

KAWAI



Owner's Manual

WARNING: This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it can cause interference to radio communications. The rules with which it must comply afford reasonable protection against interference when used in most locations. However, there can be no guarantee that such interference will not occur in a particular installation. If this equipment does not cause interference to radio or related equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

- reorient the receiving antenna.
- move the receiver away from the instrument.
- plug the instrument into a different outlet so that it and receiver are on different branch circuits.
- consult the dealer or a qualified service personnel.

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

"Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada."

INTRODUCTION

Thank you for purchasing the Kawai K4/K4r synthesizer. This revolutionary new synthesizer uses 16-bit sampled and synthesized waveforms for optimum sound quality. The friendly user-interface and parameter structure of the Kawai K series has been retained, and new functions and features added to increase the K4/K4r's music making power.

Please read this manual thoroughly before using the K4/K4r. It has been written to allow you to get the most out of the instrument's capabilities with the least amount of effort.

Features

The K4 is a 61 key touch-sensitive synthesizer equipped with a DMS (Digital Multi Spectrum) tone generator capable of up to 16 notes of polyphony when set at two Sources per tone. The K4r is a 19 inch, 2U rack-mount module version.

The K4/K4r utilizes a newly developed DMS tone generator. Not only does it use 16 bit system, but because it has a Digital Filter function, your freedom in producing sounds is unlimited. It is also capable of AM (Ring Modulation) to easily and simply produce clangorous and distorted sounds.

256 high quality internal waveforms

The K4/K4r has 96 DC (Digital Cyclic) waveforms composed of as many as 128 harmonics, and a total of 160 PCM waveforms, for a total of 256 waveforms. Because the K4/K4r's internal waveforms are reproduced using 16-bit quantization, noise and distortion are virtually inaudible.

DRUM Section

The K4/K4r has its own DRUM Section which can be controlled independently of SINGLE Patches or the eight Sections of a MULTI Patch. The 61 keys from C1-C6 on the keyboard may be assigned freely to produce these tones.

Internal EFFECT (K4) and mixing capability (K4r)

The K4 has 16 types of internal effects, including Reverb, Delay and Overdrive, etc.. In MULTI PLAY, the depth of the effect may be set for each tone.

Realistic touch response

The K4/K4r has the feeling of an acoustic piano keyboard, a feature which has made the Kawai K series so popular. In addition, Velocity, Aftertouch, Release Velocity and Keyboard Scaling features allow the expression of the most minute touch on the keyboard.

MULTI PLAY capability

Eight SINGLE tones may be reproduced by the DMS tone generator, freely combining the Layer, Velocity Switch and Split functions, enabling far more beautiful layered and split sounds than have ever been possible before.

Variable Multi-Timbral capability

In the MULTI PLAY mode, each tone may be set to a specific MIDI channel, allowing the K4/K4r to function as though it were eight MIDI tone generators (or nine with the DRUM Section). The Variable Multi-Timbral function also allows the voices of each Section to be played simultaneously.

Features

INDIVIDUAL OUTPUT function (K4r only)

The K4r is equipped not only with two stereo output jacks, but with six separate output jacks as well to allow the connection of external effects units to create high quality sound.

LINK

Eight patches from those in the unit may be selected and stored together. This function is used, for instance, when multiple tones are to be used in sequence. When arranged in the order in which they are to be called up, the operator may easily change tones from one to the next while playing.

MIDI

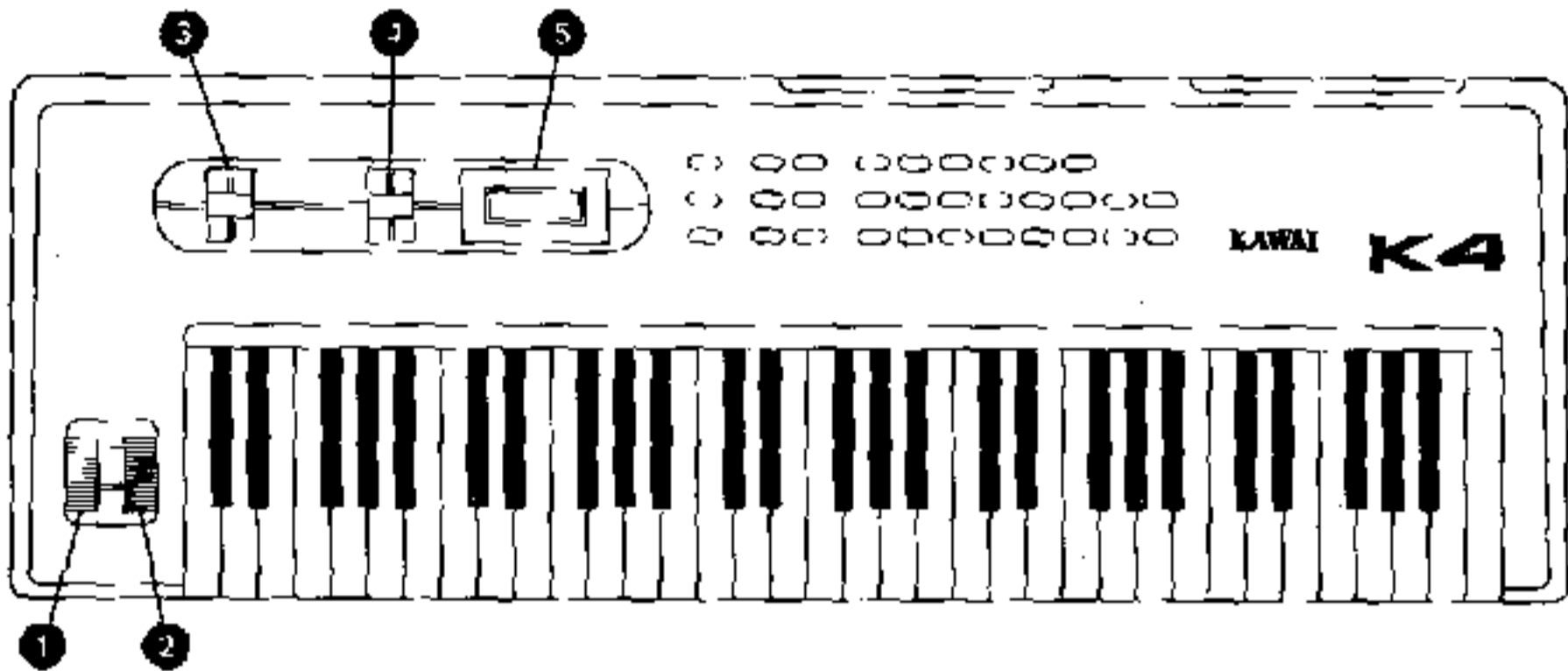
By connecting an external MIDI device to the MIDI jack, the K4/K4r may be used as a tone generator module with drums, or to control the external MIDI device.

Card

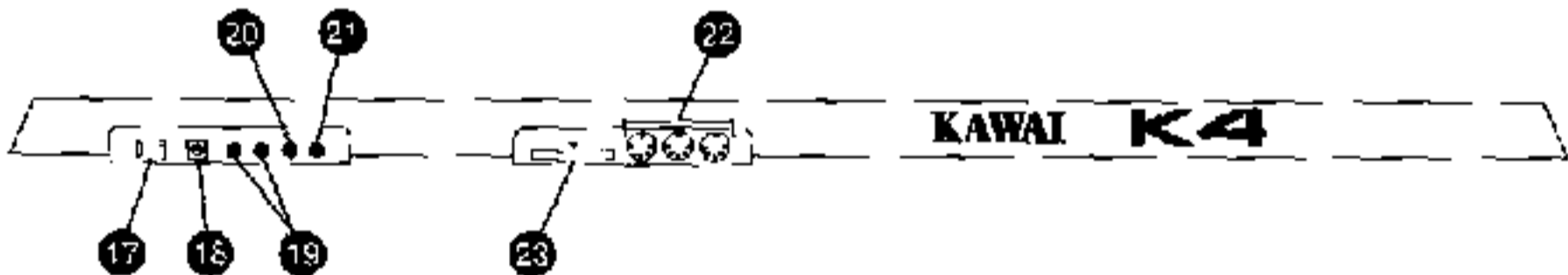
A card permits an increased number of tones to be placed in memory. One card can hold 64 SINGLE Patches, 64 MULTI Patches, the DRUM Section and EFFECT or OUTPUT Settings.

■ K4 PANEL LAYOUT

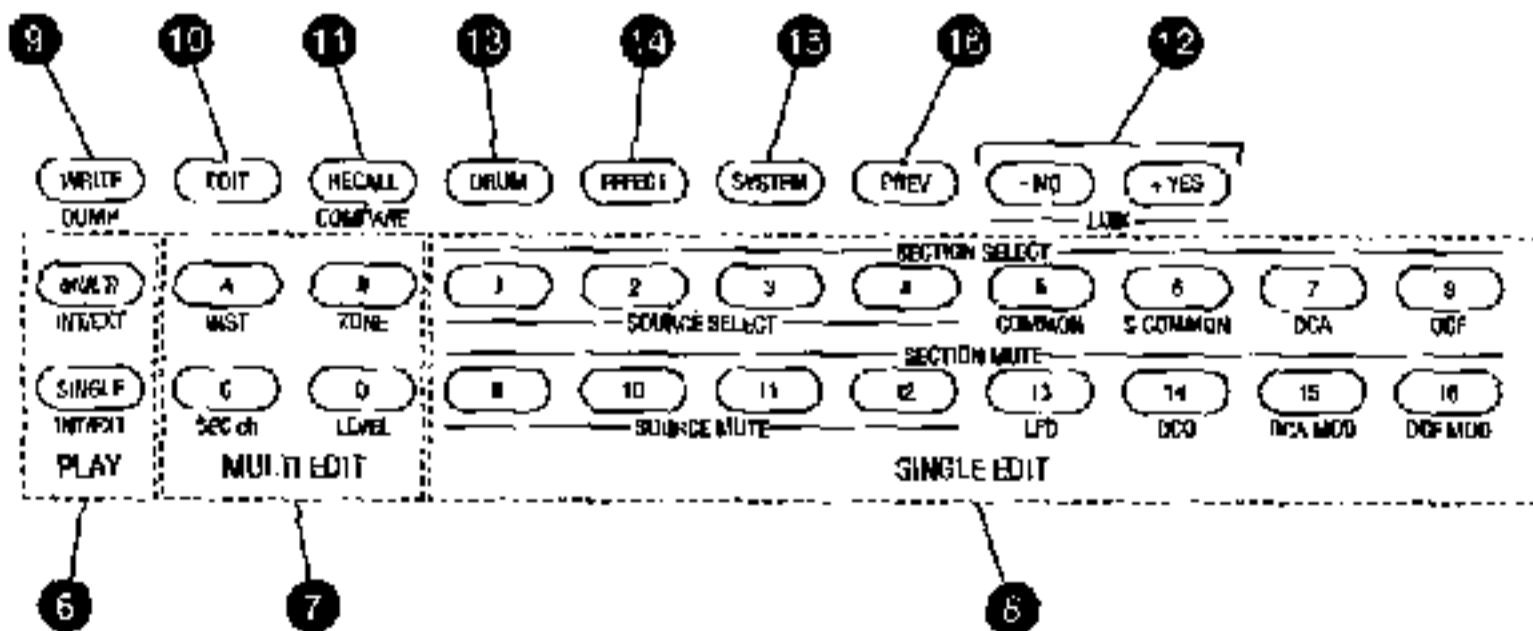
[FRONT VIEW]



[REAR VIEW]



[CONTROL SWITCHES]



■ Names of Parts

① PITCH BEND wheel (K4 only)

Controls continuous pitch change. The pitch of an electric guitar may be changed, for example, producing a wider range of sounds.

② MODULATION wheel (K4 only)

Controls continuous modulation of sounds, such as Vibrato and Wah wah.

③ VOLUME slider

Used to adjust the sound output from the headphone and output (R/MONO, L) jacks.

④ VALUE slider

Used to make major changes to parameter values during editing.

⑤ DISPLAY

Indicates the patch number and name while playing, and the value of the parameter during editing.

⑥ Patch select switch group 1 (MULTI, SINGLE)

Selects between SINGLE and MULTI PLAY modes when selecting patches, and between Internal tones and those stored on a card.

⑦ Patch select switch group 2 (A, B, C, D)

Selects between the four banks, A, B, C and D, when selecting patches, and selects parameters when editing tones in MULTI EDIT mode.

⑧ Patch select switch group 3 (1-16)

Selects among the 16 patch numbers. During SINGLE editing, it may be used to select the Source Mute, Source Select, Parameter Select. And during MULTI Editing, Section Select and Section Mute.

⑨ WRITE switch

Is used to store changed tone data into memory as well as for MIDI DATA DUMP and to SAVE and LOAD data from a card.

⑩ EDIT switch

Puts the K4/K4r into the EDIT mode to allow tones to be modified.

⑪ RECALL/COMPARE switch

Is used to call up the most recently edited patch while playing, and to compare the edited tone values with the values before editing.

⑫ LINK/VALUE switch

Calls up the patches set in sequence with LINK while playing, and changes the values of parameters during editing.

⑬ DRUM switch

Allows control and editing of the DRUM Section.

⑭ EFFECT (K4 only)/OUTPUT (K4r only) switch

K4:Used for setting internal digital EFFECTs.

K4r:Used for making OUTPUT Settings.

⑮ SYSTEM switch

Is used to change SYSTEM Settings (e.g., tuning or transposing) and MIDI parameters.

⑯ PREV switch

Calls up the previously edited parameter during an editing session.

⑰ POWER switch

Turns the Instrument's power on and off.

⑱ DC IN jack

This jack is used to connect the external power supply.

⑲ Output jacks

The output jacks are used to connect the unit to a keyboard amplifier or PA equipment. The K4r has individual outputs 1-6 (separate outputs) in addition to the L and R/MONO jacks.

⑳ PHONES jack

The stereo headphone jack is used to monitor the sound of R/MONO & L output. (See P.71)

㉑ HOLD jack (K4 only)

When an F-1 or other foot switch (optional) is connected to this terminal, it may be used to sustain the sound.

When the Sustain Level is set at 0, the sound will decay in accordance with the Decay Sound Setting (the same effect as is obtained with a piano damper pedal. In this case, due to Release Time Settings, there are times when the effect may not be audible). (Refer to P. 48 DCA Group.)

㉒ MIDI (IN, OUT, THRU) jacks

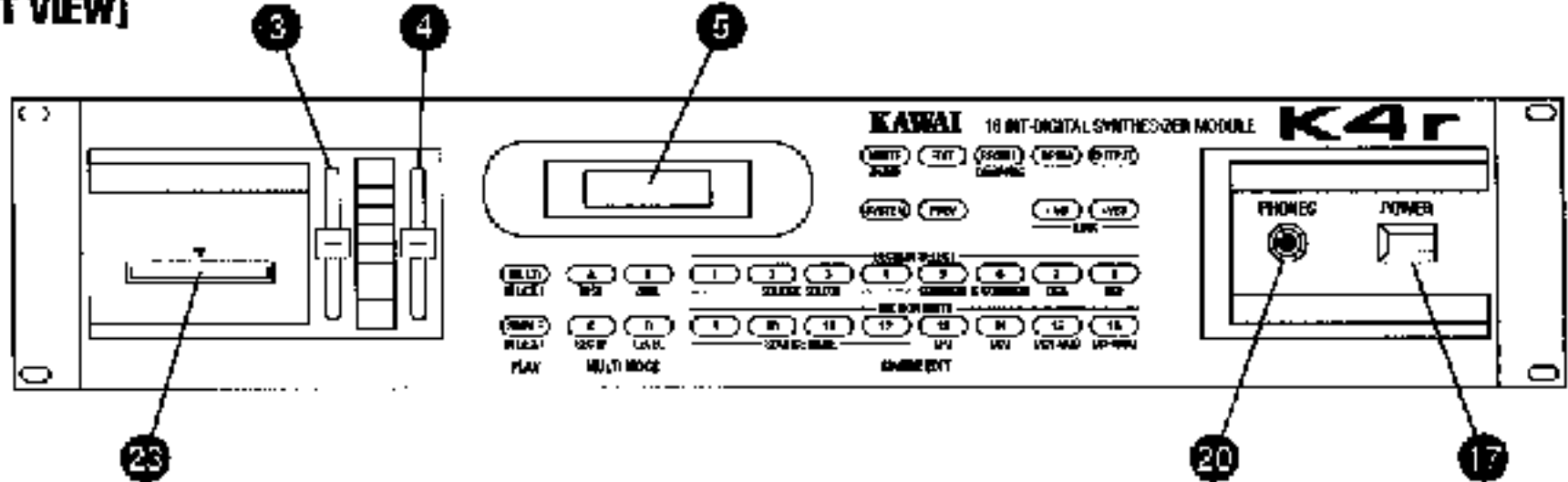
These are used to connect equipment to other MIDI devices.

㉓ Card slot

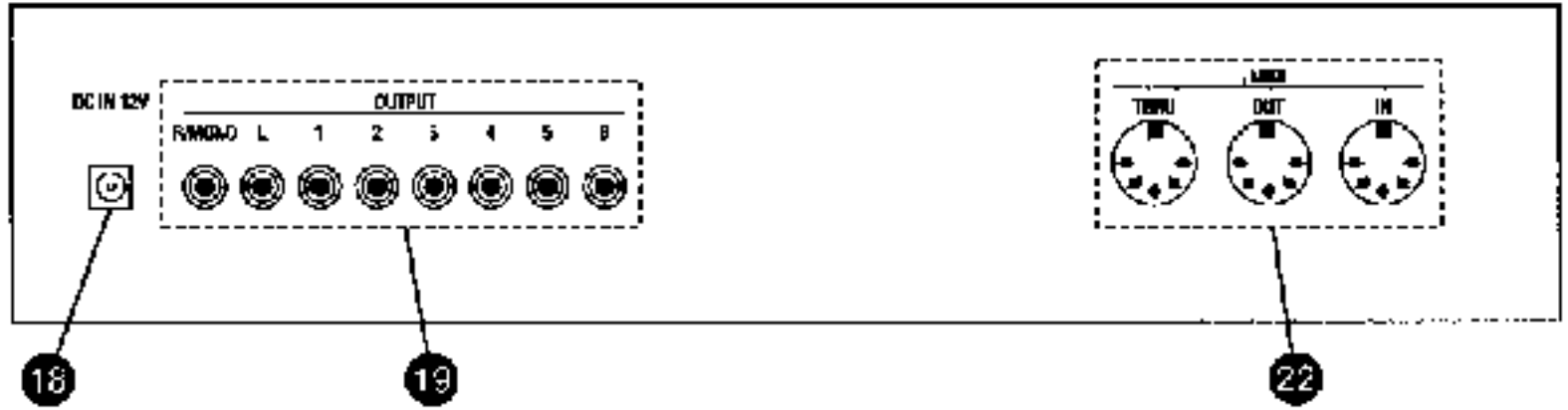
The card slot is for the insertion of (optional) memory cards (DG-18). The ▼ mark on the card should be aligned with the mark ▲ on the unit when inserting.

■ K4r PANEL LAYOUT

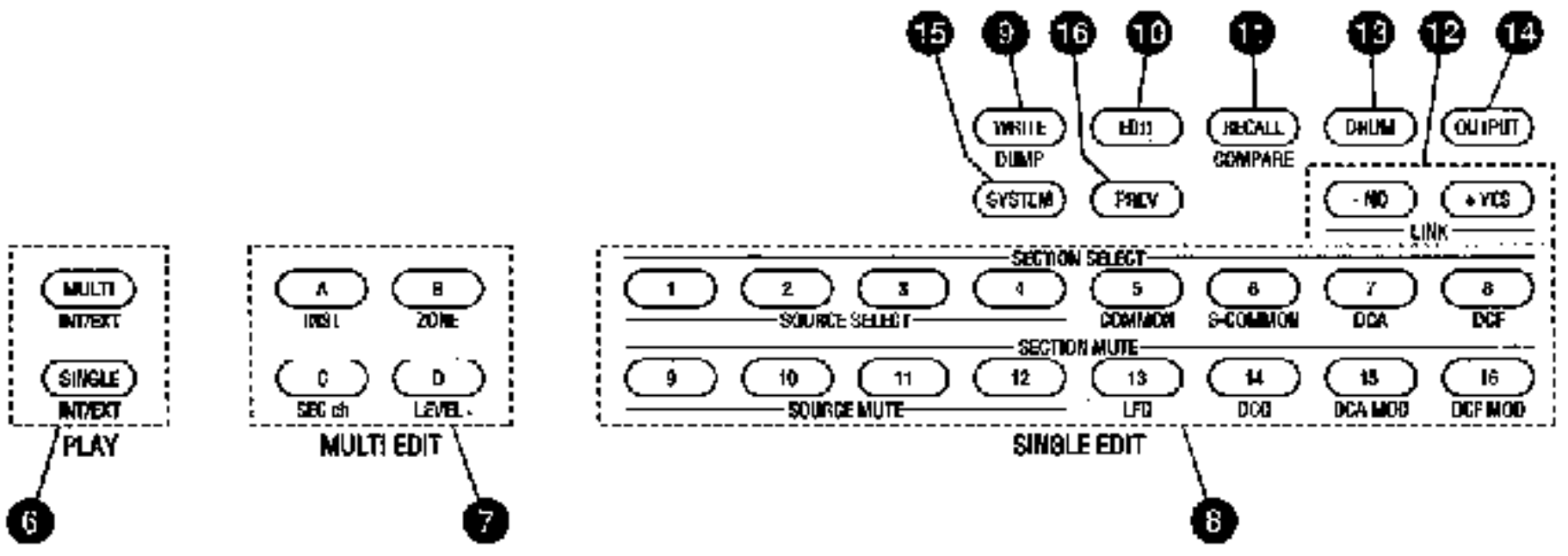
[FRONT VIEW]



[REAR VIEW]



[CONTROL SWITCHES]



Contents of Panel Nomenclature

■ PLAY Mode

- MULTI** : Select Internal or Card MULTI Patch (P. 12)
- SINGLE** : Select Internal or Card SINGLE Patch (P. 11)
- NO** **+YES** : Select and Set LINK Play (P. 15)
- PLAY** : Return to PLAY mode

■ SINGLE EDIT Mode

- PLAY** : Enter EDIT mode (P. 28-33)
- NO** **+YES** : Select Value (P. 28)
- PREV** : Return to Previous Parameter (P. 28)
- RECALL** : Compare with Sound before Editing (P. 28)
- WRITE** : Perform WRITE, followed by SAVE and LOAD (P. 26)
- 1** **2** **3** **4** : Select EDIT Source (P. 32)
- OFF** **ON** **11** **12** : Select Source Mute (P. 32)

- 6** : Select Source mode, Pressure, Wheel, etc. (P. 34)
- 8** : Select Velocity, KS (Keyboard Scaling) Curve, etc. (P. 43)
- 7** : Set Volume Envelope (P. 48)
- 9** : Select Cutoff, Resonance, etc. (P. 52)
- 13** : Change Tuning and Tone with LFO (P. 40)
- 14** : Set Waveform and Pitch (P. 46)
- 15** : Control Volume with Velocity and KS (P. 49)
- 18** : Change Tone in real time (P. 54)
- PLAY** : Return to PLAY mode

■ MULTI EDIT Mode

- SECTION SELECT** : Set Instrument (SINGLE) to be edited (P. 60)
- SECTION MUTE** : Set MULTI Section Mute (P. 60)

- A** : Set MULTI Instrument (SINGLE) (P. 61)
- B** : Set Play Range (P. 62)
- C** : Set MIDI Channels for MULTI Sections (P. 63)
- D** : Set Instrument Level and Output Destination (P. 64)
- PLAY** : Return to PLAY mode

■ Other EDIT Modes

- DRUM** : Set DRUM Section, Manual Drums (P. 66)
- EFFECT** : Set EFFECT (K4 only) (P. 24, 71)
- OUTPUT** : Set Panpot or Individual Output (K4r only) (P. 24, 71)
- SYSTEM** : Set Tuning and MIDI (P. 77)
- WRITE DUMP** : Set MIDI Data Dump contents and Execute Dump (P. 82, 88)
- PLAY** : Return to PLAY mode

Basic Control

SINGLE EDIT

MULTI EDIT

EFFECT/ OUTPUT EDIT

EFFECT/ OUTPUT EDIT

SYSTEM SETTING

ADVANCED USER

OPTION DATA

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■ How to use this manual

This manual is composed of three chapters and appendices as shown below.

Chapter 1.: Introduction

- Instrument Setup
- Let's Play!
- The Fundamentals of MIDI

Chapter 2.: Applications

- K4/K4r Structure of Patches
- The Tone Editing Process
- Saving and Loading Data
- Before Entering EDIT Mode: The Basics of Editing
- Editing a SINGLE Patch
- Editing a MULTI Patch
- Editing Sounds for the DRUM Section
- EFFECT (K4) and OUTPUT (K4r) Settings
- SYSTEM Programming

Chapter 3.: Advanced Applications

- MIDI DATA DUMP
- Play Using a Sequencer or Computer
- MULTI Real Time Play
- MIDI for the Advanced User

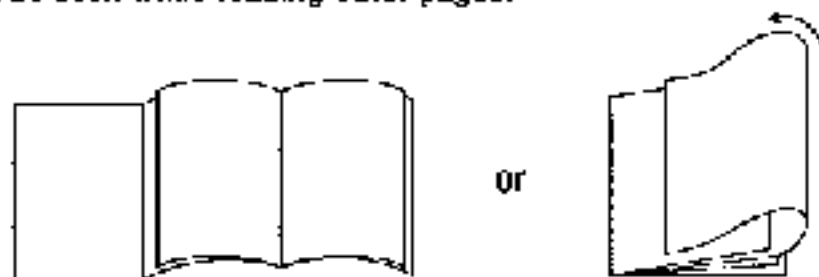
Appendices

- Error Messages
- Troubleshooting
- Parameter Reference Chart
- DRUM Section and EFFECT Factory Settings
- Blank Chart
- MIDI Implementation Chart

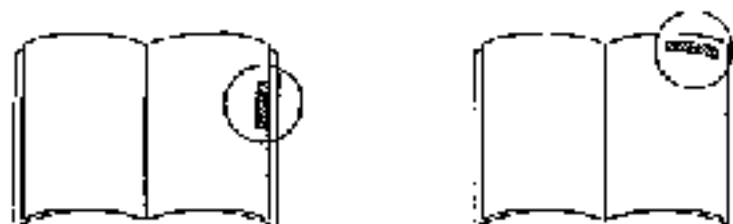
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Specifications

Page 6' explains the basic function of each panel switch and the page number for more detailed information. This page pulls out and can be seen while reading other pages.



A section heading appears on the right side of each page, which makes it easy to locate a particular section of the manual. In addition, the primary subject covered on each page is shown in the upper right corner.



Chapter 1. Introduction

This chapter explains how to set up the K4/K4r and the functions available when playing.

1-1. Instrument Setup

1. Making Connections

1-2. Let's Play!

1. Selecting a **PLAY** mode (**SINGLE** or **MULTI**)
2. Possibilities of **MULTI PLAY** Mode
3. Tuning and Transposing
4. **LINK** Play
5. **DRUM** Play
6. Play Using a Computer or Sequencer

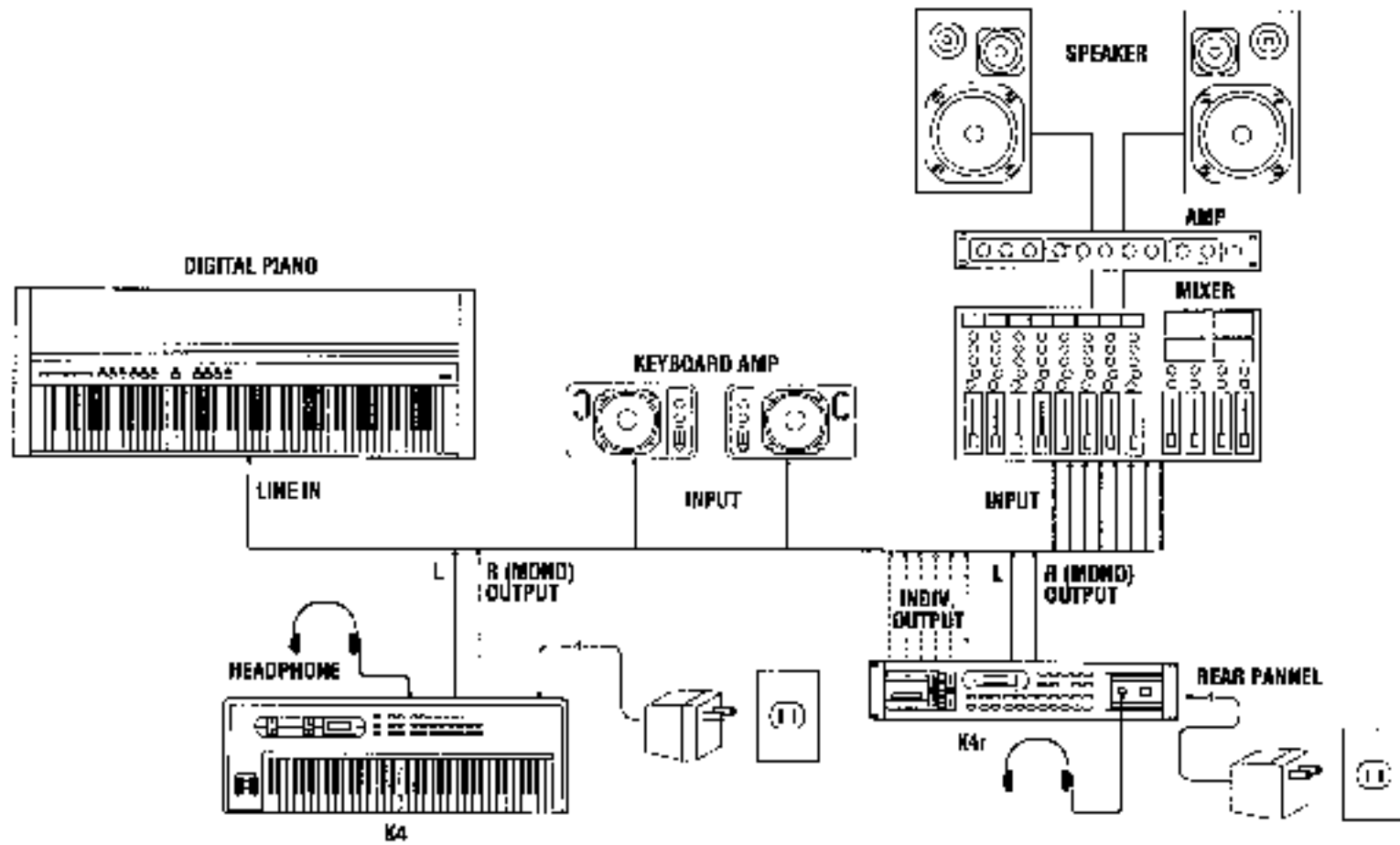
1-3. The Fundamentals of MIDI

1-1. Instrument Setup

1. Making Connections:

How to set the unit up quickly and easily

- (1) Connect the power adapter and keyboard amp (or headphones) as shown in below.



Note: The K4/K4r has no internal power amp or speakers. In order to obtain sound output, you may either use headphones, or connect it to a keyboard amp or PA system. It is possible to use home radio cassette players or audio amps, but caution should be paid to when the power is turned on and to volume, etc., in order to avoid damage to these appliances.

KAWAI K-4
SYNTHESIZER

KAWAI K-4r
SYNTHESIZER

SINGLE
IA-1 C. Grand

- (2) Turn the POWER switch at the right of the rear (K4r: front) panel on. This display lasts only a few seconds.
- (3) The unit is now ready to play.
- (4) The K4/K4r retains in memory the parameters in it when the power was turned off. When the POWER has been turned on again, you may call up the patch that was being played at that time by pressing the **RECALL**.
- (5) Turn on the power of amps and other equipment connected to the K4/K4r after turning the K4/K4r on, to protect the other equipment.

1-2. Let's Play!

First, let's take a look at the tones currently stored into the memory of the K4/K4r.

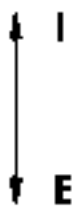
1. Selecting a PLAY Mode (SINGLE or MULTI)

With the K4/K4r, each single tone is referred to as a SINGLE Patch, and the combined setting of multiple patches is referred to as a MULTI Patch.

1) SINGLE PLAY

64 different SINGLE Patches may be stored into the internal memory of the K4/K4r. These are stored into the four banks, A–D, each of which can store 16 patches (for a total of 64). Cards may also be used to store an additional 64 patches, 16 in each of the four banks from A–D.

```
SINGLE
IA-1  C. Grand
```



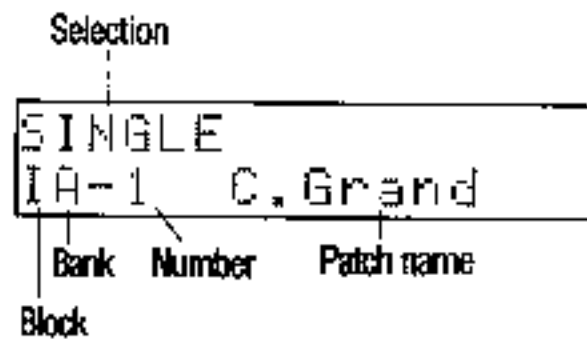
```
SINGLE
EA-1  Ultra 7th
```

<Procedure>

- (1) Press **SINGLE** to select SINGLE PLAY.
- (2) With every further press of the **SINGLE**, the unit switches between the INT (inside the unit itself) and EXT (card) memories.

I: INT (internal) memory
E: EXT (card) memory

- (3) Select a bank from **A** to **D**.
- (4) Select a number from **1** – **16**.



- (5) When switching between SINGLE Patches, if the patches are in the same bank, repeat step 4. When they are in the same block, repeat steps 3 and 4.

A SINGLE Patch has now been selected.

Note: The tone patch names and numbers used in this manual are not necessarily the same as those on your K4/K4r.

2) MULTI PLAY

Sixty-four different MULTI Patches may be stored into the internal memory of the K4/K4r. Split and Layer play is possible with a maximum of eight different instruments (See P. 61). These are stored into the four banks, A–D, each of which can store 16 patches (for a total of 64). Cards may also be used to store an additional 64 patches, 16 in each of the four banks from A–D.

```
MULTI
IA-16 HORIZON
```

↑ I
↓ E

```
MULTI
EA-16 P: I: C: O
```

<Procedure>

- (1) Press **MULTI** to switch to MULTI PLAY.
- (2) With every further press of the **MULTI**, the unit switches between the INT (inside the unit itself) and EXT (card) memories.
- I: INT (internal) memory
E: EXT (card) memory
- (3) Select a bank from **A** to **D**.
- (4) Select a number from **1** – **16**.
- (5) When switching between MULTI Patches, if the patches are in the same bank, repeat step 4. When they are in the same block, repeat steps 3 and 4.

A MULTI Patch has now been selected.

Note: MULTI Patches contain numerous settings. Pressing a few keys on the keyboard is not enough to allow you to determine what kind of patch settings have been made: go ahead and play the keyboard from one end to the other, hitting the keys hard and hitting them softly, holding the keys down after you have pressed them, etc., to see what the current settings are.

2. Possibilities of MULTI PLAY Mode

This section explains the basic functions of the MULTI PLAY mode.

● SPLIT

The keyboard may be divided into a maximum of eight segments and each assigned a different (SINGLE Patch) tone. For instance, the low range might be assigned to the bass, the middle range to the piano and the high range to the strings to allow the playing of several different tones on different parts of the keyboard (ID 1-4). (See P. 86)

● VELOCITY Switch

Tones may be changed by varying the amount of force applied to the keys during play (at a maximum of two settings per key). For instance, key settings may be made so that a light strike will produce a bass tone, whereas a strong strike will produce a chopper bass tone. Differing tones may also be combined to produce a completely new tone (ID 5-8). (See P. 87)

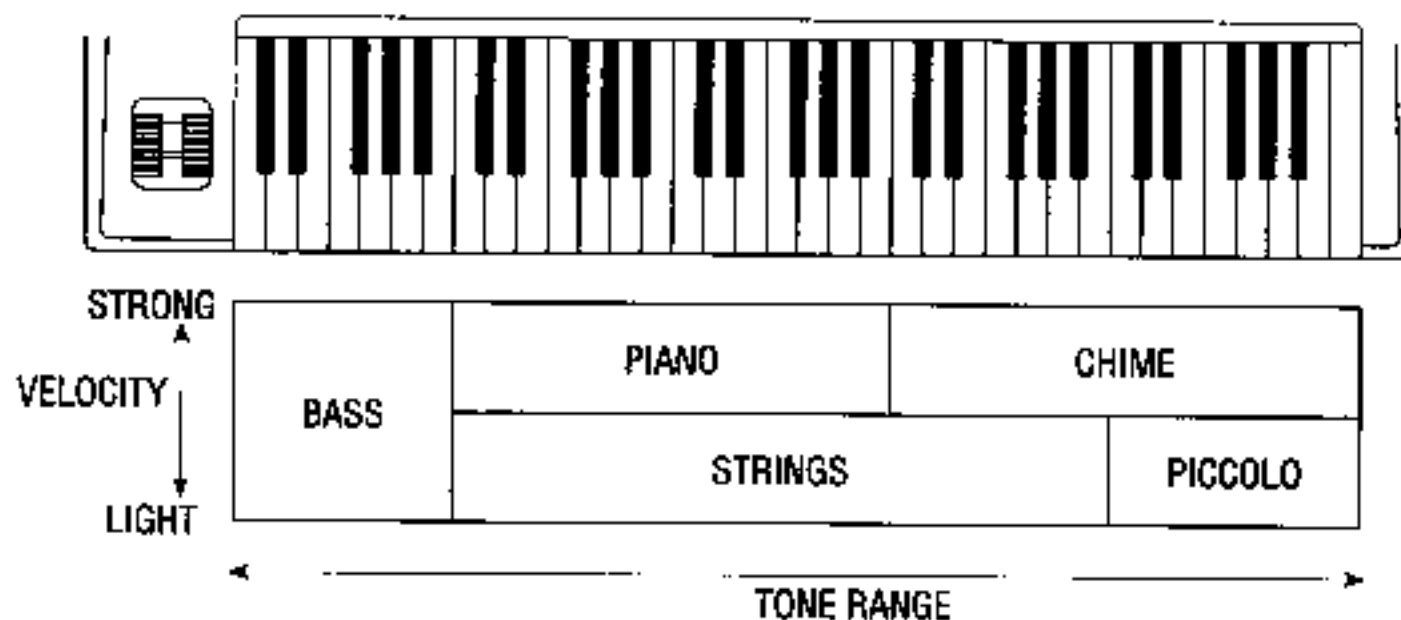
● LAYER

A maximum of eight tones may be combined into a single sound. A very fat sound may be obtained by combining and slightly detuning similar tones, and a completely new sound created by combining different tones (ID 9-12). (See P. 85)

● MULTI tone generator

If each of the MIDI receiving channels of a MULTI Patch is set independently, a maximum of eight (nine including the DRUM Section) MIDI tone generator modules may be created. The unit keyboard may be used to play different tones or control external tone generators while the K4/K4r is played by a computer or MIDI sequencer such as the Q-80 (ID 13-16). (See P. 83)

All of the above functions may be freely combined in a single MULTI Patch.



3. Tuning and Transposing

■ TUNE

(Value: -50 to 0 to +50)

TUNE enables fine tuning of the overall pitch of the K4/K4r, and is used when tuning the synthesizer to other instruments, like a piano.

Note: The pitch tuning of the K4/K4r is based on A3=440 Hz and can be raised or lowered up to a maximum of a half tone (100 cents) in increments of 2 cents.

```
SYSTEM/MIDI
                =SYS
```

```
SYSTEM
TUNE           = 0
```

<Procedure>

- (1) Press **SYSTEM**.
- (2) Use the VALUE Slider or **+YES** and **-NO** to call up the SYS display.
- (3) Press **SYSTEM** several times to call up the TUNE display.
- (4) Use the VALUE Slider or **+YES** and **-NO** to fine tune the pitch.

■ TRANSPOSE

(Value: -12 to 0 to +12)

The pitch of the K4/K4r can also be transposed up or down in half tone units, allowing you to finger in any key as though it were the key of C.

<Procedure>

```
SYSTEM/MIDI
                =SYS
```

```
SYSTEM
TRANSPOSE     = 0
```

- (1) Press **SYSTEM**.
- (2) Use the VALUE Slider or **+YES** and **-NO** to call up the SYS display.
- (3) Press **SYSTEM** several times to call up the TRANSPOSE display.
- (4) Set the VALUE Slider, **+YES** or **-NO**.

4. LINK Play

This function allows patches to be called up in a specified order during LINK Play by merely pressing the **+YES** and **-NO**. Any eight of the 256 patches in the unit or card may be selected and stored regardless of whether they are MULTI or SINGLE Patches, in the unit, or on a card.

■ How to set a LINK

```
SYSTEM/MIDI
                =SYS
```

```
LINK    MIA-1
1st
```

<Procedure>

- (1) Press **SYSTEM**.
- (2) Use the VALUE Slider or **+YES** and **-NO** to call up the SYS display.
- (3) Press **SYSTEM** several times to call up the LINK 1st display.
- (4) Use the VALUE Slider or **+YES** and **-NO** to select the first patch in the LINK.
- (5) For the 2nd and later patches, repeat steps (3) and (4).
- (6) When there are 8 or fewer patches to be stored for a LINK, press **-NO** and turn off every time a patch is selected with (4).
- (7) To return to the PLAY mode while setting a LINK, first press **MULTI** or **SINGLE**, then chose the desired patch.

5. DRUM Play

The K4/K4r provides a separate DRUM Section independent of SINGLE Patches or the eight MULTI Patch Sections. A Q-80 MIDI sequencer, etc., may be used to play the DRUM Section while the keyboard is being played.

■ MANUAL DRUM

The DRUM Section may be controlled from the keyboard.

Notes: There are two DRUM Sections available in the K4/K4r when a Card is inserted in the Card Slot. One is Internal, the other is the Card (external). If you select an internal SINGLE or MULTI Patch, the internal DRUM Section is selected.

Selecting an external SINGLE or MULTI Patch automatically selects the external DRUM Section.

To SAVE and LOAD the DRUM Section to the Card, see p. 70.

If the MIDI transmit channel of the controlling MIDI instrument and the DRUM Section receiving channel of the K4r (channel 10 at time of factory shipment) are not the same, no sound will be produced.

<Procedure>

DRUM VOLUME	= 100
----------------	-------

DRUM RCV CH	= 10
----------------	------

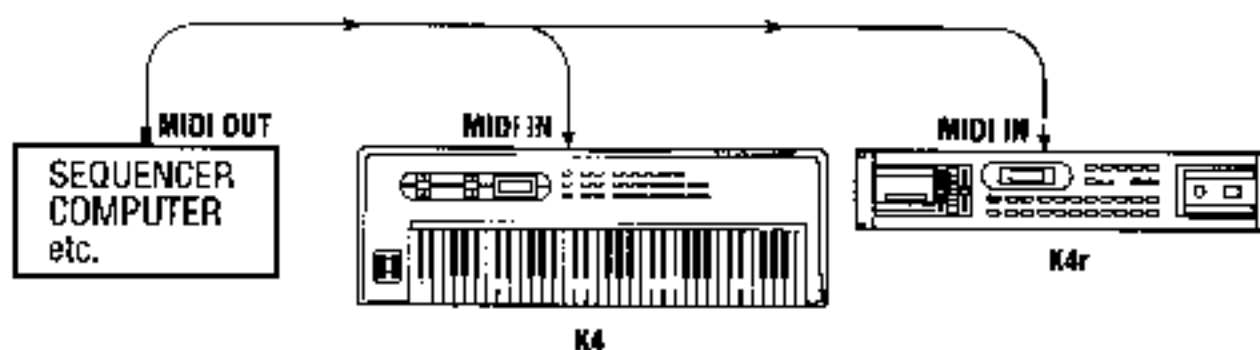
- (1) Press **DRUM** to call up the DRUM Section.
- (2) Use the VALUE Slider or the **+YES** or **-NO** as required to adjust the volume of the DRUM Section.
- (3) Press **DRUM** to call up the receiving channel set display.
- (4) Use the VALUE Slider or the **+YES** or **-NO** as required to set the MIDI receiving channel.

6. Playing Using a Computer or Sequencer

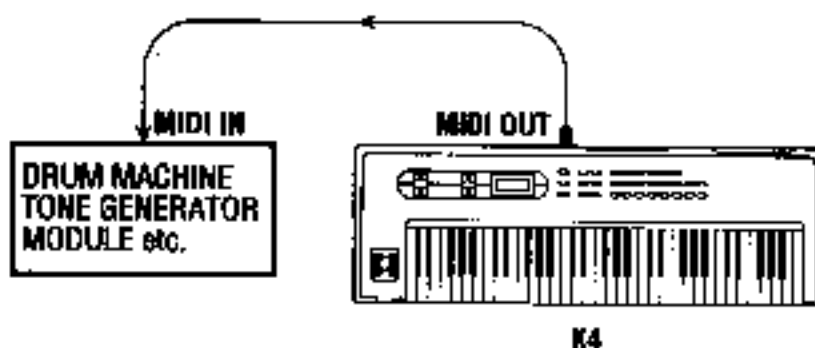
One way to make effective use of the K4 MULTI Section is to use a Q-80 or other MIDI sequencer, or a computer for automatic play. In this way, 1 or 2 Sections can be played manually, while the DRUM Section can be controlled by a Q-80 or other MIDI sequencer or a computer. (See P. 83, 88)

■ Connection to an external MIDI device

The K4/K4r controlled by an external computer or recording with a Q-80 MIDI sequencer



The K4 controlling a MIDI tone generator



1-3. The Fundamentals of MIDI

In order to get the most out of the MULTI functions of your K4/K4r, a knowledge of MIDI is indispensable. This does not mean that you must have a complete of knowledge of all the ins and outs of the MIDI, but a basic knowledge of how it works will assist you greatly.

How MIDI works

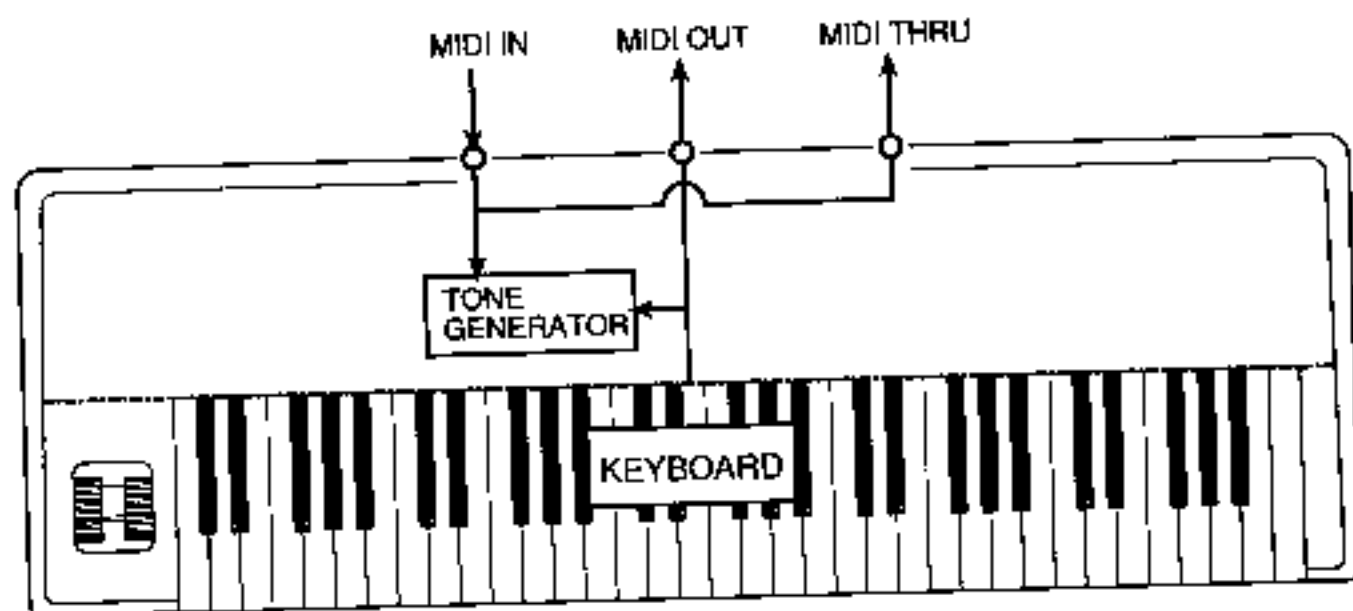
MIDI can be thought of as a universal language that allows keyboards, modules and sequencers to talk to each other. MIDI messages have been defined according to the MIDI standard and they facilitate total performance control using the keyboard, bender, modulation wheel, pedals and continuous controllers. When actually playing, keyboard operations are digitized and transmitted over MIDI cables.

MIDI connections

Because MIDI signals are digital, different kinds of signal information may be mixed and transmitted over a single cable using a single connector.

Most equipment made to support MIDI have three jacks, IN, OUT and THRU, that are used for the exchange of information (though some pieces of equipment come only with IN and OUT jacks). These jacks are connected using a MIDI cable.

The MIDI IN jack is for receiving information from an external MIDI source, the OUT jack is for transmitting information to an external MIDI destination, and the THRU jack is for relaying information received from one external source to another external destination. The THRU jack is used when one piece of equipment is being used to control two or more others.



As shown in the illustration above, the information received via the MIDI IN jack cannot be output through the OUT jack, nor can information from the keyboard during play be output via the THRU jack.

Note: When connected in a sequence MIDI IN → MIDI THRU → MIDI IN → MIDI THRU, an unlimited number of connections can be made. This is called a series connection. Actually, however, with this type of connection, there is some delay in the signal by the time it reaches the last link, as well as some signal deterioration, so it is best to limit a series of this type to 4 or 5 units, or use a MIDI thru box.

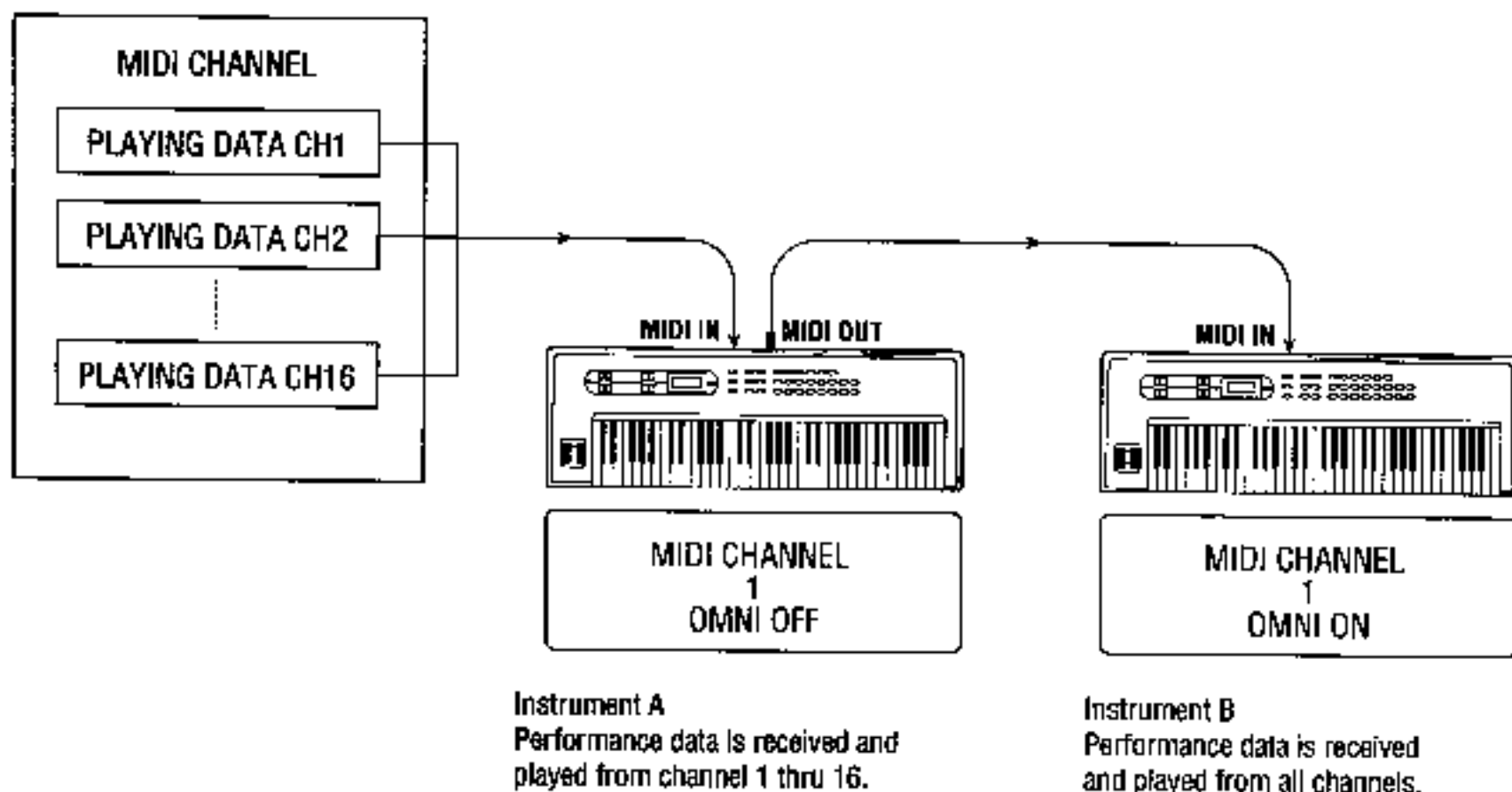
MIDI information

■ MIDI Channel

With MIDI, any number of instruments may be controlled from a single source. Thus, in order to be able to distinguish one instrument from another, it is possible to assign a channel number from 1–16 to each. When performance data is transmitted, the channel number is transmitted at the head of the information to identify for which machine the information is intended. This number is called the MIDI channel. When the instrument is one which supports multi timbres, you will want to control each part, so MIDI channels will have to be allotted to each.

■ MODE

In addition to the channel on which MIDI information is transmitted, information may also be transmitted in different modes. There are both POLY and MONO modes, to determine if the performance data received is to be played polyphonically or monophonically (the K4 operates only in the POLY mode). Both of these modes may be set for OMNI ON or OMNI OFF, and when set for OMNI OFF, information from all MIDI modes may be received and sound produced.



■ Note Information

Of the different types of performance data which can be transmitted via MIDI, the most basic is the note message. Note messages indicate such information as which key has been pressed with how much force, and when it was released.

■ Note Number

In order to enable the control instrument to differentiate between keys when they are played, a number is assigned to each, called a note number. Middle C (C3) is MIDI note number 60, and each note number corresponds to a half tone, or one key on the keyboard (MIDI divides the half tones from C-2 to G8 into 128 steps, numbering them in sequence from lowest to highest).

■ Velocity

This is a message which tells with how much force a key on the keyboard was pressed (velocity is detected not by the pressure on the key, but by the speed of its movement at the time the note on message is sent).

■ Aftertouch

Numerous kinds of effects may be obtained by pressing harder after a key has once been pressed. Aftertouch is a message which transmits the amount of pressure with which a key is being pressed.

■ Program Change

Most MIDI instruments currently in use allow settings, tones, and other data to be programmed. These programs can be switched by a message from the master instrument. This type of message is called a program change. Since MIDI standards say only that numbers from 0 to 127 can be used as program change data, the items in the tone memory that correspond to the program change numbers are different for every type of instrument.

■ Control Change

Besides information regarding when a key has been pressed and released and so on, volume, hold, portamento on/off, damper and soft pedal on/off, pan and modulation information, etc., are functions which may be handled in many different ways as performance data. These are transmitted as control change messages.

■ Pitch Bend

This is a message which tells just how far the pitch bend wheel has been turned. The maximum amount of pitch bend is usually programmed in the synthesizer's patch data. Therefore, pitch range depth may differ between instruments.

■ Exclusive Messages

While MIDI is a standard accepted world-wide, in order to get the most out of the different types of equipment produced by different manufacturers, each produces to some extent, their own independent specifications. These are outside of the specifications prescribed by MIDI, and consist of messages for the transmission and reception of information unique to a particular piece of equipment. Called "system exclusive messages," these may be used to exchange tone data between equipment produced by the same manufacturer and for storing tone data to a computer.

■ Others

● LOCAL Control On/Off

LOCAL Control is a message for the transmission of keyboard and tone data within the MIDI system. When LOCAL Control is turned off, keyboard data is not sent to the internal tone generator, but only to the MIDI OUT jack. This function is often used for the external control of a MIDI tone generator module that is different than the keyboard being used, or to use only the keyboard as a MIDI keyboard controller.

● All Notes Off

This is a message which stops all sounds currently being produced.

● Active Sensing

The purpose of this message is to prevent a bad cable or connection from causing stuck notes.

● Reset

This message reinitializes the unit while the power is still on.

● Common

This indicates the selection or location of a song when a MIDI sequencer or drum machine are being played in sync.

● Real Time

This message indicates the timing clock or start/stop, etc., when a synthesizer, drum machine or other device are being played in sync.

Implementation chart

Data which can be transmitted and received by MIDI equipment includes only that which is common to both the transmitter and receiver. MIDI is actually nothing more than a standard which enables the transmission of performance data via a MIDI cable; the implementation chart is merely a chart which states what the equipment is capable of. Each different type of equipment has its own characteristics, and capabilities. This goes for MIDI standards as well: some capabilities are not compatible with some types of equipment. That is why each MIDI unit comes with a list of the types of data it is capable of receiving and sending, called the MIDI implementation.

MIDI and rhythm performance

The K4/K4r has a rhythm sound generator, and although drum sounds can be played from the keyboard, it is generally more practical to create an ensemble using a Q-80 or other MIDI sequencer or drum machine. The rhythm sound generator may be used to create many different kinds of tones simultaneously. Because of the number of drum sounds in the K4/K4r, each sound is allocated to a single note number on the same MIDI channel.