effect Select	0 - 3
			(OFF, HARMONY, CHASE, ARPEGGIO)
00 10H	0000 00aa	Chase Mode	0 - 2
			(SINGLE, REPEAT, ALTERNATE)
00 11H	0aaa aaaa	Chase Rate	0 - 100
00 12H	000a aaaa	Chase Shift	0 - 24
			(-12 - +12)
00 13H	0aaa aaaa	Chase Level	0 - 100
00 14H	0000 00aa	Arpeggio Mode	0 - 3
			(UP, DOWN, UP&DOWN, RANDOM)
00 15H	0aaa aaaa	Arpeggio Rate	0 - 100
00 16H	0000 aaaa	Arpeggio After	0 - 10
			(-05 - +05)
00 17H	0000 00aa	Arpeggio Style	0 - 2
			(STACCATO, PORTATO, LEGATO)
Total size		00 00 18H	

／Example of RQ1 application／
When Model 660 recieve following messages, it sends data of "System Memory" from USER PATCH #3.

F0 41 10 35 11 08 08 40 00 00 18 18 F7

／Example of DT1 application／
When the Reverb type of USER PATCH #2 write as "GATE" and memorized, transmit to the Model 660 following messages.

F0 41 10 35 12 08 04 2B 05 46 F7

*4 - 3 - 2 Part Memory (Part1 - Part6)

The data of Part parameter is memorized.

Offset address		Description	
00 00H	000a aaaa	Tone Group	0 - 17
			(A.PIANO, E.PIANO, ..., CARD1, CARD2)
00 01H	0aaa aaaa	Tone Variation	0 - 127(Max.)
			(Variation #)
00 02H	0aaa aaaa	Part Level	0 - 100
00 03H	0000 aaaa	Part Pan	0 - 15
			(L7 - 0 - R7, RND)
00 04H	0000 000a	Chorus SW	0 - 1
			(OFF, ON)
00 05H	0000 000a	Reverb SW	0 - 1
			(OFF, ON)
Total size		00 00 06H	

／Example of RQ1 application／
When Model 660 recieve following messages, it sends data of "Part Memory" from Part 3 of USER PATCH #4.

F0 41 10 35 11 08 0D 04 00 00 06 61 F7

/Example of DT1 application/
When the Level of Part 4 of USER PATCH #6 write as "100", transmit to the Model
660 following messages.

FO 41 10 35 12 08 15 2C 64 53 F7

*4 - 3 - 3 Tone Memory (Part1 - Part6)
The data of Tone parameter is memorized.

+------------+-----------------+------------------------------------+
| Offset | | |
| address | | Description |
+------------+-----------------+------------------------------------+
00 00H	00aa aaaa	Pitch Coarse 0 - 48
		(-24 - +24)
00 01H	0aaa aaaa	Pitch Fine 0 - 100
		(-50 - +50)
00 02H	0000 aaaa	Bender Range 0 - 12
00 03H	000a aaaa	After Bend 0 - 26
		(-36, -24, -12 - +12)
+------------+-----------------+------------------------------------+
00 04H	0aaa aaaa	Vibrato Rate 0 - 100
00 05H	0aaa aaaa	Vibrato Depth 0 - 100
00 06H	0aaa aaaa	Modulation Lever 0 - 100
00 07H	0aaa aaaa	After Modulation 0 - 100
+------------+-----------------+------------------------------------+
00 08H	0aaa aaaa	Level 0 - 100
00 09H	000a aaaa	Velocity Sense 0 - 20
		(-10 - +10)
00 0AH	000a aaaa	After Sense 0 - 20
		(-10 - +10)
00 0BH	000a aaaa	Attack Rate 0 - 20
		(-10 - +10)
00 0CH	000a aaaa	Decay Rate 0 - 20
		(-10 - +10)
00 0DH	000a aaaa	Sustain Level 0 - 20
		(-10 - +10)
00 0EH	000a aaaa	Release Rate 0 - 20
		(-10 - +10)
00 0FH	0000 0000	Dummy
+------------+-----------------+------------------------------------+
| Total size | 00 00 10H |
+------------+---+

/Example of RQ1 application/
When Model 660 recieve following messages, it sends data of "Tone Memory" from
Part 6 of USER PATCH #1.

FO 41 10 35 11 08 01 0C 00 00 10 5B F7

/Example of DT1 application/
When the Pitch Coarse of Part 2 of USER PATCH #5 write as " - 12", transmit to
the Model 660 following messages.

FO 41 10 35 12 08 11 4C 0C 0F F7

*4 - 3 - 4 Drums Memory (Internal, Card1, Card2)
The data of Drums Setup is memorized.

+----------+--+
| Offset | |
| address | Description |
+----------+--+
00 00H	Tone Setup (for Note# 35, B1) *4-3-5
00 02H	Tone Setup (for Note# 36, C2) :
:	:
00 32H	Tone Setup (for Note# 60, C4) :
: :	:
00 7CH	Tone Setup (for Note# 97, C#7) :
00 7EH	Tone Setup (for Note# 98, D7) :
+----------+--+
| Total size | 00 01 00H |
+----------+--+

*4 - 3 - 5 Tone Setup (each Note #)

+----------+--+
| Offset | |
| address | Description |
+----------+--+
00H	0000 aaaa Pan 0 - 15
	(L7 - 0 - R7, RND)
01H	0000 000a Reverb SW 0 - 1
	(OFF, ON)
+----------+--+
| Total size | 00 00 02H |
+----------+--+

/Example of RQ1 application/
When Model 660 recieve following messages, it sends data of "Internal Drums Memory"
from USER PATCH #7.

FO 41 10 35 11 08 1A 60 00 01 00 7D F7

/Example of DT1 application/
When the Reverb of C4 key of Card1 Drums of USER PATCH #8 write as "ON",
transmit to the Model 660 following messages.

FO 41 10 35 12 08 20 33 01 24 F7

*4 - 4 Tone Modify Area (#1 - #128)
The data of Tone Modify of Internal or Card 1/2 is memorized.
When modify Tone settings, it is written in this area.

+------------+-----------------+------------------------------------+
| Offset | | |
| address | | Description |
+------------+-----------------+------------------------------------+
00 00H	00aa aaaa	Pitch Coarse 0 - 48
		(-24 - +24)
00 01H	0aaa aaaa	Pitch Fine 0 - 100
		(-50 - +50)
00 02H	0000 aaaa	Bender Range 0 - 12
00 03H	000a aaaa	After Bend 0 - 26
		(-36, -24, -12 - +12)
+------------+-----------------+------------------------------------+
00 04H	0aaa aaaa	Vibrato Rate 0 - 100
00 05H	0aaa aaaa	Vibrato Depth 0 - 100
00 06H	0aaa aaaa	Modulation Lever 0 - 100
00 07H	0aaa aaaa	After Modulation 0 - 100
+------------+-----------------+------------------------------------+
00 08H	0aaa aaaa	Level 0 - 100
00 09H	000a aaaa	Velocity Sense 0 - 20
		(-10 - +10)
00 0AH	000a aaaa	After Sense 0 - 20
		(-10 - +10)
00 0BH	000a aaaa	Attack Rate 0 - 20
		(-10 - +10)
00 0CH	000a aaaa	Decay Rate 0 - 20
		(-10 - +10)
00 0DH	000a aaaa	Sustain Level 0 - 20
		(-10 - +10)
00 0EH	000a aaaa	Release Rate 0 - 20
		(-10 - +10)
00 0FH	0000 0000	Dummy
+------------+-----------------+------------------------------------+
| Total size | 00 00 10H |
+------------+---+

/Example of RQ1 application/
When Model 660 recieve following messages, it sends modifyed data of "R.ORGAN 1"
from Internal Tone Modify Area.

FO 41 10 35 11 09 07 70 00 00 10 70 F7

/Example of DT1 application/
When the Release of CHOIR 1 of Internal Tone write as " + 3", transmit to the Model
660 following messages.

FO 41 10 35 12 09 04 3E 0D 28 F7

*4 - 5 Drums Modify Area (Internal, Card1, Card2)
The data of Drums Modify of Internal or Card 1/2 is memorized.
When modify Drums settings, it is written in this area.

+----------+--+
| Offset | |
| address | Description |
+----------+--+
00 00H	Tone Setup (for Note# 35, B1) *4-5-1
00 02H	Tone Setup (for Note# 36, C2) :
: :	:
00 32H	Tone Setup (for Note# 60, C4) :
: :	:
00 7CH	Tone Setup (for Note# 97, C#7) :
00 7EH	Tone Setup (for Note# 98, D7) :
+----------+--+
| Total size | 00 01 00H |
+----------+--+

* 4 - 5 - 1 Tone Setup (each Note #)
The data of each key (Note #) of Drums Setup.

```
+------------+----------------------------------------------+
| Offset     |                                              |
| address    |                Description                    |
+------------+----------------------------------------------+
|   00H | 0000 aaaa | Pan              0 - 15               |
|       |           |                 (L7 - 0 - R7, RND)    |
|   01H | 0000 000a | Reverb SW        0 - 1                |
|       |           |                 (OFF, ON)             |
+------------+----------------------------------------------+
|  Total size     |  00 00 02H                              |
+------------+----------------------------------------------+
```

/Example of RQ1 application/
When Model 660 recieve following messages, it sends data of "Drums Memory" from Card2 Drums Modify Area.

FO 41 10 35 11 0C 02 00 00 01 00 71 F7

/Example of DT1 application/
When the Reverb of C3 key of Internal Drums write as "ON", transmit to the Model 660 following messages.

FO 41 10 35 12 0C 00 1B 01 58 F7

* 4 - 6 Display Area
Model 660 deciphers incoming data and sends then to the LCD as a string of ASCII code characters.
The display data in this area cannot brought outside Model 660 though MIDI message, such as RQ1.

```
+------------+----------------------------------------------+
| Offset     |                                              |
| address    |                Description                    |
+------------+----------------------------------------------+
|  00 00H | 0aaa aaaa | Displayed Letter   32 - 127 (ASCII)|
|    :    |    :      |     :                :            |
|  00 1FH | 0aaa aaaa | Displayed Letter   32 - 127 (ASCII)|
+------------+----------------------------------------------+
|  Total size     |  00 00 20H                              |
+------------+----------------------------------------------+
```

/Example of DT1 application/
When display to the LCD of Model 660 "Hello!", transmit to the Model 660 following messages.

FO 41 10 35 12 10 00 00 48 65 6C 6C 6F 21 5B F7

------------------------- Address Map for Model 660 -------------------------

Address	Block	Sub Block	Reference
00 00 00	System Temp.		4-1
00 00 15			
01 00 00	Part1 Temp.		4-2
01 00 06	Part2 Temp.		
01 00 0C	Part3 Temp.		
01 00 12	Part4 Temp.		
01 00 18	Part5 Temp.		
01 00 1E	Part6 Temp.		
01 00 24			

Address	Block	Sub Block	Reference
08 00 00	Patch #1 Mem.	System Memory	4-3-1
08 04 20	Patch #2 Mem.	Part Memory	4-3-2
08 08 40	Patch #3 Mem.	:	
08 0C 60	Patch #4 Mem.	Tone Memory	4-3-3
08 11 00	Patch #5 Mem.	:	
08 15 20	Patch #6 Mem.	Drums Memory	4-3-4
08 19 40	Patch #7 Mem.	:	
08 1D 60	Patch #8 Mem.		
08 22 00	:		
09 00 00	Int #1 Mod.		4-4
09 00 10	Int #2 Mod.		
09 00 20	:		
09 07 70	Int #64 Mod.		
09 08 00	:		
09 0F 50	Int #126 Mod.		
09 0F 60	Int #127 Mod.		
09 0F 70	:		
0A 00 00	Card1 #1 Mod.		4-4
0A 00 10	Card1 #2 Mod.		
0A 00 20	:		
0A 07 70	Card1 #64 Mod.		
0A 08 00	:		
0A 0F 60	Card1 #127 Mod.		
0A 0F 70	Card1 #128 Mod.		
0A 10 00	:		
0B 00 00	Card2 #1 Mod.		4-4
0B 00 10	Card2 #2 Mod.		
0B 00 20	:		
0B 07 70	Card2 #64 Mod.		
0B 08 00	:		
0B 0F 60	Card2 #127 Mod.		
0B 0F 70	Card2 #128 Mod.		
0B 10 00	:		
0C 00 00	Int Drums Mod.	Setup Note= 35	4-5-1
0C 01 00	Card1 Drums Mod.	:	
0C 02 00	Card2 Drums Mod.	Setup Note= 98	
0C 03 00	:		
10 00 00	Display		4-6
10 00 20			

	Function ···	Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 – 16 1 – 16	1 – 16 1 – 16	Memorized
Mode	Default Messages Alterd	Mode 3 × * * * * * * * *	Mode 3 ×	
Note Number	True Voice	0 – 127 * * * * * * * *	0 – 127 0 – 127	
Velocity	Note ON Note OFF	○ v = 1 – 127 ○ v = 1 – 127	○ v = 1 – 127 ×	
After Touch	Key's Ch's	× * 1	* 1 * 1	
Pitch Bender		○	○ (0 – 12, semitone steps)	9 bit resolution
Control Change	1 2 7 10 64 100, 101 38, 6 121	○ × × × ○ * 3 (# 1) ○ ○	○ * 1 * 1 ○ ○ * 3 (# 0, # 1) ○ ○	Modulation Breath Volume Pan Hold 1 RPN LSB, MSB Data Entry LSB, MSB Reset All Controllers
Prog Change	True #	* 1 0 – 127 * * * * * * * *	* 1 0 – 127 0 – 127	
System Exclusive		○	* 1	
System Common	Song Pos Song Sel Tune	× × ×	× × ×	
System Real Time	Clock Commands	× ×	× ×	
Aux Messages	Local ON/OFF All Notes OFF Active Sense Reset	× × ○ ×	* 2 ○ (123) ○ ×	

Notes		* 1 Can be set to ○ or × manually, and memorized.
		* 2 Can be set to ○ or × manually.
		* 3 RPN = Registered Parameter Number
		      RPN # 0 : Pitch Bend Sensitivity RPN # 1 : Fine Tune
		      The value of parameter is to be determined by entering data.		

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

■How to read a MIDI Implementation Chart

○ : MIDI data that can be transmitted or received.
× : MIDI data that cannot be transmitted or received.

●Basic Channel
The MIDI channel for transmitting (or receiving) MIDI data can be specified over this range. The MIDI channel setting is remembered even when the power is turned off.

●Mode
Most recent keyboard use mode 3 (omni off, poly).
   Reception : MIDI data is received only on the specified channels, and played polyphonically.
   Transmission : All MIDI data is transmitted on the specified MIDI channel.

* "Mode" refers to MIDI Mode messages.

●Note Number
This is the range of note numbers that can be transmitted (or received). Note number 60 is middle C (C4).

●Velocity
This is the range over which velocity can be transmitted (or received) by Note On and Note Off messages.

●Aftertouch
Key's : Polyphonic Aftertouch
Ch's : Channel Aftertouch

●Pitch Bender
The bender range setting of each Tone determines the range of pitch change caused by Pitch Bender messages. When set to 0, Pitch Bender messages will be ignored.

●Control Change
This indicates the control numbers that can be transmitted (or received), and what they will control. For details, refer to the MIDI implementation.

●Program Change
The program numbers in the chart indicate the actual data.(This is one less than the Pitch and Tone program numbers.)

●Exclusive
Exclusive message reception can be turned On/Off.

●Common, Real time
These MIDI messages are used to synchronize sequencers and rhythm machines. The Model 660 dose not use these messages.

●Aux messages
Mainly, these messages are of the type used to prevent problems, such as Active Sensing (Checks whether MIDI cable is in proper condition or not) ; and All Notes Off (Message which terminates the sounding of all notes).

SPECIFICATIONS

Rhodes Model 660 : PCM Keyboard

● **Keyboard**

61 keys (with Velocity and Channel Aftertouch)

● **Sound Source**

RS - PCM Process

Number of Part ·· 6

Number of simultaneously producible notes ························ 30

● **Internal Memory**

Patches ·· 8

Tones : Internal ·· 128

       PCM card 1 ·· Max. 128

       PCM card 2 ·· Max. 128

● **Digital Effectors**

Chorus, Reverb/Delay

● **Key Effects**

Harmony, Chase, Arpeggio

● **Display**

16 character , 2 line (Backlit)

● **Dimensions**

978 (W) × 281 (D) × 84 (H) mm

38 − 1/2" × 11 − 1/16" × 3 − 5/16"

● **Weight**

8.0 kg

17 lb 11 oz

● **Current Rating**

850 mA (9V DC)

● **Supplied Accessories**

AC Adaptor

Owner's Manual

Connection Cable (PJ - 1M) × 1

● **Options**

PCM card ··· SN - U01 Series

Pedal Switch ······················· Rhodes DP - 2R, BOSS FS - 5U

Keyboard Stand ································· Rhodes KS - 8R

Stereo Headphones ····························· Roland RH - 100

MIDI/SYNC Cable ·············· Roland MSC - 07, 15, 50, 100

Semi - hard Case ······························· Roland SHC - 2

Carrying Bag ···································· Roland CB - 10

*The specifications for this product are subject to change without prior notice, in the interest of improvement.

INDEX

Model 660 Tones List — Rhodes

A. PIANO
No.	Tone name
1	A. PIANO 1
2	A. PIANO 2
3	A. PIANO 3
4	A. PIANO 4
5	A. PIANO 5
6	A. PIANO 6
7	A. PIANO 7
8	A. PIANO 8
9	A. PIANO 9
10	A. PIANO 10

E. PIANO
No.	Tone name
11	E. PIANO 1
12	E. PIANO 2
13	E. PIANO 3
14	E. PIANO 4
15	E. PIANO 5
16	BRIGHT EP1
17	BRIGHT EP2

A. GUITAR
No.	Tone name
18	A. GUITAR 1
19	A. GUITAR 2
20	A. GUITAR 3
21	A. GUITAR 4
22	A. GUITAR 5

E. GUITAR
No.	Tone name
23	E. GUITAR 1
24	E. GUITAR 2
25	E. GUITAR 3
26	E. GUITAR 4
27	HEAVY. EG1
28	HEAVY. EG2

STRINGS
No.	Tone name
29	STRINGS 1
30	STRINGS 2
31	STRINGS 3
32	STRINGS 4
33	JP. STRINGS
34	STRINGPAD1
35	STRINGPAD2

CHOIR
No.	Tone name
36	CHOIR 1
37	CHOIR 2
38	CHOIR 3
39	CHOIR 4
40	SYN. CHOIR
41	SYN. VOX 1
42	SYN. VOX 2
43	BREATH VOX

BRASS
No.	Tone name
44	BRASS 1
45	JP. BRASS 1
46	JP. BRASS 2
47	RICH BRASS
48	BRASTRINGS
49	METAL HIT

TP / TRB
No.	Tone name
50	SOFT TP 1
51	SOFT TP 2
52	TP / TRB 1
53	TP / TRB 2
54	TP / TRB 3

E. ORGAN
No.	Tone name
55	E. ORGAN 1
56	E. ORGAN 2
57	E. ORGAN 3
58	E. ORGAN 4
59	E. ORGAN 5
60	E. ORGAN 6
61	E. ORGAN 7
62	E. ORGAN 8
63	E. ORGAN 9
64	R. ORGAN 1
65	R. ORGAN 2

MALLETS
No.	Tone name
66	VIBE 1
67	VIBE 2
68	VIBE 3
69	MARIMBA
70	BELL 1
71	BELL 2
72	PIZZ
73	METAL
74	NAILS

D - SOUNDS
No.	Tone name
75	FANTASIA
76	FANTA BELL
77	L. CALLIOPE
78	CALLIOPE
79	BELL PAD
80	SYNTH HARP
81	SPECT BELL
82	PIZZAGOGO
83	BELL DRUM
84	SPECTRUM 1
85	SPECTRUM 2
86	N. DANCE

SYNTH WAVE
No.	Tone name
87	PULSWAVE1
88	PULSWAVE2
89	PULSWAVE3
90	SAW WAVE 1
91	SAW WAVE 2

SLAP BASS
No.	Tone name
92	SLAP 1
93	SLAP 2
94	SLAP 3
95	SLAP 4
96	SLAP 5
97	SLAP 6
98	SLAP 7
99	SLAP 8
100	SLAP 9
101	SLAP 10
102	SLAP 11
103	SLAP 12

BASS
No.	Tone name
104	AC. BASS
105	FRETLESS 1
106	FRETLESS 2
107	FINGERED 1
108	FINGERED 2
109	PICKED 1
110	PICKED 2
111	SYN. BASS 1
112	SYN. BASS 2
113	SYN. BASS 3
114	SYN. BASS 4
115	SYN. BASS 5
116	SYN. BASS 6
117	SYN. BASS 7
118	SYN. BASS 8

WINDS
No.	Tone name
119	SAX 1
120	SAX 2
121	SAX 3
122	SAX 4
123	SAX 5
124	FLUTE 1
125	SHAKU 1
126	SHAKU 2
127	BREATH

DRUMS
No.	Tone name
128	DRUMS

Program number / Tone name

DRUMS(128) Chart

MIDI note number	Note name	Drum sound
35		Bass Drum 1
36	C2	Bass Drum 2
37		Rim Shot
38		Snare Drum 1
39		Hand Clap
40		Snare Drum 2
41		Low Tom 1
42		Closed High Hat 1
43		Low Tom 2
44		Open High Hat 2
45		Middle Tom 1
46		Open High Hat 1
47		Middle Tom 2
48	C3	High Tom 1
49		Crash Cymbal 1
50		High Tom 2
51		Ride Cymbal 1
52		China Cymbal 1
53		Cup(Mute)
54		Off
55		Off
56		Cowbell
57		Crash Cymbal 2
58		Snare Drum 3
59		Ride Cymbal 2
60	C4	Off
61		Off
62		Off
63		Off
64		Off
65		Off
66		Off
67		Off
68		Off
69		Cabasa
70		Off
71		Off
72	C5	Off
73		Off
74		Off
75		Off
76		Off
77		Off
78		Off
79		High Pitch Tom Tom 2
80		Off
81		High Pitch Tom Tom 1
82		Off
83		Off
84	C6	Bass Drum 3
85		Bass Drum 4
86		Snare Drum 4
87		Snare Drum 5
88		Snare Drum 6
89		Low Tom 3
90		Closed High Hat 2
91		Middle Tom 3
92		China Cymbal 2
93		High Tom Tom 3
94		Ride Cymbal 3
95		Off
96	C7	Off

Patches List

	1: Jazz Band	2: Rock Band	3: Pops Band	4: Funk Band	5: Orchestral	6: Digital	7: Solist	8: Amazement
Part 1	1 A. PIANO 1	27 HEAVY. EG 1	11 E. PIANO 1	14 E. PIANO 4	32 STRINGS 4	75 FANTASIA	125 SHAKU 1	86 N. DANCE
Part 2	104 AC. BASS	109 PICKED 1	107 FINGERED 1	117 SYN. BASS 7	51 SOFT TP 1	17 BRIGHT EP2	120 SAX 2	36 CHOIR 1
Part 3	29 STRINGS	64 R. ORGAN 1	33 JP STRINGS	25 E. GUITAR 3	54 TP / TRB 3	41 SYN. VOX 1	48 RICH BRASS	45 JP. BRASS 1
Part 4	44 BRASS 1	49 METAL HIT	52 TP / TRB 1	56 E. ORGAN 2	124 FLUTE 1	77 L. CALLIOPE	63 E. ORGAN 9	29 STRINGS 1
Part 5	119 SAX 1	90 SAW WAVE 1	23 E. GUITAR 1	92 SLAP 1	37 CHOIR 2	84 SPECTRUM 1	87 PULSEWAVE1	12 E. PIANO 2
Part 6	128 DRUMS	128 DRUMS	128 DRUMS	128 DRUMS	80 SYNTH HARP	112 SYN. BASS 2	114 SYN. BASS 4	115 SYN. BASS 5

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