KORG
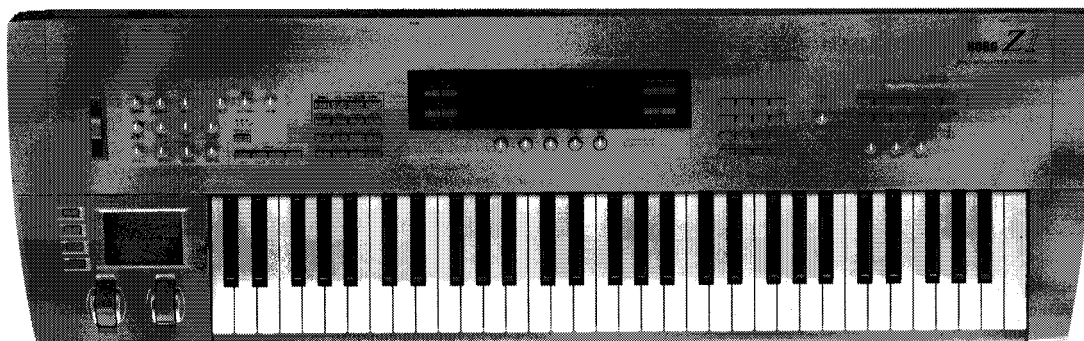# Z1 *M*OSS
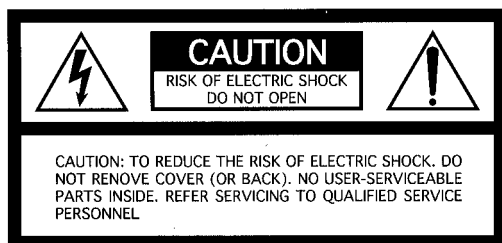
Multi Oscillator Synthesis System

Owner's Manual

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Thank you for purchasing the Korg Z1 Multi Oscillator Synthesizer. In order to enjoy long and trouble free use, please readthis manual carefully and use the instrument correctly.

IMPORTANT SAFETY INSTRUCTIONS

WARNING — When using electrical products, basic precautions should be followed, including the following:

1. Read all the instructions before using the product.
2. Do not use this product near water — for example, near a bathtub, sink, in a wet basement, or near a swimming pool, etc.
3. This product should be used only with additional hardware that is recommended by the manufacturer.
4. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
5. The product should be located so that its location or position does not interfere with its proper ventilation.
6. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.
7. The product should be connected to a power supply of the type described in the operating instructions or as marked on the product.
8. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
9. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
10. The product should be serviced by qualified personnel when:
    A. The power-supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the product; or
    C. The product has been exposed to rain; or
    D. The product does not appear to operate normally or exhibits a marked change in performance; or
    E. The product has been dropped, or the enclosure damaged.
11. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK. DO NOT RENOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

The lightning flash with the arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to people.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

GROUNDING INSTRUCTIONS
This product must be grounded (earthed). If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with the local codes and ordinances.

DANGER – Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product – if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

THE FCC REGULATION WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.
Unauthorized changes or modification to this system can void the user's authority to operate this equipment.

CE mark for European Harmonized Standards

CE mark which is attached to our company's products of AC mains operated apparatus until December 31, 1996 means it conforms to EMC Directive (89/336/EEC) and CE mark Directive (93/68/EEC).
And, CE mark which is attached after January 1, 1997 means it conforms to EMC Directive (89/336/EEC), CE mark Directive (93/68/EEC) and Low Voltage Directive (73/23/EEC).
Also, CE mark which is attached to our company's products of Battery operated apparatus means it conforms to EMC Directive (89/336/EEC) and CE mark Directive (93/68/EEC).

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Warning-THIS APPARATUS MUST BE EARTHED
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
- the wire which is coloured green and yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol ⏚, or coloured green or green and yellow.
- the wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
- the wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

ADAT and Alesis are registered trademarks of Alesis Corporation.
ADAT Digital Interface is a trademark of Alesis Corporation.

About the Z1's backup battery

The Z1 contains a backup battery which prevents memory from being lost when the power is turned off. When an indication of "Internal battery is LOW" appears in the display, the battery must be replaced. Please contact a nearby service center or dealer.

About data

If for some reason a malfunction occurs, there may be cases in which the contents of memory will be lost, so be sure to save important data on an external data filing device.
Korg can accept no responsibility for any damages, direct or otherwise, that may occur as a result of loss of data.

How this owner's manual is organized

This owner's manual is organized as follows.

Introduction

This section explains basic handling of the Z1, introduces its overall functionality, and explains the front and rear panels.

Quick-start guide (Basic Operation/Performance Editing, Editing)

If you wish to immediately begin playing and editing, read this chapter first.

The first section, "**Basic Operation/Performance Editing,**" explains how to select a Program or MultiSet on the Z1, how to use the controllers and editor, and other basic performance techniques using the arpeggiator.

The second section, "**Editing,**" explains the basic procedure for creating sounds, and introduces you to basic editing.

Editing parameter guide

This section explains all editing parameters of the Z1, organized by mode (or section). If you wish to learn more about the function of a specific parameter, you can use this part of the manual like a dictionary.

Appendices

This section contains various information such as the MIDI functionality of the Z1, utility functions, options, specifications, and error messages.

Conventions in this owner's manual

Switches and knobs etc. [ ]

Switches and knobs on the Z1's front panel are printed in square brackets [ ].

Parameters appearing in the LCD

Parameters which are displayed in the LCD are printed in double quotation marks " ". Parameter values are printed in bold characters.

Caution mark

This points out related parameters or information pertaining to the marked item.

Procedure ① ② ③ ...

Steps in a procedure are indicated as ① ② ③ ...

(see p.XX)

This indicates a page in the manual with related information.

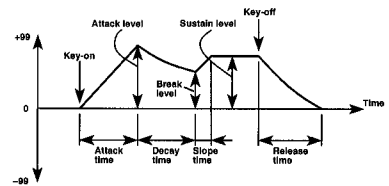### The Editing Parameter Guide (pages 29 to) is formatted as follows.

Title of the mode or section, etc. ── **5. EG section**

Explanation of the mode or section ── This section provides four general purpose EGs (envelope generators). The four EGs can be used as modulation sources for the parameters of other sections to create time-variant change in the sound.

Page title ── **EG1 page**

Parameter heading ── Column ⓵ ⓶ ⓷ ⓸ ⓹
Line
Column

❑ **Settings for the general-purpose EGs**

2-1 **Start Level** .... [-99...+99]
Parameter of name
Explanation of parameter ── Specify the value at the time of key-on.

1-2 **Attack Time** .... [0...99]
Parameter setting range ── Specify the time from key-on (when a note is played) until the value reaches the attack level. With a value of **0**, the value will change instantly. With a value of **99**, the value will change slowly.

2-2 **Attack Level** .... [-99...+99]
Specify the value that will be reached after the Attack Time has elapsed.

Program names etc. that appear in this manual are provisional, and may not necessarily be the same as what you see in the LCD of your Z1.

Contents

Main features

The Z1 is a 61 key polyphonic synthesizer with a MOSS (Multi-Oscillator Synthesis System) tone generator. It offers 12 voices of polyphony.

Broadly speaking, the Z1's MOSS (Multi-Oscillator Synthesis System) tone generator consists of the following sections: voice, EG/LFO, effect, and controllers.

In the voice section, there is an OSC section with two oscillators (1 and 2) that can use 13 types of oscillator algorithm (standard, ring modulation, VPM resonance, organ model, electric piano model, etc.), a sub-oscillator and a noise generator. The voice section also contains two filters, each of which can be used as one of five filter types, and including a dual band-pass filter that allows two center frequencies to be specified. This allows you to create human voice sounds or body resonances such as those characteristic to a violin or guitar.

This voice section can be modulated using five EGs and four LFOs to produce rich variation in the pitch, tone, and volume of each voice.

Two effects are also provided, each of which allows you to select one of 15 effect types, including multi-tapped delay, overdrive, and rotary speaker. In addition, there is a master effect that creates a spatial effect such as reverb or delay. The effect section also contains a two-band EQ that lets you put the finishing touch on your sound.

The Z1 gives you realtime control over all of this synthesis power. You have a modulation wheel, X-Y pad, a realtime editor section that lets you control parameters such as filter cutoff, resonance, filter EG and amp EG in the same way as on an analog synthesizer, five performance editor controls to which parameters can be freely assigned, and a rich variety of controllers including foot switch/volume pedal controllers. All of this means that you have realtime control of virtually any aspect of the sound including the effects.
In addition, this functionality is MIDI-compatible, and the LFO allows MIDI synchronization.

The built-in polyphonic arpeggiator provides not only standard preset patterns such as up, down, ALT1, ALT2 and random, but also allows the user to freely create 15 original patterns for even greater possibilities.

This rich array of functionality can be controlled via a large, easy to view LCD.

A PCMCIA flash card slot expands the memory by up to 16 banks of data when a 4 Mbyte memory card is used. The Z1 supports both ATA specification Flash ROM and Device Type: Flash ROM card formats.

About the Z1's modes

The Z1 has the following seven modes.

❑ Program Play mode

This mode allows you to play Programs.

A "program" is a single sound produced by the MOSS (Multi-Oscillator Synthesis System) tone generator.

The Z1 has 256 internal (built-in) programs, and these are grouped into two banks with 128 programs in each bank. A memory card (sold separately) can also be used and adds 256 Progams per bank.

Internal: A000 to A127 / B000 to B127
When a card is inserted: CARD A000 to Card A127 / CARD B000 to Card B127 (256 Programs) × 16 (4096 Programs when a 4 Mbyte memory cards is used)

For the factory setting programs and the sounds within each MultiSet (discussed below), refer to the "Voice Name List."

In Program Play mode you can select and play individual programs. In addition to controlling the sounds from the keyboard, you can also use the Z1's various controllers or the editor to modify the sound.

Arpeggiator function

Internal memory contains 5 preset patterns, and 15 user patterns. When a memory card (sold separately) is used, this can be increased by an additional 5 preset patterns and 15 user patterns per bank. The arpeggiator can be used in any mode.

Internal: PRESET_UP • DOWN • ALTERNATE 1 • ALTERNATE 2 • RANDOM, U1-1 to U1-5, U2-1 to U2-5, U3-1 to U3-5
When a card is inserted: CARD PRESET_UP • DOWN • ALTERNATE 1 • ALTERNATE 2 • RANDOM, U1-1 to U1-5, U2-1 to U2-5, U3-1 to U3-5 (15 User patterns) × 16 (240 User patterns when a 4 Mbyte memory cards is used).

❑ MultiSet Play mode

This mode allows you to play MultiSets. A MultiSet has up to six timbres ("slots" for programs; refer to the diagram at right), and assigns a timbre program (program settings with the effect portion omitted) to each timbre, allowing you to play up to six different sound simultaneously. Each timbre program can be assigned to a different area of the keyboard, or to a different dynamic range.

The Z1 has 32 MultiSets in internal memory, grouped into two banks with 16 in each bank. When a memory

card (sold separately) is used, an additional 32 MultiSets can be added per bank.

Internal: A00 to A15, CARD B00 to CARD B15

When a card is inserted: CARD A00 to CARD A15, CARD B00 to CARD B15 (32 MultiSets) × 16 (512 MultiSets when a 4 Mbyte memory card is used).

In the same way as with Program Play mode, you can use the Z1's various controllers and editor to modify the sound of the MultiSet.

❏ Program Edit mode

This mode allows you to edit a program. "Edit" refers to the process of modifying the values of various settings (parameters). In Program Edit mode, you can modify the values of the various parameters which make up a program, thus changing the sound.

❏ MultiSet Edit mode

This mode allows you to edit a MultiSet. You can assign programs to each timbre, and make a variety of other settings.

An example where programs that sound in different areas of the keyboard are assigned to each timbre.
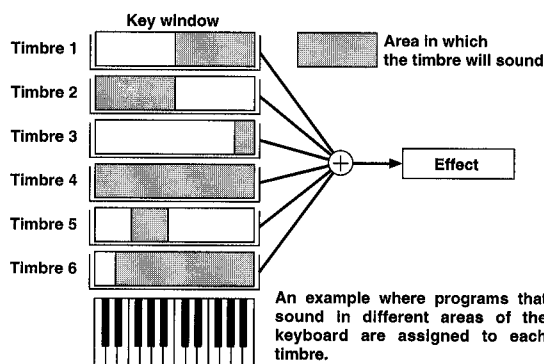
By setting parameters appropriately, you can use MultiSets in ways such as the following.

Layer

When the keyboard is played, two or more timbre programs will sound.

Split

Different timbre programs will sound, depending on the keyboard area that you play.

Velocity switch

Different timbre programs will sound, depending on the velocity (playing dynamics).

Multi-timbre

A different timbre program will sound on up to six channels. This allow the Z1 to function as up to six different MIDI tone generators.

❏ Arpeggio mode

Here you can make various settings for the arpeggiator that you can use in Program Play mode or MultiSet Play mode. You can also create your own arpeggio patterns. User patterns allow you to create an arpeg-gio pattern with up to 36 steps (see p.23). For preset patterns, you can modify parameters such as resolution, and the velocity and duration of the arpeggio notes to create a variety of arpeggio variations (see p.10).

❏ MIDI mode

In this mode you can make settings that allow the Z1 to control external MIDI devices and to be controlled by external MIDI devices.

❏ Global mode

In this mode you can make settings that affect the entire Z1, such as tuning. You can also use functions which restore the Programs or MultiSets to their factory settings.

• •

Upgrading with optional boards

The Z1 comes standard with 12 voices of polyphony. By adding a <DSPB-Z1 option board (6 additional voices)>, polyphony can be expanded to a maximum of 18 voices. This will provide even better playability for electric piano or organ-type sounds, or for MultiSet Play mode.

Also, a <DI-TRI digital I/F board> can be added that incorporates ADAT compatible, optional outputs, so that the audio signal of the Z1 can be output digitally.

Front panel
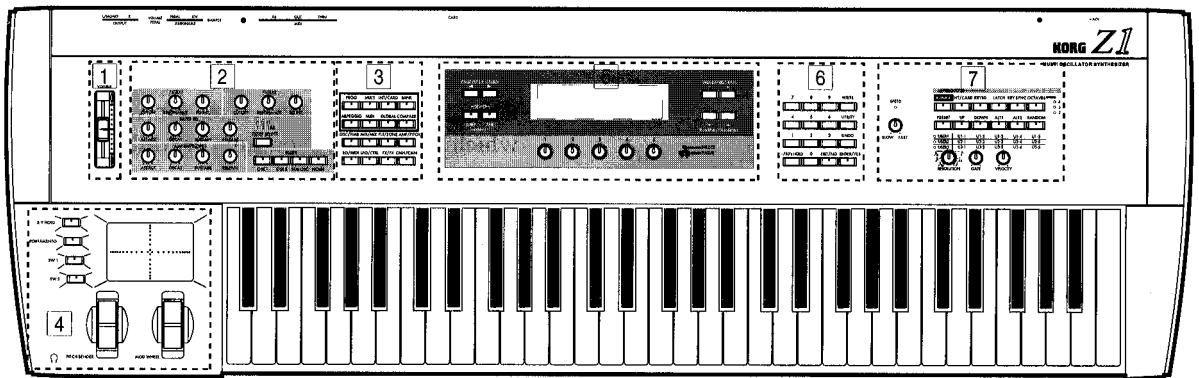
[1] **[VOLUME] slider**

This slider adjusts the volume of the entire Z1. It adjusts the volume of the OUTPUT jacks (rear panel) and the volume of the PHONES jack.

[2] **FILTER1:**

[CUTOFF] knob, [RESONANCE] knob, [EG INT] knob

FILTER2:

[CUTOFF] knob, [RESONANCE] knob, [EG INT] knob

FILTER EG:

[ATTACK] knob, [DECAY] knob, [SUSTAIN] knob, [RELEASE] knob, [FILTER SELECT] key

AMP ENVELOPE:

[ATTACK] knob, [DECAY] knob, [SUSTAIN] knob, [RELEASE] knob

MIXER:

[OSC1] key, [OSC2] key, [SUB OSC] key, [NOISE] key
These knobs and keys are collectively referred to as the "realtime editor." They allow you to modify the timbre and volum etc. in realtime.

[3] **[PROG] key, [MULTI] key, [ARPEGGIO] key, [MIDI] key, [GLOBAL] key**

The many functions of the Z1 are organized into various groups, called "modes." Press one of these keys to enter the desired mode.

[INT/CARD] key, [BANK] key

These keys select the source and bank for the desired Program or MultiSet.

[COMPARE] key

This key allows you to return to the un-edited state after program parameters have been edited, or to return to the sound that you had been editing if you select another program without writing the edited data.

[OSC/TIMB] key, [MIX/MIX] key, [FLT/ZONE] key, [AMP/PITCH] key, [EG/MIDI] key, [LFO/CTRL] key, [FX/FX] key, [CMN/CMN] key

Editable parameters for Programs and MultiSets are grouped into "sections." Press the appropriate key to move to the desired section.
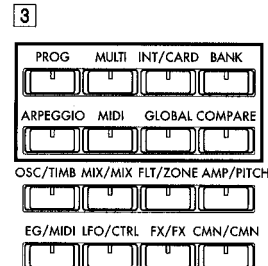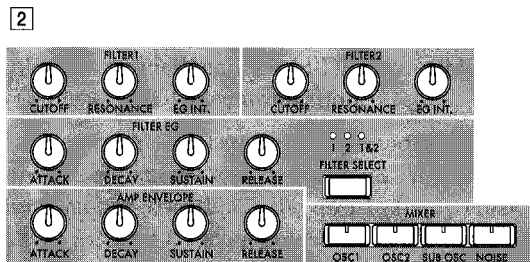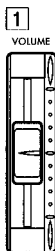
[4] **[X-Y HOLD] key**

This selects whether or not the [X-Y PAD] effect will be maintained when you take your finger off the pad. When the function is being held, the switch LED will be lit.

[PORTAMENTO] key

This switches portamento on/off. When portamento is on, the switch LED will be lit.

[SW1] key, [SW2] key

These keys allow effects to be switched on/off, the keyboard to be shifted an octave up/down, or the polyphony to be switched between mono/poly. The function performed by these keys can be specified in the various Edit modes.

[X-Y PAD]

Assigned parameters such as pitch or modulation can be controlled by moving your finger in the X-Y directions on the controller.

[PITCH BENDER]

This is the pitch bend controller. Rotating the wheel will change the pitch.

[MOD WHEEL]

This is the modulation controller. Rotating the wheel will control modulation.
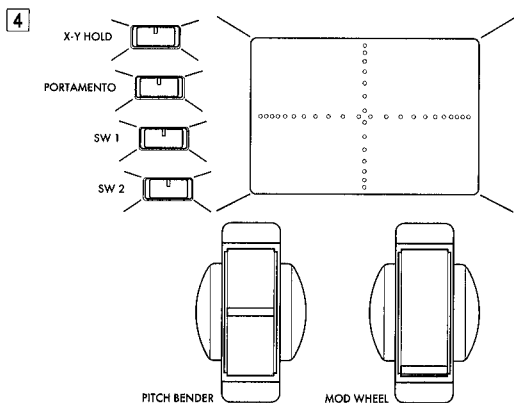
⑤ PAGE/USER GROUP: [◄] key, [►] key

In Program Play mode, these keys select program numbers within the user group.
In the various editing modes, these keys move through the pages that appear in the display. Pressing the [◄] key will move to the page located to the left. Pressing the [►] key will move to the page located to the right.

MENU (/DEMO): [JUMP] key, [TAB] key

When editing, these keys display a page menu and a tab menu. If both keys are pressed simultaneously, you will enter demonstration play mode.

VALUE/PROGRAM: [+] key, [-] key

In Program Play mode, these keys select program numbers. In MultiSet mode, they select MultiSet numbers. In the various editing modes, they modify the value of the parameter where the cursor is located.

CURSOR/CATEGORY; [▼] key, [▲] key

In Program Play mode, these keys select various categories of sounds. In the various editing modes, they move the cursor to a different line.

LCD

In each Play mode, this displays the name of the currently selected sound and the performance editor. In the various editing modes, this displays parameters.

[1] to [5] knobs

In each Play mode (Program or Multiset), you can rotate these knobs to modify the value of parameters assigned to them, causing the tone to change while you play. In the various editing modes, these knobs allow you to move between columns and lines, and to modify parameter values.
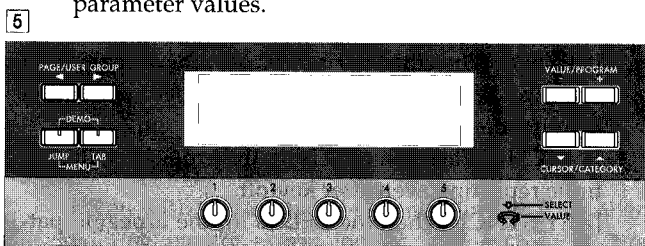
⑥ [0] to [9] numeric keys

In each Play mode, these keys select Program numbers or MultiSet numbers. In the various editing modes, they allow parameter values to be input numerically.

[-/10's HOLD] key

When selecting a Program number or MultiSet number in a Play mode, this key allows the 10's place to remain fixed, or the selection to be changed in steps of 10.
In the various editing modes, pressing this key will switch the sign of the parameter value between negative and positive.

[WRITE] key

This saves the currently selected Program, MultiSet, or arpeggio pattern settings.

[UTILITY] key

This key accesses various functions that assist your editing, such as Copy and Initialize.

[UNDO] key

This key restores the original value of an individual parameter after it has been modified.

[ENTER/YES] key

This key is used to finalize a value or execute an operation. When finalization or execution is required, a message will be displayed.

[EXIT/NO] key

Use this key if you decide not to finalize or execute, or to exit from an edit mode.
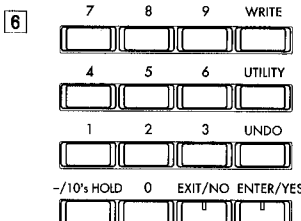
ARPEGGIATOR

7 [ON/OFF] key

This switches the arpeggio function on/off. When it is on, the LED will be lit.

[INT/CARD] key

This key selects whether the arpeggio pattern will be selected from internal memory or from a memory card. The selection will alternate each time the key is pressed. When the LED is lit, card patterns are selected.

[KEYBD] key, [LATCH] key, [KEY SYNC] key, [OCTAVES] key

These keys specify the operation of the arpeggiator.
[KEYBD]: When the LED is dark, only the arpeggio will be heard. When the LED is lit, the keyboard will sound simultaneously with the arpeggio.
[LATCH]: When the LED is lit, the arpeggio will continue repeating even after key-off.
[KEY SYNC]: When the LED is lit, the arpeggio pattern will playback from the beginning when you release all notes and play again.
[OCTAVES]: This key selects the range (in octave units) in which the arpeggio will play.

[PRESET/USER] key

This key selects the bank of the preset pattern or user pattern. The bank will change each time the key is pressed.

PATTERN SELECT: [UP] key, [DOWN] key, [ALT1] key, [ALT2] key, [RANDOM] key

These keys select preset arpeggio patterns (UP to RANDOM) or user patterns (U1-1 to U3-5).

[RESOLUTION] knob, [GATE] knob, [VELOCITY] knob

These knobs regulate how the notes of the arpeggio are sounded.
[RESOLUTION]: This modifies the base timing of the arpeggio. [GATE] modifies the length that each note will sound of the arpeggio. [VELOCITY] modifies the playing strength of the notes in the arpeggio.

[SPEED] knob

This adjusts the tempo of the arpeggiator. The LED above the knob will blink at quarter-note intervals.

If the arpeggiator is being controlled by MIDI clock messages from an external device, the setting of this knob will be ignored.
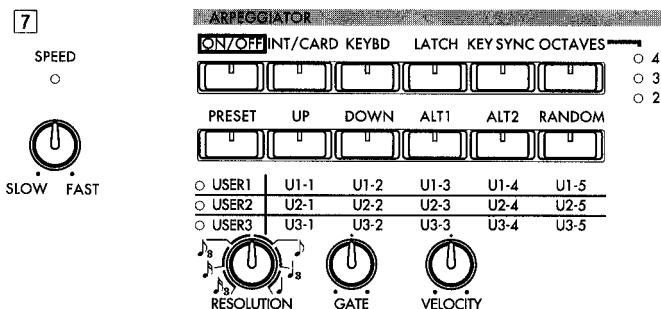
Rear panel

1 AC power supply inlet

Connect the included power cable to this inlet.

POWER (power switch)

This turns the power on/off ①.

2 OUTPUT jacks (L/MONO, R)

These are the output jacks. They can be connected to powered monitor speakers, a stereo amp, a mixer, or a multi-track recorder, etc. If you are listening in monaural, use the L/MONO jack.

3 DAMPER jack

A switch pedal can be connected to this jack. Pressing the pedal will apply the damper effect.

ASSIGNABLE SW jack

A switch pedal can be connected to this jack. Pressing the pedal will turn the specified function on/off, etc.

ASSIGNABLE PEDAL jack

A volume pedal can be connected to this jack. Operating the pedal will control the assigned function.

VOLUME PEDAL jack

A volume pedal can be connected to this jack. Operating the pedal will control the volume.

4 MIDI THRU connector

MIDI messages received at the MIDI IN connector are retransmitted without change from this connector.

MIDI OUT connector

MIDI messages are transmitted from this connector. Use this connector when you wish to control an external MIDI device.

MIDI IN connector

MIDI messages are received at this connector. Use this connector when you wish to play the sounds of the Z1 from another instrument, etc.

5 WORD CLOCK IN connector

This is the system clock input connector. In order to use this functionality, you must install an optional DI-TRI digital I/F board (sold separately) (refer to p.109).

DIGITAL OUT connector (Digital I/F format)

In order to use this functionality, you must install an optional DI-TRI digital I/F board (sold separately) (refer to p.109).

6 MEMORY CARD

An optional card can be inserted here can provide (or be used to store) additional programs, MultiSets, and arpeggiator patterns (refer to p.110).

7 Contrast

This adjusts the LCD contrast. The readability of the screen display may vary depending on your viewing height or angle, so you can change this adjustment as necessary.

Connections

⚠ Be sure to turn the power off before making connections. Careless operation while making connections can damage your speaker system, and may cause malfunctions.

1. Connecting the power cable

❖ Connect the included power cable.
First connect the power cable to the Z1, and then connect the other end to an AC outlet.

2. Connecting audio equipment

❖ Use audio cables to connect the Z1's OUTPUT jacks (L/MONO, R) to your mixer or powered monitor system (amplified speaker).
In order to take full advantage of the Z1's sound, we recommend that you listen in stereo. If you are making monaural connections, connect the L/MONO jack, and set the GLB Ctrl SetUp page "Output Mode" setting to **MONO**.

❖ If you wish to use headphones, connect them to the PHONES jack located on the left front of the Z1.

3. Connecting pedals, etc.

By connecting volume pedals and switch pedals, you can enjoy a wider range of performance control.
Pedals can be connected as desired. The Global mode page GLB Basic "Polarity" setting allows you to specify the pedal polarity (Max/Min state) (see p.91).

DAMPER jack

If you wish to control the damper effect from a pedal, connect a switch-type pedal such as the DS-1H (sold separately) damper pedal or PS-1/2 (sold separately) pedal to the DAMPER jack.

ASSIGNABLE SW jack

① If you wish to use a pedal to control the sustain effect, octave up/down, the portamento effect, or arpeggiator on/off etc., connect a PS-1/2 switch pedal (sold separately) or DS-1H damper pedal (sold separately) to the ASSIGNABLE SW jack.

② The function of this pedal can be specified independently for each program or MultiSet. This is done using the "Assignable SW Function" setting (refer to p.62, 82) of Program Edit mode or MultiSet Edit mode.

ASSIGNABLE PEDAL jack

① If you wish to use a pedal to control breath controller, volume, pan, or expression etc., connect an EXP-2 or XVP-10 foot controller (sold separately) to the ASSIGNABLE PEDAL jack.

② The function of this pedal can be specified independently for each program or MultiSet. This is done using the "Assignable SW Function" setting (refer to p.62, 82) of Program Edit mode or MultiSet Edit mode.

VOLUME PEDAL jack

① If you wish to control volume (either volume or expression) using a pedal, connect an EXP-2 or XVP-10 foot controller (sold separately) to the VOLUME PEDAL jack.

② Set the function to either Volume or Expression. This setting is made by the GLB Ctrl SetUp page "Volume Pedal Function" parameter (p.93).

4. Connections with MIDI equipment

If you wish to connect external MIDI equipment, use MIDI cables to make connections to the MIDI connectors of the other devices. For details refer to p.97.
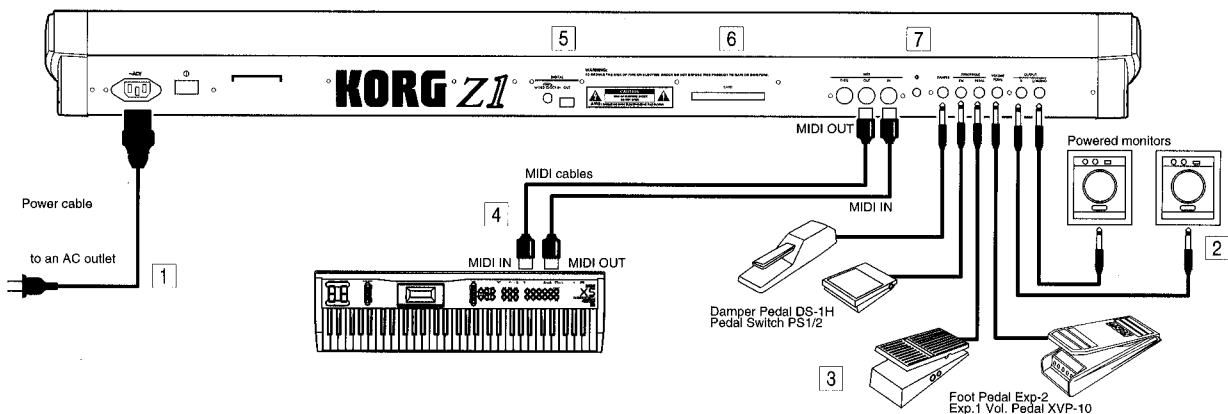
xiii

Quick-start Guide

Basic Operation and Performance Editing, Editing

1. Check the connections

Refer to "Connections" (p.xiii) and make the appropriate connections.

2. Turning the power on/off

❑ Turning the power on

① Press the [POWER] switch of the Z1 to turn the power on.
The Program Play mode or MultiSet Play mode display will appear. With the factory settings, you will be in Program Play mode with program A000 selected.

If the Global mode page GLB Basic "Page Memory" setting is turned **ON**, the program or MultiSet that was last selected when the power was turned off will be selected. Refer to "Using the Page Memory function" (p.91).

---

① On   ③ Off
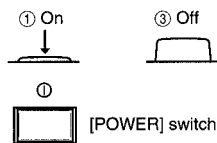
[POWER] switch

② Turn on the power of your powered monitor system or stereo amp.

❑ Turning the power off

③ Press the [POWER] switch once again, and the power of the Z1 will be turned off. Turn off your powered monitor speaker system or stereo amp before turning the Z1 off.

3. Adjusting the volume

✦ Raise the [VOLUME] slider to adjust the volume to an appropriate level. The volume of the headphones is also controlled by the [VOLUME] slider.
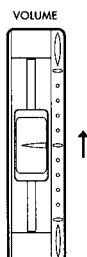
4. Listen to the demo songs

The Z1 contains several built-in demo songs. Listen to the demo songs to experience the Z1's rich sounds and expressive possibilities.

① Hold down the [JUMP] key and press the [TAB] key, and you will enter the demonstration mode.

┌DEMO┐

JUMP   TAB
└MENU┘
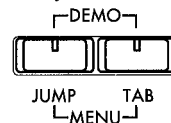
The LCD will indicate the demo songs.

② Press the knob [3] and then, the songs will begin playback successively, starting with song 01.

③ To stop playback or select another song, press the appropriate knob [1] to [5] or key.
Knob [1]: Select the previous song. During playback, return to the beginning of the current song.
Knob [2]: Stop playback.
Knob [3]: Playback.
Knob [4]: Select the next song.
Knob [5]: Exit demonstration mode.

```
Welcome to the Z1 world!
<DEMONSTRATION>(1-13)────Press Knob3 ►
01:"Z" Saves the Day
02:Nature Cry
03:Physical Slapper
04:Maybe Someday
  ◄◄        ■■        ►        ►►        EXIT
```

1   2   3   4   5
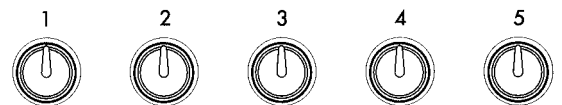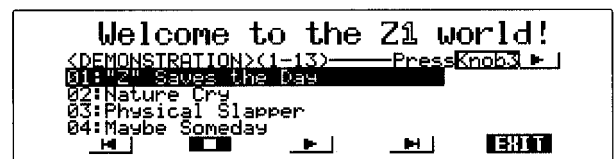
[▼] key: Same function as knob [4].
[▲] key: Same function as knob [1]

▼   ▲
CURSOR/CATEGORY

[EXIT] key: Same function as knob [5].

EXIT/NO

5. Playing a program

Now let's select and play a program. At this time you can also try out the Z1's various controllers and knobs, to hear the results for yourself. For details on the controllers and knobs, refer to the following sections "7. Using various controllers to modify the sound," "8. Using the realtime editor to modify the sound," and "9. Using the performance editor to modify the sound."

With the factory settings, some programs will automatically turn the arpeggiator on when they are selected (the ARPEGGIATOR [ON/OFF] key LED will light). For details on the arpeggiator, refer to "10. Using the arpeggiator."

❑ Select Program Play mode

❖ Press the [PROG] key (the LED will light) to enter Program Play mode.

PROG   MULTI

ARPEGGIO   MIDI

The following display will appear.

Program
Source ┌ Bank ┌ Number   ┌ Name   Category

```
 B127:ANALOG INIT          [HARD]
                           Synth-Hard
 [USER GROUP]01:UserGroup-000
 [SW1]MOD.SW1
 [SW2]MOD.SW2      [ARPEGGIO]♩=120( ♪ )
                   PRESET:UP
```

Function of [SW1] and [SW2]   Arpeggiato
└ User group   └ pattern   Speed   Resolution
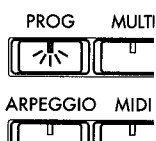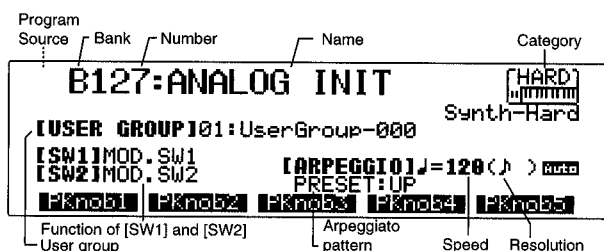
❑ Select a program bank

❖ Press the [BANK] key to select the bank (A/B). The bank will change each time the key is pressed.

/CARD   BANK

.OBAL COMPARE
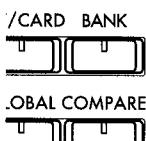
When bank A is selected, the LCD program bank field will indicate "A," and the [BANK] key LED will be dark. When bank B is selected, the LCD program bank field will indicate "B," and the [BANK] key LED will be lit.

If you operate the realtime editor or performance editor, or modify the sound in Program Edit mode and then return to Program Play mode, the LCD program bank indication will change to lowercase characters (a/b), indicating that the program has been edited. If you select a different program or save the program, your edits will be canceled or saved, and this display will return to uppercase.

❑ Select a program number

Each bank contains 128 programs (000-127). Use one of the following methods to select a program.

Using the [+] and [–] keys

❖ Press the [+] key to increase the program number by 1, or press the [–] key to decrease it by one.

VALUE/PROGRAM
–   +
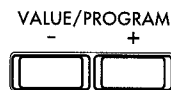
Using the numeric keys [0] to [9]

① Use the numeric keys to enter the desired program number, starting with the upper digit.
The LCD will show a list of the programs which can be finalized by the next numeric key input.

```
7      8      9    WRITE
4      5      6    UTILITY
1      2      3    UNDO
-/10's HOLD  0   EXIT/NO  ENTER/YES
```

② If the program list is still displayed even though you have finished inputting the number, press the [ENTER] key to finalize the input.

Using the [10's HOLD] key

❖ If you press the [10's HOLD] key to turn the function on (the LCD will indicate "HOLD"), you can select programs as follows.
Pressing numeric keys [0] to [9] will change only the one's place, and the 10's and 100's place will remain fixed-
Pressing the [+] or [–] keys will change the progra number in steps of 10.
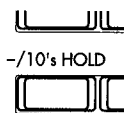
-/10's HOLD

To turn off the 10's HOLD function, press the [10's HOLD] key once again, or press the [EXIT] key.

❑ Selecting programs of the same category

You can search for and select other programs that are in the same category as the currently selected program. There are 18 different categories. Normally, categories are used to distinguish types of sound; like organs, synth pads, etc.

❖ Press the CATEGORY [▼] key, and the next program (closest-numbered) in the same category will be selected. Press the [▲] key, and the previous program (closest-numbered) in the same category will be selected.

▼   ▲
CURSOR/CATEGORY

3
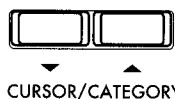
❏ Selecting programs of the same user group

You can search for and select other programs that are in the same user group as the currently selected program. There are 16 different user groups. User groups provide a convenient way to classify sounds by performer or song.

✧ Press the USER GROUP [▶] key, and the next program (closest-numbered) in the same user group will be selected. Press the [◀] key, and the previous program (closest-numbered) in the same user group will be selected.

PAGE/USER GROUP
◀   ▶

You can freely assign your own user group names (see p.92).

❏ Selecting programs by category or user group

You can search for programs by category or user group and select them.

① Press the [UTILITY] key.

6   UTILITY

3   UNDO
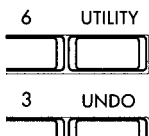
The bottom line of the LCD will show the UTILITY menu.

```
[SW1]MOD.SW1      [ARPEGGIO]J=048(♪ )
[SW2]MOD.SW2          PRESET:UP
UTILITY: UsrGrp Categr Init Factry
```

1   2   3   4   5
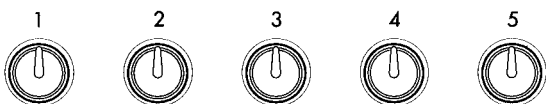
② To select from a user group, press knob [2] (UsrGrp). To select from a category, press knob [3] (Categr). The corresponding UTILITY window will appear.

③ Rotate knob to select the desired user group or category, and press the [ENTER] key to execute your selection.
Programs in the specified user group or category will be located, and the program will change.
If the specified user group or category is not found, the display will indicate "NotFound," and will wait for your response. To cancel the operation, press the [EXIT] key.

❏ Other ways to select programs

✧ Programs can be selected by incoming MIDI program change messages (see p.98).

❏ Selecting programs from a card

Memory cards (sold separately; see p.110) must be formatted before they can be used. When a memory card containing Z1 programs is inserted, card programs can be selected.

✧ Press the [INT/CARD] key to select either internal programs or memory card programs. The source will alternate each time the key is pressed.

TI INT/CARD BA

)I   GLOBAL COM
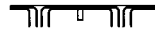
When the card is selected, the LCD program source area will indicate "CARD" and the [INT/CARD] key LED will light.

6. Playing a MultiSet

Now let's select and play a MultiSet. At this time you can use the Z1's various controllers and knobs, and the arpeggiator in the same way as when playing a program.

❑ Select MultiSet Play mode

❖ Press the [MULTI] key (the LED will light) to select MultiSet Play mode.

IG   MULTI INT/

;GIO MIDI GLC

The following display will appear.

MultiSet
source Bank Number Name Arpeggiator pattern Speed Resolution

A02:Brass Section
[ARPEGGIO]♩=120(♪)
PRESET:UP

T1:B040(Trumpet)
T2:B044(Tb-202 xy)
T3:B042(Brass Ens)
T4:
T5:
T6:

Timbre program

Timbre compatible with performance editor (p.9)
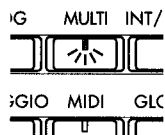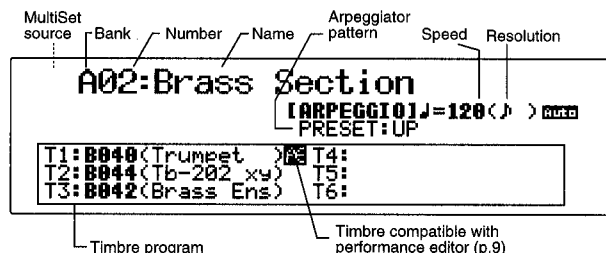
❑ Select the MultiSet bank

❖ Press the [BANK] key to select the bank (A/B). The bank will change each time the key is pressed.

/CARD BANK

.OBAL COMPARE
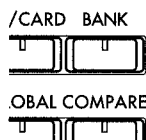
When bank A is selected, the MultiSet bank field in the LCD will indicate "A," and the [BANK] key LED will be dark. When bank B is selected, the MultiSet bank field will indicate "B," and the [BANK] key LED will be lit.

If you operate the realtime editor or performance editor, or modify the sound in MultiSet Edit mode and then return to MultiSet Play mode, the MultiSet bank indication in the LCD will change to lowercase characters (a/b), indicating that the MultiSet has been edited. If you select a different MultiSet or save the MultiSet, your edits will be canceled or saved, and this display will return to uppercase.

❑ Select the MultiSet number

Each bank contains 16 MultiSets (00 to 15). As when selecting programs, you can use the [+]/[–] keys, the numeric keys [0] to [9], and the [10's HOLD] key to select the MultiSet number.

7	8	9	WRITE
4	5	6	UTILITY
1	2	3	UNDO
–/10's HOLD	0	EXIT/NO	ENTER/YES

VALUE/PROGRAM
–   +
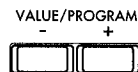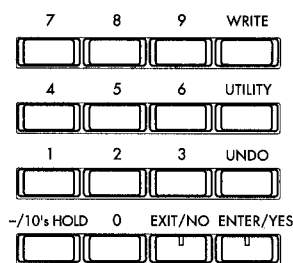
❑ Other ways to select a MultiSet

❖ MultiSets can be selected by incoming MIDI program change messages (see p.98).

❑ Selecting MultiSets from a card

Memory cards (sold separately; see p.110) must be formatted before they can be used. When a memory card containing Z1 MultiSets is inserted, card MultiSets can be selected.

❖ Press the [INT/CARD] key to select either internal MultiSets or memory card MultiSets. The source will alternate each time the key is pressed.
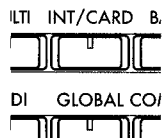
ILTI INT/CARD B,

DI   GLOBAL CO/

When the card is selected, the LCD program source area will indicate "CARD" and the [INT/CARD] key LED will light.

7. Using various controllers to modify the sound

The Z1 provides a variety of controllers that allow you to control the sound. By operating these controllers, you can modify the pitch, volume, and brightness etc. of the sound while you play. Since settings for these controllers can be made independently for each program (or MultiSet), you can use them to achieve a wide variety of control.

❏ Using the [X-Y PAD]

The sound can be modified by moving your finger left/right and up/down (X-Y axes) on the [X-Y PAD] in various directions.
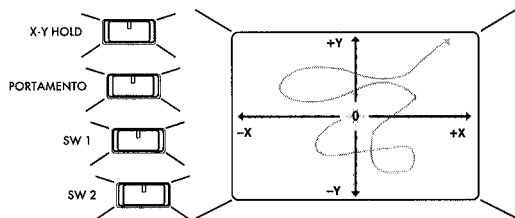
❏ Using the [X-Y HOLD] function

✧ If you press the [X-Y HOLD] key to turn this function on (LED lit), the changes in sound being controlled by the [X-Y PAD] will continue to apply even after you take your finger off the [X-Y PAD]. If this function is off (LED dark), the effect of the [X-Y PAD] will stop at the moment that you release your finger from the pad. The function will alternate on/off each time this key is pressed.

The [X-Y HOLD] on/off setting can be stored for each program and multiset using the Write operation (see p.26). However, the [X-Y PAD] location that was being held will not be stored.

❏ Using the [PORTAMENTO] control

Portamento is an effect which creates a smooth pitch change between one note and the next-pressed note (see p.30).

✧ To apply this effect, press the [PORTAMENTO] key to turn the function on (LED lit). This setting will alternate on/off each time the key is pressed.

⚠ If the Program Edit mode OSC section page OSC Set Up "Portamento Time" setting is 0, there will be no portamento even if the [PORTAMENTO] key is turned on.

The [PORTAMENTO] on/off setting can be stored for each program and multiset using the Write operation (see p.26).

❏ Using the [SW1] and [SW2] keys

By pressing these keys to turn them on (LED lit), you can switch settings such as moving the keyboard octave up/down, turning effects on/off, or switching between monophonic/polyphonic (see p.62 and p.82).

❏ Using the [PITCH BENDER]

You can move the [PITCH BENDER] toward yourself or away from yourself to modify the sound. Normally this is used to control pitch. On some programs which use a BRASS or REED oscillator type, the pitch bender produces the "mode jump" effect that is characteristic of wind instruments.
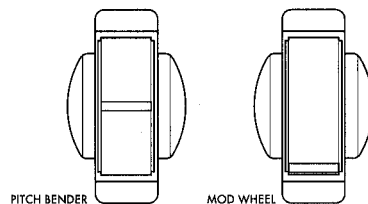
❏ Using the [MOD WHEEL]

You can move the [MOD WHEEL] away from yourself to modify the sound. Normally this is used to control the depth of vibrato or wah.

❏ Using the keyboard

Note Number

The note number (keyboard position) can be used to modify the sound. Normally the note number is used to control aspects of the sound such as volume, brightness, and attack.

Velocity

The force with which you play the keyboard can be used to modify the sound. Normally this is used to control aspects of the sound such as volume and attack.

After Touch

Pressure applied to the keyboard after striking a note can be used to modify the sound. Normally this is used to control aspects of the sound such as vibrato depth or brightness.

❏ Using controllers connected to the rear panel <Optional>

DAMPER (Damper pedal)

Sounds can be modified by pressing or releasing a pedal.
Normally this is used to control the damper pedal effect of an acoustic piano. (See p.xiii)

ASSIGNABLE SW (Assignable switch)

Sounds can be modified by pressing or releasing a pedal.
A function such as sustain pedal, octave up/down, portamento, or on/off switching for effects or the arpeggiator can be assigned to this switch. (See p.xiii, p.62 and p.82)

ASSIGNABLE PEDAL (Assignable pedal)

The sound can be controlled by the depth to which a pedal is pressed or returned.

A function such as breath controller, volume, pan or expression can be assigned to this pedal for control. (See p.xiii, p.62 and p.82)

VOLUME PEDAL (Volume pedal)

The volume can be controlled by pressing or releasing a pedal. This pedal can control either volume or expression. (See p.xiii and p.93)

❏ How to assign sound-modifying functions to a controller

A wide variety of functions can be assigned to these controllers to control pitch, tone and volume. The following lists give only the categories.

Controllers which can be used as modulation sources

[X-Y PAD], [PORTAMENTO], [SW1] key, [SW2] key, [PITCH BENDER], [MOD WHEEL], Velocity, After Touch, Note Number, DAMPER, ASSIGNABLE SW, ASSIGNABLE PEDAL. (Knobs [1] to [5] can be used as modulation source. For details refer to p.19.)

Controllers to which individual functions can be assigned

In addition to being used as modulation sources, [SW1] key, [SW2] key, [PITCH BENDER], DAMPER, ASSIGNABLE SW, and ASSIGNABLE PEDAL can also be assigned the various functions explained above.

⚠ In MultiSet Play mode, you can use the MultiSet Edit mode MLT Ctrl Fltr page settings to restrict the operation of these controllers for each timbre (refer to p.80).

8. Using the realtime editor to modify the sound

While playing in Program Play mode or MultiSet Play mode, you can operate the 14 knobs and five keys located at the left side of the Z1 to modify the tone and volume etc. On the Z1, these 14 knobs and keys are collectively referred to as the "realtime editor." By operating these controls you can give a wide variety of variation to the sound without entering an Edit mode.

❏ Modifying the cutoff frequency to vary the brightness of the sound

If you rotate the [CUTOFF] knob of FILTER1 or FILTER 2, the "Cutoff Frequency" setting (see p.16 and p.53) of the respective filter will increase or decrease, affecting the brightness of the sound.

The result will depend on the filter type that is specified for each program (MultiSet). However for the low pass filter (LPF) that is widely used on synthesizers, rotating the knob toward the right will normally brighten the tone, and rotating it toward the left will darken the tone.

❏ Modifying the resonance to give character to the sound

If you rotate the [RESONANCE] knob of FILTER1 or FILTER 2, the "Resonance" setting (see p.16 and p.53) of the respective filter will increase or decrease, giving a unique character to the sound.

❏ Causing the brightness to vary over time

The various knobs and keys of the FILTER EG can be used to change the way in which the brightness of the sound varies over time.

Adjusting the depth of the FILTER EG

Rotate the [EG INT.] knob of FILTER1 or FILTER2, and the depth of the FILTER EG effect will change (refer to "Cutoff Frequency Mod. EG Intensity" p.16 and p.53).

Selecting the FILTER whose EG you wish to modify

You can select the filter whose FILTER EG will be affected by your adjustments. Each time you press the [FILTER SELECT] key, the LEDs will light consecutively: when "1" is selected only the FILTER EG of filter 1 will be affected, when "2" is selected only filter 2, and when "1&2" is selected both filters 1 and 2 will be affected.

⚠ In Program Play mode, the function of this key may be fixed by the filter settings of the currently selected program. If the same EG is being used by "Cutoff Frequency Mod. EG" (see p.53) of both filter 1 and filter 2, this setting will automatically be fixed at "1&2." Also, if "Filter Link SW" (see p.52) is on, "1" will be selected. In MultiSet Play mode the functioning will be similar.

7

Modifying the brightness of the attack

By rotating the [ATTACK] knob you can adjust the time over which the brightness changes from key-on until the attack level is reached.

Normally, rotating the knob toward the right will cause the tone to brighten gradually, and rotating the knob toward the left will cause the tone to brighten quickly.

Modifying the brightness of the decay

By rotating the [DECAY] knob you can adjust the time over which the brightness changes from the attack level until the sustain level is reached.

Normally, rotating the knob toward the right will cause the tone to darken gradually, and rotating the knob toward the left will cause the tone to darken quickly.

Modifying the brightness of the sustained sound

By rotating the [SUSTAIN] knob you can adjust the brightness of the sustained sound.

Modifying the brightness of the decaying sound after the key is released

By rotating the [RELEASE] knob you can adjust the time over which the brightness changes after key-off until it decays to silence.

Normally, rotating the knob toward the right will cause the tone to darken gradually, and rotating the knob toward the left will cause the tone to darken quickly.
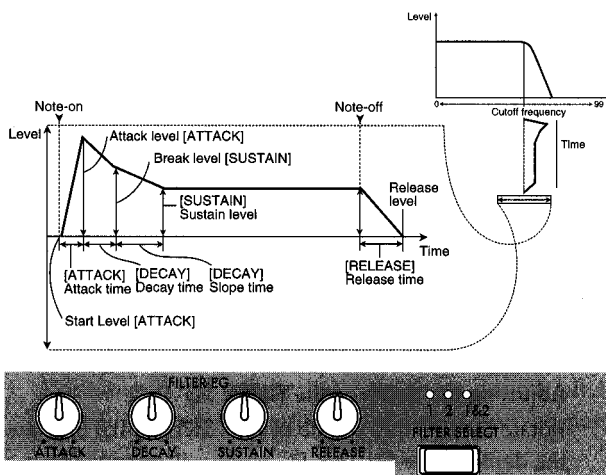
❏ Causing the volume to vary over time

The various knobs of the AMP ENVELOPE can be used to change the way in which the volume varies over time. (Refer to p.17 and "Amplitude Mod. EG" p.55)

Modifying the speed of the attack

By rotating the [ATTACK] knob you can adjust the time from key-on until the sound reaches the attack level.

Normally, rotating the knob toward the right will cause the sound to attack gradually, and rotating the knob toward the left will cause the sound to attack quickly.

Modifying the speed of the decay

By rotating the [DECAY] knob you can adjust the time from when the attack level is reached until the sound

falls to the sustain level.

Normally, rotating the knob toward the right will cause the sound to decay gradually, and rotating the knob toward the left will cause the sound to decay quickly.

Modifying the sustain volume

By rotating the [SUSTAIN] knob, you can adjust the volume at which the sound will be sustained.

Modifying the speed at which the sound decays after the key is released

By rotating the [RELEASE] knob, you can adjust the time over which the sound decays after key-off until it decays to silence.

Normally, rotating the knob toward the left will cause the sound to decay more gradually, and rotating the knob toward the left will cause the sound to decay more quickly.
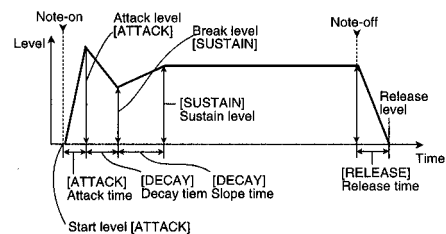
❏ Mute an oscillator to modify the sound

The tone generator portion of a Z1 program contains two oscillators, a sub oscillator, and a noise generator (see p.15). You can modify the sound by changing the combination of these elements.

❖ Pressing the [OSC1] key, [OSC2] key, [SUB OSC] key or [NOISE] key to turn off the LED will mute the corresponding oscillator so that it will not sound.

In MultiSet Play mode, the performance editor will be enabled only for the timbre whose MultiSet Edit mode MLT Controller Fltr page "P_Edit" setting is set to ENA. Only one of the six timbres can be set to ENA (refer to p.80).

❏ Saving a sound that you modified using the realtime editor

Sound program that you modified using the realtime editor in Program Play mode can be saved (see p.26). In MultiSet Play mode it is not possible to save a modified sound program. "Saving a sound that you modified using the Performance Editor" (refer to p.9).

9. Using the performance editor to modify the sound

While playing in Program Play mode or MultiSet Play mode, you can operate the five knobs located below the LCD to modify various parameters that change the pitch, tone and volume. On the Z1, these knobs are collectively referred to as the "performance editor." By operating these knobs, you can modify the sound in various ways without entering an Edit mode. While each knob or key of the realtime editor has a fixed function, each knob of the performance editor can have up to four desired parameters assigned to it. (You can select from 439 different parameters. Refer to p.107) This makes it possible for you to modify the sound in complex ways.

Furthermore, each knob of the performance editor can function as a modulation source just like the controllers ([X-Y PAD], [MOD WHEEL] etc.) that were discussed in "7. Using various controllers to modify the sound." (see to p.6)

✎ The performance editor cannot be used while a Program or MultiSet is being selected (i.e., while a list is displayed).

❏ Using the performance editor to control the sound

In Program Play mode

✧ When you rotate a knob [1] to [5], sliders which represent the values of the parameters assigned to each knob will move, and the sound will change.
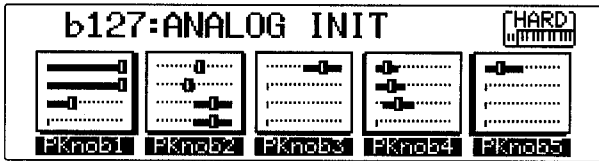
✧ When you press a knob [1] to [5], the LCD will show the sliders which represent the values of the assigned parameters, and will also display the parameter names.
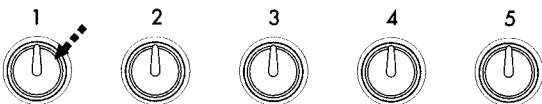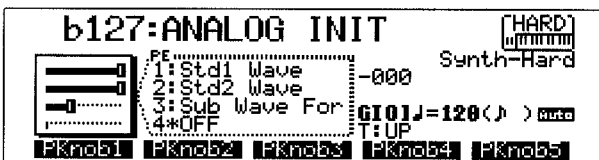
A wide variety of parameters which control the sound can be assigned to performance editor knobs [1] to [5] (see p.20 and p.63).

In MultiSet Play mode

In the case of MultiSets that can be controlled by the Performance Editor, an indication of "PE" will be shown beside one of the timbre programs. The performance editor will be active for this timbre program. The performance editor settings of the program itself will be used.

✧ When you rotate knobs [1] to [5], the sound will be modified according to the parameters that were specified for the "PE" timbre program.

✎ In MultiSet Play mode, the performance editor will be enabled only for the timbre whose MultiSet Edit mode MLT Controller Fltr page "P_Edit" setting is set to ENA. Only one of the six timbres can be set to ENA (refer to p.80).

❏ Saving a sound that was modified using the Performance Editor

In Program Play mode, you can save a sound that you modified using the performance editor (refer to p.26). In MultiSet Play mode, a modified sound cannot be saved.

However when a timbre program used in a MultiSet is the same as the program selected in Program Play mode, the timbre program in MultiSet Play mode will be displayed in bold characters. In this case, modifications made to the sound using the realtime editor or performance editor will be determined to be program editing. (The bank display of the timbre program will change from uppercase characters to lowercase characters.) You can move to Program Play mode or to Program Edit mode, and then save the modified sound.

10. Using the arpeggiator

The Z1's arpeggiator contains five preset patterns (UP, DOWN, ALTERNATE1, ALTERNATE2, RANDOM) and 15 user patterns (U1-1 to U3-5). Select an arpeggio pattern, and play a Program or MultiSet.

❏ Turning on the arpeggiator

Press the ARPEGGIATOR [ON/OFF] key to turn it on (LED lit). Arpeggiation will begin when you play the keyboard. Arpeggio patterns can be polyphonic by specifying two or more tones for steps within the pattern. Press the key once again to turn off the arpeggiator.
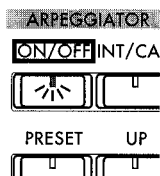
❏ Adjusting the arpeggiator tempo

Rotate the [SPEED] knob to set the desired tempo.

You can also synchronize the tempo with an external MIDI device (see p.86). In this case, the knob setting will be ignored.

❏ Changing the base timing of the arpeggiated notes

Rotate the [RESOLUTION] knob to set the base timing of the arpeggiated notes. You can select a setting from sixteenth note triplets to quarter notes.

❏ Selecting the arpeggio bank

Press the [PRESET/USER] key to select the bank (PRESET to USER3). Each press of the key will cycle consecutively through the banks.

❏ Selecting the arpeggio pattern

Use PATTERN SELECT ([UP] to [U3-5] keys) to select the arpeggio pattern. The display will indicate the pattern name.

	UP	DOWN	ALT1	ALT2	RANDOM
USER1	U1-1	U1-2	U1-3	U1-4	U1-5
USER2	U2-1	U2-2	U2-3	U2-4	U2-5
USER3	U3-1	U3-2	U3-3	U3-4	U3-5

❏ Selecting arpeggio patterns from a card

⚠ If a memory card (sold separately; refer to p.110) in which Z1 arpeggio patterns have been saved is inserted, you can select arpeggio patterns from the card.

✧ Press ARPEGGIATOR [INT/CARD] to specify whether you wish to use internal arpeggio patterns or memory card arpeggio patterns. The selection will alternate each time you press the key.
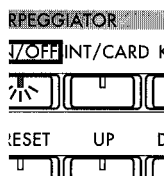
❏ Playing keyboard notes together with arpeggio notes

If you press the [KEYBD] key to turn this function on (LED lit), notes played on the keyboard will be sounded as well, so that the chord you play on the keyboard will sound simultaneously with the arpeggio. The setting will alternate on/off each time you press the key.
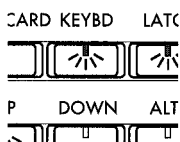
❏ Causing the arpeggio to continue playing after you release the notes

If you press the [LATCH] key to turn this function on (LED lit), the arpeggio will continue playing even after you take your hand off the keyboard. The setting will alternate on/off each time you press the key.
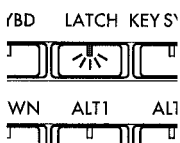
☐ Causing the arpeggio to play through multiple octaves

By pressing the [OCTAVE] key you can cause the arpeggio to extend through multiple octaves. As the LED is switched through settings of 2 → 3 → 4, the arpeggio will change to cover the corresponding number of octaves.

YNC OCTAVES
○ 4
○ 3
☀ 2
T2   RANDOM
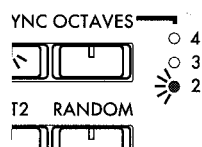
🔖 If a user pattern is selected, the operation of this function will depend on the "Octave Motion" setting.

☐ Applying key-sync to the arpeggiator

If you press the [KEY SYNC] key to turn this function on (LED lit), the arpeggio pattern will start over from the beginning at the first key-on that follows the releasing of all notes. When you are playing together with other instruments, you can use this function to make sure that the beginning of each measure is aligned correctly.

TCH KEY SYNC OCT

LT1   ALT2   RAN
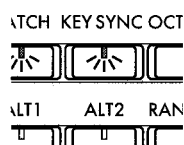
☐ Changing the length of the arpeggiated notes

You can use the [GATE] knob to adjust the length of the arpeggiated notes. Rotating the knob toward the left will make the notes shorter, and rotating it toward the right will make them longer.

GATE

☐ Changing the loudness of the arpeggiated notes

You can use the [VELOCITY] knob to adjust the loudness of the arpeggiated notes. Rotating the knob toward the left will make the notes softer, and rotating it toward the right will make them stronger.

VELOCITY

☐ Saving the arpeggiator on/off setting etc.

When writing a program or MultiSet (refer to p.26), the status of the arpeggiator can be saved together with the program or MultiSet settings.

The following settings will be saved: arpeggio [ON/OFF] key, pattern, [SPEED] knob, [KEYBD] key, [LATCH] key, [KEY SYNC] key, [OCTAVES] key, [RESOLUTION] knob, [GATE] knob, and [VELOCITY] knob.

🔖 These settings will be valid when the Global mode "Auto-Arpeggio SetUp Program" or "Auto Arpeggio SetUp MultiSet" settings are ON.

☐ Linking the arpeggiator to a program or MultiSet

When you select a program or MultiSet, the status of the arpeggiator will be switched together with the program or MultiSet. Refer to "Saving the arpeggiator on/off setting etc."

🔖 These settings will be valid when the Global mode "Auto-ArpeggioSetUp Program" or "Auto Arpeggio SetUp MultiSet" settings are ON. In each Play mode, the display will indicate "AUTO."

🔖 In MultiSet Play mode, arpeggio playing will be enabled only if the MultiSet Edit mode MLT MIDI&Arp page setting "Arpeggio" is set to ENA, and only for timbres whose transmit/receive channel matches the Global MIDI channel (refer to p.79)

11

Editing

1. Restoring the factory settings

The factory settings are referred to as the "factory preset data," and this data can be recalled to restore the Z1's Programs, MultiSets, arpeggio patterns, and other mode settings to their factory condition.

If you are using the editing operations described in this section and get into a situation where there is no sound or you are unsure of how to proceed, you can use the following procedure to bring back the factory preset data.

There are two ways in which the factory preset data can be brought back: it can be written into internal memory, or it can be called into the edit buffer. With the first method, the data will be written into internal memory without your having to perform the Write operation. The second method would normally be used when you wish to use the factory preset data as the basis for editing, and the data would not be saved in internal memory unless you perform the Write operation. Here we will explain the procedure by which the factory preset data is written directly into internal memory. For the procedure of recalling factory preset data into the edit buffer, refer to p.28.

⚠ Be aware that when you perform the following procedure, the contents of internal memory (all of your own original data that you created and stored) will be lost. If you wish to keep this data, be sure to save it to a memory card or data filer before executing the following procedure (see p.88 and p.95).

① Press the [GLOBAL] key to enter Global mode.

GLOBAL COMP.

② Press the [JUMP] key, and then press knob [5] (UTY's) to access the GLB Data Utility page.

┌─DEMO─┐

JUMP   TAB
└─MENU─┘
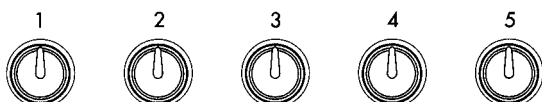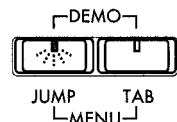
③ Press knob [2] several times to move the cursor to the "Factory (Load Source)" line.

④ You can choose whether to restore the factory preset data for an individual Program or MultiSet, or for a specific mode. However in this example we will show how to restore the factory preset data for all settings. Rotate knob [2] to select **All_Data**.

⑤ Press the [ENTER] key and a message will ask for confirmation. If you wish to recall the factory preset data, press the [ENTER] key once again.
If you decide to cancel the operation, press the [EXIT] key. Pressing it once will cancel the operation, and pressing it again will return you to the previous Play mode.

2. About the edit mode display

Page title   ┌─ Entry parameter name

                         └─Cursor   └─Parameters
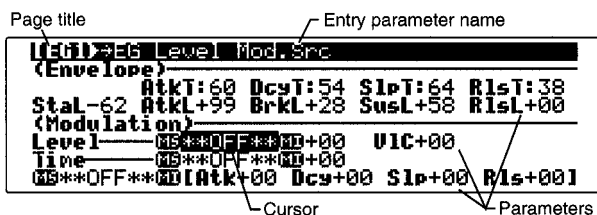
Page title

This indicates the name of the currently selected page. Each of the edit modes consists of multiple pages.

Parameters

Each page contains several related parameters. By modifying the values of these parameters you can modify the sound or change the system settings.

Cursor

The highlighted area indicates the parameter that is being edited. You can use knobs [1] to [5], the [+] key and the [–] key to modify the value.

Entry parameter name

This indicates the name of the parameter which is selected for editing (i.e., the parameter where the cursor is located).

3. Basic editing procedure

Here we will explain the basic procedure for editing.

❏ Select a mode (and section)

First, select the mode in which you wish to edit.

Program Edit mode

① In Program Play mode, select the program that you wish to edit. (Refer to "Playing a program.") If you wish to start editing from an initialized state, refer to "Initializing settings (Init)" (p.28).

② To select the desired section of Program Edit mode, press the appropriate section key to make the LED light. (The [PROG] key LED will blink.)

[OSC/TIMB] key	: OSC section
[MIX/MIX] key	: Prog Mixer section
[FLT/ZONE] key	: Filter section
[AMP/PITCH] key	: AMP (Amplifire) section
[EG/MIDI] key	: EG section
[LFO/CTRL] key	: LFO section
[FX/FX] key	: Prog Fx (Effect) section
[CMN/CMN] key	: Prog Common section

OSC/TIMB MIX/MIX FLT/ZONE AMP/PITCH

EG/MIDI LFO/CTRL FX/FX CMN/CMN
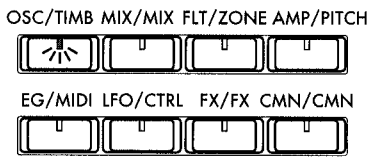
MultiSet Edit mode

① In MultiSet Play mode, select the MultiSet that you wish to edit. (Refer to "Playing a MultiSet.") If you wish to start editing from an initialized state, refer to "Initializing settings (Init)".

② To select the desired section of MultiSet Edit mode, press the appropriate section key to make the LED light. (The [MULTI] key LED will blink.)

[OSC/TIMB] key	: Timbre section
[MIX/MIX] key	: Multi Mixer section
[FLT/ZONE] key	: Filter section
[AMP/PITCH] key	: Pitch section
[EG/MIDI] key	: Multi MIDI section
[LFO/CTRL] key	: Ctrl Fltr (Controller Filter) section
[FX/FX] key	: Multi Fx (Effect) section
[CMN/CMN] key	: Multi Common section

Arpeggio mode

① In Program Play mode or MultiSet Play mode, select the arpeggio pattern that you wish to edit. (Refer to "Selecting an arpeggio pattern.")

② Press the [ARPEGGIO] key to enter Arpeggio mode. (The LED will blink.)

MIDI mode

✧ Press the [MIDI] key to enter MIDI mode. (The LED will blink.)

Global mode

✧ Press the [GLOBAL] key to enter Global mode. (The LED will blink.)

ARPEGGIO   MIDI   GLOBAL CO
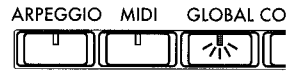
❏ Select a page

Select the page that you wish to edit. There are two ways to do this.

✧ Press the [◀] key or the [▶] key to select a page.

✧ Press the [JUMP] key (the LED will blink) to access a page menu in the lower part of the LCD. Then press the desired knob [1] to [5] to make your selection. (Example: Program Edit mode)

PAGE/USER GROUP
◀   ▶

┌DEMO┐

JUMP   TAB
└MENU┘

(Portamento)
         NORMAL Time:18   ＭＢ**OFF**ＣＤ+00
(Pitch Bend)
 Set Up OSC1   OSC2   SubOSC   Noise

—— Page menu

1   2   3   4   5
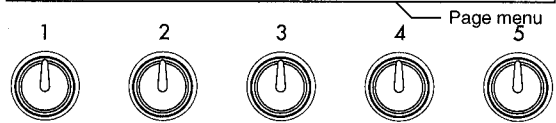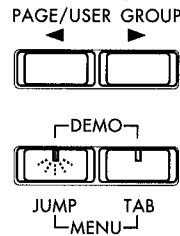
Some pages of Program Play mode are further divided using "tabs." These can be selected in two ways.

✧ Press the [◀] key or the [▶] key to select a page.

✧ Press the [TAB] key (the LED will blink), and the tab menu for that section will appear in the lower part of the LCD. Then press the desired knob [1] to [5] to make your selection. (Example: Program Edit mode)

Oct:8' Semi+08 Fine+00 Ofst+00.0[Hz]
(Mod.) 1.ＭＢ   LFO1 ＣＤ-44+[ＭＢ**OFF**ＣＤ+00]
       2.ＭＢ**OFF**ＣＤ+00
 Pitch Wave   Form   Shape

—— Tub menu

1   2   3   4   5
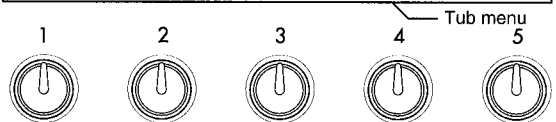
❏ Moving the cursor

In Program Edit mode, MultiSet Edit mode, Arpeggio mode, MIDI mode and Global mode, two or more parameters will be shown simultaneously in the LCD. If you wish to modify the value of a parameter, you will need to move the cursor to the desired parameter. Use the CURSOR [▼] and [▲] keys and knobs [1] to [5] to move the cursor.

13

Moving the cursor vertically

✧ Press the CURSOR [▼] key or [▲] key, and the cursor will move upward or downward.

CURSOR/CATEGORY
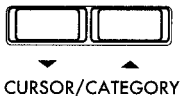
✧ When you press a knob [1] to [5] that corresponds to the currently-selected parameter, the cursor will move downward.

Moving the cursor horizontally

✧ When you press a knob [1] to [5], the cursor will move to the corresponding parameter on the line where the cursor is located.

✧ When you rotate a knob [1] to [5], the cursor will move to the parameter which corresponds to the knob which was rotated, allowing you to modify the value of that parameter.

1   2   3   4   5
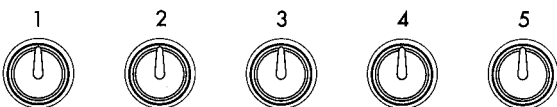
Other list-type pages

Some edit pages display lists for editing. List-type pages include the following.

● MIDI Multi Map page ● MIDI CChg Filter page
● CMN Mod. Src List page ● MIDI Prog Map page

In these pages, knob [1] (↑ List ↓) will scroll the list. Even in this case, you can still move the cursor vertically in the same way as described above in "Moving vertically."

❏ Inputting values

There are several ways in which a value can be input for the parameter highlighted by the cursor. Use the method that is most appropriate for the range of settings or the display format of the parameter that is being set.

✧ You can rotate a knob [1] to [5] to modify the value.

✧ You can press the [+] key or [–] key to modify the value. The value will increase or decrease in steps of one. If you continue holding the key the value will continue to change. This is a good method for adjusting a parameter that has a narrow range of settings, or for making fine adjustments to a parameter that has a wide range of settings.

VALUE/PROGRAM
–   +
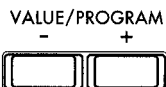
✧ You can use the numeric keys [0] to [9] to enter a value. Even for parameters whose value is not a number, the numeric keys can be used to enter a value that corresponds to the number you entered.

Enter numerals beginning with the highest place. The number of key presses required to finalize a value will depend on the range of the individual parameter (0 to 9 or 000 to 127 etc.). If the setting is not yet finalized even though you have entered the desired number, press the [ENTER] key to finalize it.

If the number that you entered would exceed the maximum value of the parameter, the maximum value will be entered. If it would exceed the minimum value, the minimum value will be entered. If the range of possible values is discontinuous, the next lowest number that is a valid setting for that parameter will be entered.

✧ To input a negative (–) sign, press the [–/ 10's HOLD] key. Thereafter, subsequent presses will switch the sign of the number between positive and negative. Press the [ENTER] key to finalize the value.

7   8   9   WRITE

4   5   6   UTILITY

1   2   3   UNDO

–/10's HOLD   0   EXIT/NO   ENTER/YES
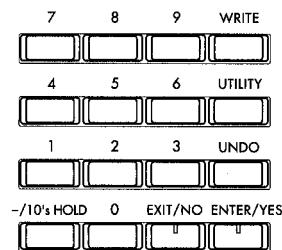
✧ You can press a note on the keyboard to enter a value. For parameters whose value is a note name (C to B, or C-1 to G9), or parameters related to key velocity, hold down the corresponding knob and play a note on the keyboard to enter that note name or velocity as the setting.

In this case, the note number will not be affected by the "Transpose" setting (GLB Basic page) or the octave up/down setting.

Parameters that require you to press the [ENTER] key

For some parameters, you must press the [ENTER] key to validate the setting after using one of the above methods to specify the value.

❏ Saving the modified settings

After you have finished editing, you can save the changes that you have made. Refer to "Saving data."

4. Program editing (Program Edit mode)

Although you can use the realtime editor or performance editor to edit the sound while you are still in Program Play mode, there are limitations on the parameters which can be edited.

In Program Edit mode you can freely edit all parameters, either to modify the sound of an existing program or to create a completely new sound.

⚠️ After editing program parameters, you will need to execute the Write operation (see p.26) if you wish to keep your edits.

❑ How a Program is organized

The Z1's programs are organized as follows.

OSC (Oscillator) section

This section is where the basic waveform of the sound is produced.

Oscillator 1/2

Thirteen types of tone generator (oscillator type) are provided. You can combine two of these oscillator types, and make settings to specify the basic pitch and other aspects of the sound. However some oscillator types can be used only by themselves.

Sub Oscillator

You can select one of four types of basic waveform. Pitch-related settings can be made in the same way as for OSC 1/2.

Noise Generator

This produces white noise. The white noise can be sent through a multi-mode filter (low pass filter, high pass filter, band pass filter).

Prog Mixer section

Here, the signals from oscillator 1/2, the sub oscillator, and noise generator are mixed with the feedback from the AMP section, and output to multi-mode filters 1 and 2 (the Filter section).

Filter section

This section processes the waveform by attenuating or boosting specific frequency regions of the sound. Two multi-mode filters are provided. You can specify the type of each filter (low pass filter, high pass filter, band pass filter, band reject filter, dual band pass filter). This section allows you to modify the brightness of the sound. You can also specify how the two filters, the MIXER section and the AMP section will be connected.

AMP (Amplifier) section

This section creates time-varying changes in the volume that is output from the FILTER section. Two independent amps are provided. The signal that is input to each amp will depend on the way in which connections have been made in the filter section.

The AMP section also provides amp envelope generators (Amp EG) that can be used to control the amps.

Prog Fx (Effect) section

This section applies effects to the signal that is output from the AMP section. Effect units 1 and 2 provide fifteen types of effect including modulation-type effects and exciter. The master effect unit provides delay, hall reverb, or room reverb. A two-band EQ is also provided in this section. Each effect unit (effect units 1 and 2, and the master effect unit) can produce one type of effect at a time.

EG section

This section contains four general-purpose envelope generators (EG). The four EGs of the EG section can be used as modulation sources for the parameters of other sections, in order to create time-varying changes in the sound.

LFO section

This section contains four general-purpose LFOs. The four LFOs of the LFO section can be used as modulation sources for the parameters of other sections, in order to create cyclic changes in the sound.

Prog Common section

The Prog Common section is where you assign a name to the program, and specify the function of the keyboard and controllers (knobs [1] to [5], [X-Y PAD] etc.).
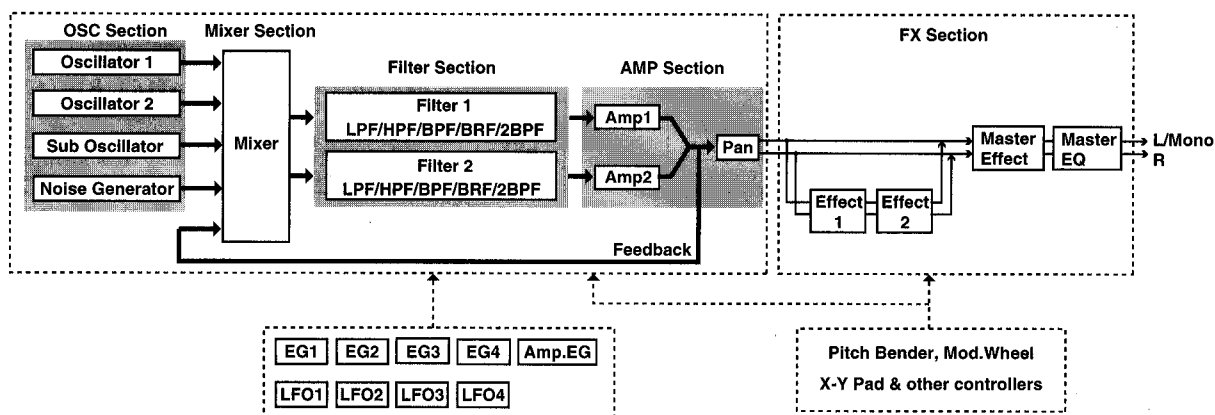
❏ Filter settings (Filter section)

The filter attenuates or boosts specific frequency regions of the sound produced by the oscillator, thus making the sound brighter or darker. Filter settings can make dramatic differences in the tone.

The Z1 provides two filters, each of which can be used as one of five filter types. The characteristics of each filter can be modified freely, allowing a wide range of tonal changes to be created.

This section will provide a simple explanation of what the filter does.
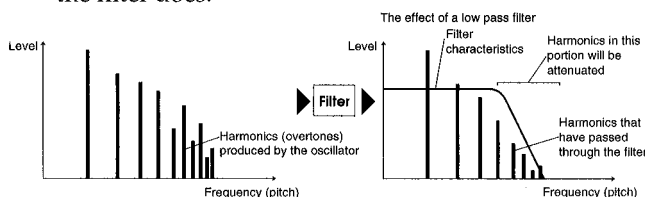
① Enter Program Play mode, and select the program number that you wish to edit. (Refer to "Playing a program.")

② Press the [FLT] key (the LED will light) to access the Filter section.

③ Press the [JUMP] key, and then press knob [1] (Route) to access the Filter Routing page.
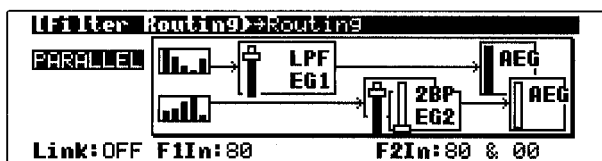
④ Press knob [1] several times to move the cursor to "Routing" (this will indicate either SERIAL1, SERIAL2, or PARALLEL).

⑤ Either press knob [1] to specify the routing. On the Z1, the way in which the two filters are connected is referred to as the routing. This setting will also determine the way in which the mixer → filter → amp are connected. There are three selections for routing: "Serial1," "Serial2" and "Parallel" (see p.52).

⑥ In this example we will check the setting of filter 1. Press the [JUMP] key, and then press knob [2] to move to the Filter1 page (you may also use the [▶] key).
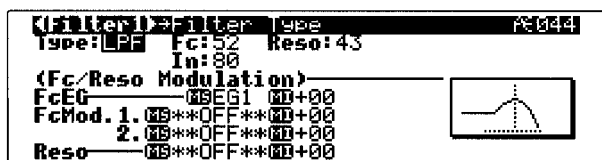
⑦ Press knob [1] to move the cursor to "Filter Type." Either by rotating knob [1] or by pressing the [+] or [−] key, set the filter type to one of the following choices: **LPF** (low pass filter), **HPF** (high pass filter), **BPF** (band pass filter), **BRF** (band reject filter), or **2BPF** (dual band pass filter). Then press the [ENTER] key. Notice how changing the filter type has affected the sound (see p.53).

⑧ Press knob [2] to move the cursor to "Fc (Cutoff Frequency)." Rotate knob [2] to modify the setting, and the brightness of the sound will change. For example if you have selected the **LPF** ("Filter Type") that is frequently used with synthesizers, higher values will cause the sound to be brighter, and lower values will cause the sound to be darker. This is because the upper frequency limit (cutoff frequency) of the sound that passes through the filter is being modified. This value can also be controlled in Program Play mode by rotating the Filter 1 knob [CUTOFF].

⑨ Press knob [3] to move the cursor to "Reso (Resonance)." Rotate knob [3] to modify the value, and notice that the tone takes on a unique character. This is because the frequency range surrounding the area of the cutoff frequency is being boosted (see p.53). This value can also be controlled in Program Play mode by rotating the Filter 1 knob [RESONANCE].

⑩ You can use a modulation source (see p.19) to control the cutoff frequency or resonance. Rotate knob [2] to lower the "Fc (Cutoff Frequency)" value (to about 10). Press knob [2] twice to move the cursor to "FcEG-🔀 (Cutoff Frequency Mod. EG Source). " Either rotate knob [2] or press the [+] key or [−] key to select an EG which will create time-variant change in the cutoff frequency. Next rotate knob [3] to raise the "FcEG-🔀 (Cutoff Frequency Mod. EG Intensity)" value (to about 90). Play the keyboard and notice how the cutoff frequency changes over time. This value can also be controlled in Program Play mode by rotating the Filter 1 knob [EG INT.].

⑪ You can make settings for the EG (EG 1 to 4, amp EG) that will vary the cutoff frequency. For example, the sound of a piano note is bright at the moment that the note is played, and then gradually becomes darker (more mellow). Depending on how it is played, a violin allows the tone of a note to be varied during the duration of the note. Settings for EG1 to 4 are made in the EG section. Settings for the amp EG are made in the AMP section. In this example we will make settings for **EG1**. Set "FcEG-🔀" to EG1.

⑫ Press the [EG] key to move to the EG section.

⑬ Press the [JUMP] key, and then press knob [1] (EG1) to access the EG1 page.
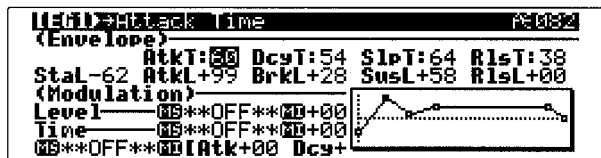
⑭ Use the [▼] key or the [▲] key, or knobs [1] to [5] to modify the values of "AtkT (Attack Time)," "DcyT (Decay Time)," "SlpT (Slope Time)," "RlsT (Release Time)," "StaL (Start Level)," "AtkL (Attack Level)," "BrkL (Break Level)," "SusL (Sustain Level)" and "RlsL (Release Level)." Play the keyboard and notice the result

of the changes you have made. For an explanation of each parameter, refer to p.57. These values can also be controlled in Program Play mode by rotating the various Filter EG knobs.

❑ Amp settings (AMP section)

The amp creates time-variant change in the volume. The time-variant change we are speaking of here is change such as "a rapid attack after a note is struck" or "a gradual decay." For example a note played on a piano reaches its maximum volume immediately, and then gradually decays to silence. A note played on an organ will maintain the same volume until it is released. Depending on the playing technique, the volume of a note played on a violin can be varied while the note continues to sound. It is the role of the AMP section to control this type of volume change.
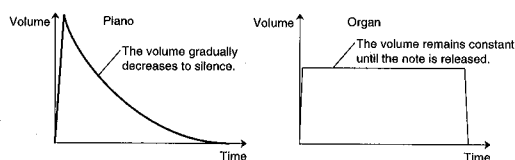
① Press the [AMP] key (the LED will light) to access the AMP section.

'ZONE AMP/PITCH

② Press the [JUMP] key, and then press knob [1] (Amp 1/2) to access the Amplitude page.
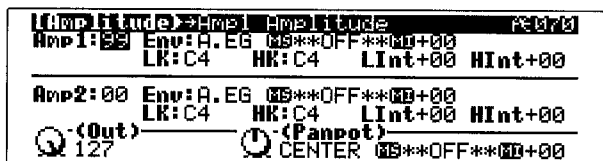
③ Press knob [2] several times to move the cursor to the "Env (Amp1 Amp Mod.EG)", and then rotate knob [2] to select one of the EGs. In this example we will select **A.EG**.

④ Press the [▶] key to access the AmpEG page.
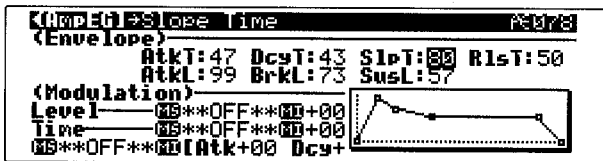
⑤ Press knob [2] several times to move the cursor to the "AtkL (Attack Level)" line, and rotate knob [2] to raise the "AtkL (Attack Level)" setting to **99**. This will cause the attack to reach the maximum volume. Press the [▲] key, and then rotate knob [2] to modify the "AtkT (Attack Time)" value. Play the keyboard and notice how the attack changes.

⑥ Go on and try modifying the values of "DcyT (Decay Time)," "SlpT (Slope Time)," "RlsT (Release Time)," "BrkL (Break Level)," and "SusL (Sustain Level)," and notice the result. For an explanation of these param-

eters, refer to p.55. These values can also be controlled in Program Play mode by rotating the various AMP ENVELOPE knobs.

⑦ The AMP section Amplitude page also contains settings such as "Output Level" which determines the output volume and "Panpot" which determines the stereo location (pan) of the signal that is sent to the effects (discussed in the following section).

❑ Effect settings (Prog Fx section)

The Prog Fx (effects) section contains three effect units: Effect 1 (Fx1), Effect 2 (Fx2), and the Master Effect (Mst.Fx).

The sound produced by the OSC, MIXER, FILTER and AMP sections is processed by these effects. Fx1 and Fx2 can respectively apply one of 15 different types of effect. Mst.Fx can apply one of three types of reverb-type effect. The sound is then sent through the Mst.EQ for final adjustment.

Effect 1 (Fx1) / Effect 2 (Fx2)

Fx1 and Fx2 are normally used as part of the sound-creating process. Fifteen different effects can be selected, including effects such as overdrive, equalizer, compressor and exciter which modify the tone or dynamics, effects such as rotary speaker which help create the character of a particular instrument, and effects such as chorus and delay which add spaciousness or reverberation. Up to two effects can be connected in series. However if either Talking Modulator, Multitap Delay, Ensemble or Rotary Speaker (L) is selected for Fx1, only one of these effects can be used.

Master effect (Mst.Fx)

The master effect is normally used to perform sound field processing for the entire program.
You can select one of three sound-field effects: delay, hall reverb or room reverb.
A Low/High type shelving EQ is also provided before the L/MONO and R outputs. This allows you to make final adjustments to the tone.

### Effect input and output

The input level to each of the Fx1, Fx2 and Mst.Fx effects is specified by "Effect Send," relative to the output level of the AMP section "Output Level." In addition, "Fx Balance" adjusts the balance between the sound processed by the effect and the unprocessed sound. The Fx1 and Fx2 effects Overdrive to Rotary Speaker (S) will output the processed sound in monaural, and the Fx1 Talking Modulator to Rotary Speaker (L) effects will output the processed sound in stereo. In either case, the unprocessed sound is output according to the "Panpot" setting from the AMP section. Master Effect combines the Fx1, Fx2 and unprocessed sound and outputs it in stereo.
Each effect can be switched on/off using [SW1], [SW2] or ASSIGNABLE SW (see p.62). If each "Fx SW" parameter is switched **OFF**, the effect will be bypassed.

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It is also possible to specify that the master effect will always be bypassed (see p.94).

① Press the [FX] key (the LED will light) to access the Prog Fx section.

CTRL FX/FX CMN
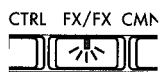
② Press the [JUMP] key, and then press knob [1] (Set Up) to access the Effect Set Up page (see p.59).

```
┌─────────────────────────────────────┐
│ LEffect Set UpDEffect Send    PAL50  │
│          ┌Fx1┐┌Fx2┐┌M.Fx┐ ┌M.EQ──  │
│ FxSend   │PEQ││Wah││Hall│ │High:00  │
│ Q=====   │ Q ││ Q ││ Q │ │+00.0dB  │
│ 100%     │   ││   ││   │ │Low:     │
│ MB**OFF**│100%││100%││020%││+00.0dB │
│   MD+00  │─ON─││─ON─││─ON─│        │
└─────────────────────────────────────┘
```
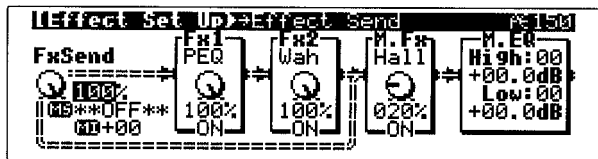
③ Press knob [1] several times to move the cursor to "Effect send."

④ Either rotate knob [1] or press the [+] or [-] key to set the balance between the level that will be sent to Fx1 and Fx2, and the level that will be sent to Mst.Fx. Raising the % will increase the level that is sent to Fx1 and Fx2.

⑤ Either rotate knob [2] or press the [+] or [-] key to select the effect type that will be used by Fx1. For details on each type, refer to p.64 to 74. After making your selection, press the [ENTER] key to execute.

⑥ Press the [▼] key to increase the "Fx1 Balance" setting, so that the effect sound will be prominent in the balance between the processed sound and the direct sound.

⑦ In order to use the effect, make sure that the "Fx1 SW" is **ON**.

⑧ In the same way as in steps ⑤ to ⑦, use knob [3] to make settings for Fx2, and use knob [4] to make settings for Mst.Fx. You can use knob [5] to adjust the Mst.EQ.

⑨ Press the [JUMP] key, then press a knob [2] to [5] to select the effect (or EQ) that you wish to edit, and make settings for the various parameters. For details refer to p.64 to 76.

❏ Oscillator settings (OSC section)

The oscillator section produces the waveform, which is the most important factor that determines the tone. One way to edit a program is to start with a program that is close to the desired sound. However when creating a sound from scratch, you will normally decide on the oscillator type before moving to the other sections to complete the sound.

① Enter Program Play mode, and select the program number that you wish to use as the basis for the program that you will create (refer to "Playing a program"). If you wish to begin editing from an initialized state, refer to "Initializing settings (Init)" (see p.28).

② Press the [OSC] key (the LED will light) to access the OSC section.

OSC/TIMB MIX/M

③ Press the [JUMP] key, and then press knob [1] (Set Up) to access the OSC Set Up page.

```
┌─────────────────────────────────────┐
│ LOSC Set UpDOSC Type                 │
│ OSC1+01:Standard_OSC                 │
│ OSC2+ 1:Standard_OSC                 │
│ (Common Pitch Mod.)────MB**OFF**MD+00│
│ (Portamento)                         │
│        NORMAL Time:00  MB**OFF**MD+00 │
│ (Pitch Bend)                         │
│      (+):+12 +Stp:0  (-):-12 -Stp:0  │
└─────────────────────────────────────┘
```
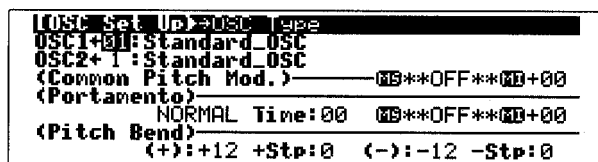
④ Press knob [1] several times to move the cursor to "OSC1 (OSC Type)."

⑤ Either rotate knob [1] or press the [+] or [-] key to select the oscillator type. After selecting the oscillator type, press the [ENTER] key to execute.

01: Standard OSC
This simulates the oscillator of an analog synthesizer. It can produce the same effects as an analog synthesizer, such as pulse width modulation (see p.32).

02: Comb Filter OSC
This oscillator creates pitched sound from noise or an impulse. It can create a wide variety of sounds — not only noisy sounds, but also sounds ranging from synth-bass to strings (see p.34).

03: VPM OSC (Variable Phase Modulation OSC)
This oscillator uses phase modulation to create overtones. By modulating the phase of two oscillators and using a wave shaping table to process the sound, rich overtones can be produced (see p.36).

04: Resonance OSC
This oscillator uses four tunable filters which are set up in series. Noise is input through the filter bank for very ethereal sounds (see p.37).

05: Ring Modulation OSC
06: Cross Modulation OSC
07: Sync Modulation OSC (oscillator sync)
These are special oscillators which simulate the effect of two oscillators which are used to modulate each other, which was a technique that was possible on analog synthesizers. These are especially suitable for producing sounds that are rich in overtones, such as bells, metallic sounds or gongs (see p.39, p.40).

08: Organ Model
This simulates a drawbar organ with three drawbars (when one oscillator is used) or six drawbars (when two oscillators are used) (see p.40). Since each drawbar can use one of four types of waveform, a wide range of tones can be produced.

09: Electric Piano Model
This is a physical model which simulates a warm, vintage electric piano sound (see p.41).

10: Brass Model
This is a physical model which simulates a brass instrument such as a trumpet or trombone (see p.42).

11: Reed Model
This is a physical model which simulates a wind instrument such as a saxophone or flute (see p.44).

12: Plucked String Model
This is a physical model which simulates a plucked string instrument such as a guitar or bass guitar (see p.45).

13: Bowed String Model
This is a physical model which simulates a bowed string instrument (see p.48).

On the Z1, you can select one of 13 types of oscillator for OSC1. If an oscillator type **1** to **9** is selected for OSC1, you will also be able to select an oscillator type **1** to **9** for OSC2. In addition, you can add the sub-oscillator and noise generator to create the desired sound. Here we will be giving a simple example using the Standard OSC. For details refer to the explanations on p.32 to 34.

Select **01:Standard_OSC** for OSC1, and press the [EN-TER] key.

⑥ Press the [▶] key to access the OSC1 page. In this page you can make settings for the oscillator that was selected in the OSC Set Up page "OSC1 (OSC Type)." The parameters in this page are further grouped into several tabs. In the first tab you can specify the basic pitch of the oscillator. Move the cursor to the "Oct" line, and rotate knobs [1] to [4] to specify the basic pitch.
Press the [▼] key to move to the "⬛⬛" and "⬛⬛" line, and you can specify a modulation source and modulation intensity that will control the pitch.

```
【OSC1】→Octave                         P100
╱Pitch ╲ Wave    Form    Shape
<Standard>
Oct:█▉█ Semi+00 Fine+00 Ofst+00.0[Hz]
(Mod.) 1.█▉  LFO1  █▉+00+[█▉**OFF**█▉+00]
       2.█▉**OFF**█▉+00]
   (Slope)   Key:C4   LS+1.00 HS+1.00
```
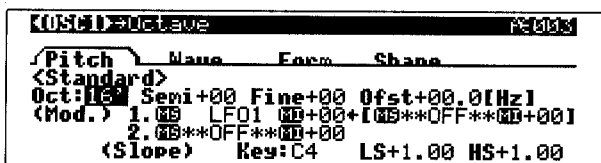
⑦ Press the [TAB] key to move to the desired tab page. Press knob [2] (Wave) to move to the Wave Select page.

```
【OSC1】→Wave                          P14?
 Pitch  ╱ Wave ╲ Form    Shape
<Standard>
(Wave)
Wave:█▉█ Edge:99        Lvl:99
(Triangle)              (Sin)
Lvl:00   Phase+00       Lvl:00
```
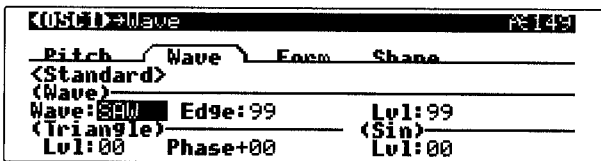
⑧ Press the [▼] or [▲] key to move the cursor to the "Wave (Wave Select)" line.

⑨ Rotate knob [1] to modify the value of "Wave (Wave Select)." Play the keyboard, and notice how the sound changes depending on whether the sawtooth (SAW) or the pulse (PULSE) waveform is selected.

⑩ Press the [▶] key to move to the Wave Form page.

```
【OSC1】→Wave Form                     P15?
 Pitch    Wave  ╱ Form ╲ Shape
<Standard>
(Wave Form)
Form█▉█   █▉LFO1█▉+00    █▉**OFF**█▉+00
```
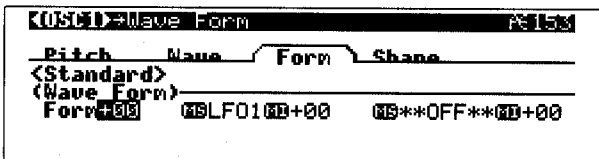
⑪ Rotate knob [3] to modify the value of "Wave Form Mod.LFO Intensity," and the way in which the sound is being modulated will change. This parameter adjusts the width of the LFO waveform selected by "Wave Form Mod.LFO" that is modulating the amplitude of the "Wave Select" waveform.

⑫ The LFO (1 to 4) settings that you heard in step ⑪ can be adjusted in the LFO section. Press the [LFO] key to move to the LFO section, and modify the parameters of the LFO that you selected for "Wave Form Mod.LFO."

❏ **Adjusting the volume of each oscillator (Prog Mixer section)**

❖ Press the [MIX] key (the LED will light) to access the Prog Mixer section. Here you can adjust the balance between the output volumes of oscillators 1 and 2, the sub-oscillator, the noise generator, and of the feedback from the amp section. These settings will determine the signal levels that are sent to the multi-mode filters 1 and 2 (the Filter section) (see p.51).

```
TIMB MIX/MIX FLT,
```

❏ **About keyboard tracking**
Keyboard tracking refers to the way in which the keyboard location can modify aspects of the sound such as pitch, tone and volume. Keyboard tracking is used mainly to compensate for irregularities in pitch, tone or volume which may occur when a sound is played over a wide range of pitches.

❏ **EG and LFO (EG/LFO section)**
An EG (Envelope Generator) applies time-variant change to a parameter, causing the pitch, tone or volume to change.
An LFO (Low Frequency Oscillator) applies cyclic change to a parameter. Using an LFO to cyclically modulate the pitch will produce the effect known as vibrato, which is often heard in a vocal or string instrument performance. Cyclically modulating the tone will produce a wah effect, which you have probably heard used by a muted trumpet or by an electric guitarist playing through a wah pedal. Cyclically modulating the volume will produce a tremolo effect, often heard on electric piano or electric guitar.

❏ **Modulation sources and intensity**
The Z1 has various modulation source (Mod.Source) and modulation intensity (Mod.Intensity) parameters. During editing, these parameters are indicated in the LCD as "⬛⬛" and "⬛⬛."

Modulation sources are control sources which can be used to control a specified parameter. For the tone generator section you can select from 48 modulation sources, and for the effect section you can select from

19

35 modulation sources (see p.104). You can also control the sound by using an EG or LFO (tone generator section only), and by using controllers such as aftertouch, the [MOD WHEEL] or the [X-Y PAD] while you play.

Modulation intensity determines the depth and direction of the control that the modulation source will perform. Since some parameters can have more than one modulation source and intensity, the sound can be controlled in highly complex ways.

As an example, let's use the [X-Y PAD] to control the effect balance amount.

① Refer to "Effect settings (Prog Fx section)" steps ① to ④, and set the "Effect Send" to **10%**.

② Press knob [1], and then press numeric keys [2], then [4], then the [ENTER] key to set "Effect Send Mod.Source" to **X[+]**.

③ Press knob [1], and then rotate knob [1] to set "Effect Send Mod.Intensity" to **+50**.

In this example, the normal effect balance will be **10%**, and when you move your finger on the [X-Y PAD] (from the center) toward the right, the proportion of the effect will gradually increase, and will reach the maximum when you reach the right edge of the pad. At this time, the effect balance will be **60%**. When the modulation source is at maximum, the actual value of the parameter will be the "parameter value" + the "Mod.Intensity" value.
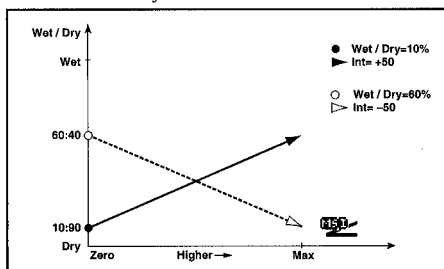
Setting and checking the modulation source

You can view a list of the parameters to which a modulation source is assigned, and check or modify the modulation source (see p.62).

❏ Performance editor assignments

For each program, you can assign program parameters to knobs [1] to [5], so that the sound can be modified by rotating the knobs. Four program parameters can be assigned to each knob.

① Press the [CMN] key (the LED will light) to access the Prog Common section.
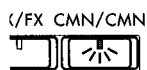
② Press the [JUMP] key, and then press knob [4] (PE Def) to access the CMN PE Define page. The display will show the parameters which can be assigned to each

knob and the upper and lower limits of their range. To specify parameters for assignment to another knob [1] to [5], press the [TAB] key, then press the knob for which you wish to make the assignment, and then make the desired setting.

③ Rotate knob [1], and the available parameters will be displayed successively. Here you can select the parameters to be assigned to each knob ([1] to [5]).

④ Rotate knob [3], and specify the parameter value that will be in effect when the knob ([1] to [5]) is rotated far left in Program Play mode (or MultiSet Play mode). Try different settings while listening to the result. The displayed value indicates the percentage relative to the Program Edit mode setting.
Knob [4] specifies the sound that will result when the knob is rotated far right. Set the value in the same way as described above. If you press knob [1] and return to the "Assign Parameter" that you checked in step ③, you will notice that the sound has changed. This is because the assigned parameter will return to the value of its setting.

⑤ Knob [5] ("LINER") allows you to choose one of four curves by which the sound will change when the knob ([1] to [5]) specified in step ④ is operated (see p.63).

Using the UTILITY function to make settings

When you move the cursor to the parameters of the various pages (the display will be highlighted), a PE number may be displayed in the upper right of the LCD. At this time, you can register this parameter in the performance editor.

① Press the [UTILITY] key.

② Press knob [2] (PE Def), and the utility menu will appear.

③ Rotate knob [2] to select the knob for which you wish to make a performance editor assignment.

④ Press the [ENTER] key. The cursor will move to the performance editor knob that you specified in step ③ for Prog Common section CME PE Define page step.

⑤ Refer to steps ④ to ⑤ of "Performance editor assignments," above, and make performance editor settings.

⑥ When you finish making settings, press the [UTILITY] key, and then press knob [2] (Return) to return to the location where you had been editing.

5. Editing a MultiSet (MultiSet Edit mode)

In MultiSet Edit mode, you can combine up to 6 programs (without their effect settings), and make settings for volume and pan (stereo location), effect send level, keyboard area and velocity range, and restrictions on MIDI message control for each program.

After editing parameters, you will need to execute the Write operation (see p.26) if you wish to keep your edits.

Be aware that if the programs assigned to a MultiSet are modified in Program Edit mode, the sound of the MultiSet will also change.

❑ How a MultiSet is organized

On the Z1, a MultiSet is organized as shown in the following diagram.

Multi TIMB (Timbre) section

Specify a program for each of the six timbres (Timbre 1 to 6), and specify the maximum number of notes for each timbre.

Multi MIX (Mixer) section

For each timbre, adjust the level, panpot, and effect balance.

Multi Zone section

For each timbre, specify the keyboard range and velocity range. The settings in this section allow you create layered, split, and velocity-switched MultiSets.

Multi Pitch section

For each timbre, specify the scale, transpose setting, and detune setting. The timbre played by the arpeggiator can also be specified here.

Multi MIDI section

Specify the MIDI channel for each timbre. You can also specify whether or not external MIDI program changes will be received. When you wish to control the Z1 from an external MIDI device and use the Z1 as a multi-timbral tone generator of up to 6 channels, specify the MIDI channels in this section.

Multi CTRL (Control Filter) section

For each timbre, you can specify whether or not each type of controller and MIDI message will be received or ignored. You can also specify that the pitch bend width of the program used by each timbre be set to a unified pitch bend width.

Multi Fx (Effect) section

You can make programmable multi-effect settings in the same way as for a program. The settings of effect units 1 and 2 are adjusted for each timbre by the Multi MIX section Effect Balance parameter.

Multi CMN (Common) section

Specify the name of the MultiSet, pitch bend settings used only for the MultiSet, scale type, and the function of the assignable switches.

❑ Selecting the Timbre Programs

① Enter MultiSet Play mode, and select the MultiSet number that will be the basis for the MultiSet that you wish to create (refer to "Playing a MultiSet"). If you wish to begin editing from an initialized state, refer to "Initializing the settings (Init)."

② Press the [TIMB] key (the LED will light) to access the Multi Timbre section.

OSC/TIMB MIX/M

③ Press the [▼] or [▲] key to select the timbre to which you wish to assign a program.

④ Press knob [1] and specify the maximum number of simultaneous notes for that timbre. The upper right of the LCD will indicate "VoiceReserve (Total=*/12 [or 18])." The area of "*" indicates the total number of notes for each timbre, and "12 (or 18)" indicates the maximum simultaneous note capacity of the Z1. It is not possible to specify a number of maximum simultaneous notes that would exceed this total. Either rotate knob [1] or press the [+] or [-] key to input the value, and then press the [ENTER] key to confirm the setting.

⑤ Use knob [2] to specify the program bank. Input the value by either rotating knob [2] or by pressing the [+] or [–] key, and then press the [ENTER] key to finalize the value.

⑥ Use knob [3] to specify the program number. Input the value by either rotating knob [3] or by pressing the [+] or [–] key, and then press the [ENTER] key to finalize the value. You can also use the numeric keys for input.

Only internal programs can be used by an internal MultiSet. Even if a card is inserted, card programs cannot be used. Similarly, card MultiSets cannot use internal programs.

21
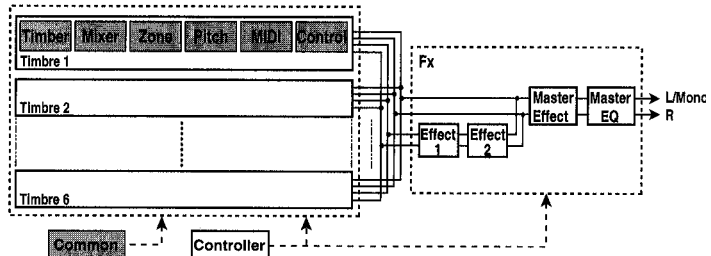
❑ Adjusting the volume, pan, and effect amount

① Press the [MIX] key (the LED will light) to access the Multi Mixer section.

IMB MIX/MIX FLT/
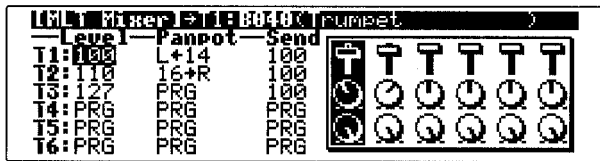
② Use knob [1] to adjust the volume for each timbre of the MultiSet, and use knob [2] to adjust the panpot (stereo location). As you modify these values, the overall volume balance and panning will change. Use knob [3] to specify the amount of the signal of each timbre that will be sent to the effects. If any setting is set to a value of **PRG**, the volume, panpot and effect balance settings of the assigned program will be used (see p.77).

❑ Specifying the way in which different keyboard areas or playing strengths will be sounded

① Press the [ZONE] key (the LED will light) to access the Multi Zone section.

AIX FLT/ZONE AM
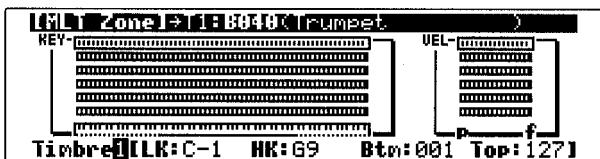
② Rotate knob [1] to select the timbre for which you wish to make keyboard zone and velocity zone settings.

③ While pressing knob [2], play a note on the keyboard and that note will be specified as the lowest note for which the selected timbre will sound. In the same way, hold down knob [3] and play a note on the keyboard to specify the highest note for which the selected timbre will sound. You can also specify these settings by rotating knob [2] or knob [3], or by pressing the [+] or [–] key.
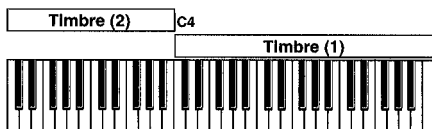
By specifying the keyboard area in this way, you can create split-type MultiSets in which (as shown in the diagram) the electric piano program that is assigned to timbre (1) will play only in the area from **C4** and above, and the bass program that is assigned to timbre (2) will play only in the area of **B3** and below.

④ Hold down knob [4] and play a note, and the velocity (strength) at which you played the note will be entered as the lowest velocity for which the selected timbre will sound. In the same way, hold down knob [5] and play a note to specify the highest velocity which will sound the timbre. You can also specify these settings by rotating knob [4] and knob [5], or by using pressing the [+] or [–] key.
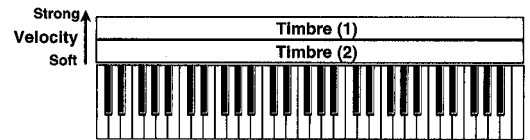
In this way, you can create a velocity-switched MultiSet in which different timbres will sound in response to notes played at different strengths.

❑ Effect settings

In a MultiSet, the effect settings for each program are ignored, and the effect settings that are made in MultiSet Edit mode will be used.

Effects for a MultiSet are basically the same as effects for a program, and provide three effect units (Fx1, Fx2, and Mst.Fx). However the input section to the effects is different; "Fx Balance" will specify the level at which each timbre is sent to Fx1, Fx2 and Mst.Fx relative to the Multi Mixer section "Level" output volume.

Copying effect settings from a program or from another MultiSet
You can use a utility function to copy effect settings from a specific program or MultiSet (see p.28 and p.105).

❑ Restricting the controllers or editor for each timbre

The Multi CTRL (Control Filter) section lets you specify which timbres will respond when the Z1's controllers and editors are operated or when MIDI messages are received from an external MIDI device. In the above example of a split-type MultiSet, you could make settings so that operating the [PITCH BENDER] would affect the pitch of only the bass program being played by timbre (2), and operating the damper pedal would apply the damper effect only to the piano program being played by timbre (1). For details refer to p.80.

❑ Editing other MultiSet parameters

You can also vary the pitch of the timbres to create riches sounds (refer to the Multi Pitch section, p.78), and specify a different MIDI channel for each timbre so that the Z1 can be used as a multi-timbral MIDI tone generator (refer to p.79 and p.97).

6. Arpeggio editing (Arpeggio mode)

In Arpeggio mode you can make settings which determine the basic operation of the arpeggiator. For the preset patterns, you can specify the resolution, and the velocity and duration of the notes in the arpeggio. User patterns allow you to create arpeggio patterns of up to 36 steps.

⚠️ If after editing the parameters of an arpeggio pattern, you wish to keep the modified settings, you must perform the Write procedure (see p.26) while still in Arpeggio mode. If you re-select the arpeggio pattern without saving, your edits will be lost.

① In a mode other than Arpeggio mode, use the [PRESET/USER] key and the PATTERN SELECT [UP] key to select the **UP** pattern.

	PRESET	UP	DOWN	ALT1	ALT2	RANDOM
○ USER1	U1-1	U1-2	U1-3	U1-4	U1-5
○ USER2	U2-1	U2-2	U2-3	U2-4	U2-5
○ USER3	U3-1	U3-2	U3-3	U3-4	U3-5

② Press the [ARPEGGIO] key (the LED will blink) to enter Arpeggio mode.

ARPEGGIO MID

③ Make sure that "Sort" is **ON**. This indicates that when the arpeggio is played, notes will be played beginning from the lowest-pitched note (i.e., "sorted"). When this function is on, you will notice that the arpeggio is repeated from the lowest note to the highest note.
Press knob [1] several times to move to the "Sort". Rotate knob [1] to turn "Sort" **OFF**, and try playing the keyboard. The notes of the arpeggio will be sounded in the order that you played them.

```
UTILITY  Basic  →Gate
Sort:ON          |||||||||||||||||||||||||||||||||||||||||||||
                 ScnZone[Bt:C-1  Tp:G9  ]
Gate:050%  Velo:KEY       Swing+00%
```
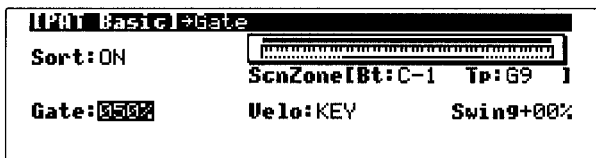
When Arpeggio Pattern is **UP**

If you pressed keys
in the order of
C4 → G4 → E4 → B4 ...

Sort : ON

Sort : OFF

④ Press knob [1] to move to "Gate." This indicates the duration (gate time) of each arpeggio note as a percentage of the note value selected by [RESOLUTION] knob. If the knob [GATE] is at 12 o'clock, arpeggio notes will be sounded with the same duration as the [RESOLUTION] setting. Try changing the "Gate" value and adjusting the knob [GATE] to hear the result.

⑤ Press knob [3] to move to "Velo." Rotate knob [3] to set this to **KEY**. With this setting, the notes of the arpeggio will be sounded at the velocity that you played. Play notes at different strengths, and notice how the resulting arpeggio changes. If you rotate knob [3] to change the value to **001 to 127**, the notes of the arpeggio will be sounded at the fixed velocity that you specify, regardless of the strength at which you played them. When the [VELOCITY] knob is in the 12 o'clock position, notes will be sounded with the velocity that you specify here. Try changing the "Velo" value and moving the [VELOCITY] knob, and listen to the result.

⑥ Press the [▲] key to move to "ScanZone Bottom/Top." Specify the range of the keyboard in which the arpeggiator will function. You can also specify the range by playing a note on the keyboard while you hold down knob [4] or knob [5].

❏ Creating a user pattern

Here let's create the arpeggio pattern shown in the musical example below.

① Rotate the [RESOLUTION] knob to the 8th note setting.

② In a mode other than Arpeggio mode, use the [PRESET/USER PATTERN] key and the [PATTERN SELECT] key to select a user pattern. Press the [ARPEGGIO] key (the LED will blink) to enter Arpeggio mode. If an arpeggio is playing, press the ARPEGGIATOR [ON/OFF] key (the LED will go dark) to turn it off.

③ Press the [JUMP] key, and then move to knob [1] and turn "Sort" **ON**.

④ Rotate knob [1] to set "Gate" to **STEP**, and rotate knob [3] to set "Velocity" to **STEP**. With these settings, the length and velocity of each arpeggio note will be the same as specified by each step. Also set "Swing" to **00%**. For details refer to p.83.

⑤ Now specify the length of the pattern. In the musical example given above, there are eight 8th notes, so press the [▼] key and then rotate knob [1] to set "Length" to **08**. Next rotate the appropriate knobs to set "Type" to **As_Played**, and "Oct" to **UP**.

⑥ Press the [▶] key to move to the PAT Step Param page. Each user pattern has up to 36 steps, and the arpeggiator will play each step in succession at the note value interval specified by the [RESOLUTION] knob. The "Stp" parameter at the left indicates the step number. Here you can specify the Tone for each step, and set step parameters such as "Pitch Offset," "Gate," "Velocity" and "Flam."
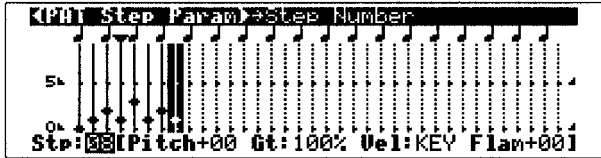
⑦ The "●" on the horizontal lines in the display indicate the Tone that will be played for each step. The solid line extends up to the step that was specified in "Length (PAT Basic page)," and subsequently a dotted line will be displayed. By pressing knob [1] to move the cursor to "Stp" and then using the numeric keys, you can specify the "Tone" or "Tones" that will be played by that step. Operate the numeric keys, and see how the display changes. Pressing [0] will register/erase "Tone0." "Tone0" corresponds to the lowest note that is being played on the keyboard. (When "Sort" is OFF, this will correspond to the first-played note.) In the same way, "Tone1" corresponds to the second-lowest note, and "Tone9" corresponds to the tenth-lowest note. For this example, enter the following settings according to the musical example. You can move backward or forward through the steps using the [+] or [–] keys or the [▼] or [▲] keys.

Stp:01 .... Tone0 [0]
Stp:02 .... Tone1 [1]
Stp:03 .... Tone2 [2]
Stp:04 .... Tone1 [1]
Stp:05 .... Tone3 [3]
Stp:06 .... Tone1 [1]
Stp:07 .... Tone2 [2]
Stp:08 .... Tone1 [1]

⑧ Specify the "Pitch Offset," "Gate," "Velocity" and "Flam" for each step. These parameters have the following effect.

Pitch Offset: Pitch Offset: Raise or lower the scale of the arpeggio notes in semitone steps. By specifying the same tone for each step and changing the "Pitch Offset" value for each step, you can create a melody with one tone.

Gate: This is the length of the arpeggio note. With a setting of **100%**, the note will last the full length of the interval specified by the [RESOLUTION] knob. With a setting of **LEGT**, the note will continue sounding until the next note begins or the pattern ends. With a setting of **OFF**, that step will not sound.

Velocity: This is the strength of the note. With a setting of **KEY**, the note will be sounded with the velocity at which you played the keyboard. With a setting of **001** to **127**, all Tones of that step will be sounded at the specified velocity.

Flam: This specifies how notes will be separated if two or more Tones were specified for the same step. With a setting of **+00**, all Tones will sound simultaneously. With positive (+) settings, notes will be separated beginning with the lowest Tone. With negative (–) settings, notes will be separated beginning with the highest Tone.

For this example, press the [▼] or [▲] key to select the step, and use knobs [1] to [5] to set parameters of Stp:01 to 08 to the following settings.

Pitch+00%   Gt:80%   Vel:100   Flam+00

Now press the ARPEGGIATOR [ON/OFF] key (the LED will light), and hold down the chord shown in the musical example. The arpeggio that you input will be played.

⚠ If the length or velocity of the arpeggio notes are incorrect, set the [GATE] and [VELOCITY] knobs to the 12 o'clock position.

⑨ Try modifying the "Pitch Offset," "Gate" and "Velocity" of each step, and listen to the result. You can also try specifying two or more Tones for the same step to create polyphonic arpeggios, and also try out the "Flam" effect.

❑ Arpeggiator settings in MultiSet

For both MultiSets and programs, the arpeggiator will transmit and receive only on the Global MIDI channel (MIDI mode "Global Channel").

If you wish to play arpeggios with a MultiSet, make the following settings.

① In MultiSet Edit mode, set the Multi MIDI&Arp page "MIDI Ch." (see p.79) setting so that the timbre that will play the arpeggio has the same channel as the global channel.

② In the "Arpeggio" field, select **ENA** for the timbre that you wish to play the arpeggio.

7. Saving data

Data that you have edited in Program Play mode, Program Edit mode, MultiSet Play mode, MultiSet Edit mode or Arpeggio mode can be saved to internal memory, an memory card, or to an external MIDI device which can accept data dumps. Here we will explain the procedure for saving data to internal memory. If you wish to save data on an external MIDI device that can accept data dumps, refer to p.88. Parameters that you edit in MIDI mode and Global mode are saved at the time that you modify them, and do not require the Write operation.

❏ About the edit buffer

When you select a Program or MultiSet or arpeggio pattern in Program Play mode or MultiSet Play mode, or when you select an arpeggio pattern, the selected data is called from internal memory into an "edit buffer." Then, when you modify parameters in Program Play, Program Edit, MultiSet Play, MultiSet Edit or Arpeggio modes, the data in the edit buffer will be modified. If you wish to save the data that was modified, you must execute the Write operation. When you execute the Write operation, the data in the edit buffer is written into the Program number, MultiSet number, or arpeggio pattern number of the corresponding bank.

If you select another Program, MultiSet or arpeggio without Writing the data, new Program, MultiSet or arpeggio pattern data will be loaded into the edit buffer. At this time, the data that you have been modifying will be saved temporarily ("[COMPARE] function," p.27), but will be lost when you begin modifying the newly selected data.

Editing affects the data in the edit buffer.
Programs or MultiSets will sound using
the data in the edit buffer.

Edit Buffer ⇐ **Edit**

When you select a Program or MultiSet, the data you select is called from internal memory or card memory into the edit buffer. **Select**

When you execute the Write operation, the Program, MultiSet or arpeggio pattern settings will be saved into internal memory or card memory. **Write**

Program	MultiSet	Arp.Pattern
Bank A0...A127	Bank A0...A15	UP...Random
Bank B0...B127	Bank B0...B15	Bank U1-1...U3-5

Internal Memory
Card Memory

❏ Memory protect

The Z1 provides a memory protect function that prevents data from being overwritten unintentionally. (i.e., this function makes it impossible to write data into memory.) Before you can Write the edited data into memory, you must turn memory protect **OFF**.

① Press the [GLOBAL] key (the LED will blink) to enter Global mode.

② Press the [JUMP] key, and then press knob [1] (Basic) to access the GLB Basic page.

③ Press knob [1] to move the cursor to the "Protect (Memory Protect)", and then rotate knob [1] to turn the setting **OFF**. Now you will be able to execute the Write operation.

❏ Modifying a name (Rename)

An edited Program, MultiSet or arpeggio pattern can be given a new name as desired. You can also assign names to user groups to classify programs.

Renaming a Program or MultiSet

① Make sure that the program or MultiSet that you wish to rename is selected.

② Press the [CMN] key (the LED will light) to access the Common section of the program or MultiSet.

③ Press the [JUMP] key, then press knob [5] (Name) to move to the CMN Program Name page (for Program Edit mode) or the MLT CMN Name page (for MultiSet Edit mode).

!/FX CMN/CMN

```
[CMN Program Name]

Name:Giant RES Sweep!

     Press Knob1 Rename ,
          for starting renaming.

Rename
```
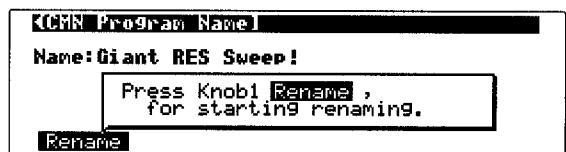
④ Press knob [1] (Rename) to access the Name Edit display.

```
[CMN Program Name]→Name Edit

Name:Giant REZ Sweep!
     ↑
      !"#$%&'()*+,-./0123456789:;<=>?
     @ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
     `abcdefghijklmnopqrstuvwxyz{|}←
     ←      Delete Insert  [-+←]
```

⑤ Rotate a knob [1] to [4] to move the [↑] to the location where you wish to input the character. Pressing knob [1] will move one character toward the left, and pressing knob [2] will move one character toward the right.

⑥ Either by rotating knob [5] or by pressing the [–] or [+] key, select the character that you wish to input. To select a character upward or downward, you can use the [▲] or [▼] keys.

⑦ To delete a character, press knob [3] (Delete). To input a space, press knob [4] (Insert).

Renaming an arpeggio pattern

① Make sure that the arpeggio pattern that you wish to rename has been selected. However, it is not possible to assign a name to a preset pattern.

② Press the [ARPEGGIO] key (the LED will blink) to enter Arpeggio mode.

③ Press the [JUMP] key, and then press knob [3] (Name) to access the PAT Pattern Name page.

④ Refer to steps ④ to ⑦ to input the name.

Renaming a user group

① Press the [GLOBAL] key (the LED will blink) to enter Global mode.

② Press the [JUMP] key, and then press knob [2] (GrpNam) to access the GLB UserGroupName page.

③ Either by rotating knob [1] or by pressing the [+] or [−] key, select the user group number to which you wish to assign a name.

④ Refer to steps ④ to ⑦ to input the name.

❏ Specifying the category and user group

As desired, you can classify programs into 18 categories and 16 user groups.

① Make sure that the program for which you wish to specify the category or user group is selected.

② Press the [CMN] key (the LED will light) to access the Prog Common section.

(/FX CMN/CMN
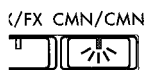
③ Press the [JUMP] key, and then press knob [1] (Voice) to access the CMN Voice page.

④ Press knob [2] several times and select "Category (Program Category)." Either rotate knob [2] or press the [+] or [−] key to specify the category.

⑤ Press knob [2] to select "UsrGroup (User Group)." Either rotate knob [2] or press the [+] or [−] key to specify the user group.
The names of each user group can be specified in the Global section UserGroupName page (see p.92).

❏ The Write procedure

Writing a Program

An edited program can be written into memory in either Program Play mode or Program Edit mode. This can also be done in Global mode or MIDI mode if the currently sounding data is a program (i.e., if the [PROG] key LED is lit).

① Turn "Memory Protect" (the setting which prohibits writing into program memory) **OFF** (see p.25).

② If desired, assign a name to the program (see p.25), and specify the category and user group.

③ Press the [WRITE] key.

9   WRITE

A message will appear in the LCD

```
 b127:ANALOG INIT        [HARD]
      ┌WRITE(Program)┐
[USE  │   b127:ANALOG INIT
[SW1  →INTERNAL / BANK_B / 127
[SW2       (ANALOG INIT    )
PKn       <Execute?> YES→ENTER/NO→EXIT
```

④ Specify the writing destination.

A program can be written into internal memories A000 to A127/B000 to B127, or if a memory card is inserted, into card memories CARD A000 to A127/CARD B000 to B127.

⚠ A memory card must first be formatted before it can be used. For details refer to p.95.

Press knob [2] to move the cursor, and either rotate knob [2] or press the [+] or [−] key to specify the destination into which the program will be written. In the same way, use knob [3] to specify the bank and knob [4] to specify the number.
Immediately after you press the [WRITE] key, the current program number will automatically be selected as the writing destination.

⑤ If you have not changed the writing destination from the current program number, press the [ENTER] key and the data will be written.

If you have changed the writing destination, a message will ask for confirmation, so press the [ENTER] key once again to write the data.

If you decide to cancel the Write operation, press the [EXIT] key twice.

Writing a MultiSet

An edited MultiSet can be written into memory in either MultiSet Play mode or MultiSet Edit mode. This can also be done in Global mode or MIDI mode if the currently sounding data is a MultiSet (i.e., if the [MULTI] key LED is lit).

For the procedure of saving a MultiSet, refer to the procedure for Programs described above.

A MultiSet can be written into internal memories A00 to A15/B00 to B15, or if a memory card is inserted, into card memories CARD A00 to A15/CARD B00 to B15. Also, it is not possible to specify a category or user group for a MultiSet.

Writing an arpeggio pattern

An edited arpeggio pattern can be written into memory in Arpeggio mode.

For the procedure of saving an arpeggio pattern, refer to the procedure for Programs described above.

An arpeggio pattern can be written into internal memories UP to Random, U1-1 to U1-5, U2-1 to U2-5, U3-1 to U3-5, or if a memory card is inserted, into card memories CARD UP to Random, CARD U1-1 to U1-5, CARD U2-1 to U2-5, CARD U3-1 to U3-5.

For both preset patterns and user patterns, the patterns which are displayed in Arpeggio mode will be saved. However when preset patterns are saved to user patterns, or when user patterns are saved to preset patterns, be aware that parameters which are not common to both types of pattern will be initialized. Also, it is not possible to specify a category or user group for an arpeggio pattern.

⚠ If the memory card which you are using is a Flash EPROM type device, it will not be possible to save the edit buffer data by writing it directly into the card. You must first write the edit buffer into internal memory, and then save it by specifying "Target Card Area" in the GLB page Data Utility [Save to Card] (see p.95).

8. Convenient editing functions

❑ UNDO function

The value of a parameter when it was initially selected by the cursor is remembered until the cursor is moved to a different location. After modifying a value, you can press the [UNDO] key to recall the original value. At this time, the value of the parameter at the time the [UNDO] key was pressed is also remembered, and can be recalled by pressing the [UNDO] key once again.

3   UNDO
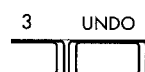
❑ COMPARE function

While editing a program, MultiSet or arpeggio pattern, you can press the [COMPARE] key to return to the state (sound) before you began editing (the upper right of the display will show the **COMPARE** indicator). In this case, the state of settings before the [COMPARE] key was pressed is remembered, so you can press the [COMPARE] key once again to bring back the data that you had been editing and continue your modifications. This function provides a convenient way to compare the results of your editing with the original sound.

For arpeggio patterns, this function is available only in Pattern Edit mode. However for programs and MultiSets, this function is available even in the respective Play modes.

If there has been editing that was discarded (i.e., when a different program etc. is selected without saving), and you have not performed any new editing, you can recall this editing once again. Press the [COMPARE] key, and the display will ask "Recall previous edit?" Press the [ENTER] key to execute the operation. Pressing any other key will cancel the operation.

OBAL COMPARE

❑ UTILITY functions

In various pages, a variety of functions are provided to make operation more efficient or to assist you in various ways (see p.105).

① Press the [UTILITY] key. The utility functions that are available will be displayed in the lower line of the LCD.

6   UTILITY

② Press the appropriate knob ([2] to [5]) to select the desired function, and execute it in accordance with the messages that appear.

Here we will explain some of the common utility functions.

Restoring the factory settings (Factry)

This function calls factory preset data into the edit buffer. This function is convenient when you wish to recall a factory preset Program or MultiSet and then edit it. Unlike the operation explained on p.12, the contents of internal memory will not change when this function is used to recall data, and unless you perform the Write operation, internal memory will not be affected.

Example: Restoring a factory preset program

① Make sure that you are in Program Play mode.

② Press the [UTILITY] key, and then press knob [5] (Factry). The utility menu will appear.

③ Rotate knob [3] to select the program that you wish to recall.

④ Press the [ENTER] key, and the factory preset program will be loaded into the edit buffer. If you decide not to load the factory preset program, press the [EXIT] key.

⚠ In this state, the data has not been saved to internal memory or to card memory.

Initializing settings (Init)

This operation initializes the data that has been called into the edit buffer. You can initialize all the settings of a program, a MultiSet, an arpeggio pattern or other settings, or initialize individual portions of the data.

Example: Initializing a program

① Make sure that you are in Program Play mode.

② Press the [UTILITY] key, and then press knob [4] (Init). The utility menu will appear.

③ Press the [ENTER] key, and the program in the edit buffer will be initialized. If you decide not to initialize, press the [EXIT] key.

⚠ In this state, the data has not been saved to internal memory or to card memory.

Example: Initializing EG3

① Make sure that a program has been called into the edit buffer.

② Press the [EG] key to access the EG section.

③ Press the [JUMP] key, and then press knob [3] (EG3).

④ Press the [UTILITY] key, and then press knob [3]. The utility menu will appear.

⑤ Select one of the 11 different EG types as appropriate, so that the EG settings can be initialized to the type that you select. Rotate knob [3] to select an EG type.

⑥ Press the [ENTER] key, and EG3 of the program which has been called into the edit buffer will be initialized to the EG type that you selected in step ⑤. If you decide not to initialize, press the [EXIT] key.

Copying and exchanging settings (Copy, Swap)

You can copy or exchange settings.

Example: Copying EG3

① Perform steps ① to ③ of "Initializing settings (Init)."

② Press the [UTILITY] key, and then press knob [4] (Copy). The utility menu will appear.

③ Select an EG of the copy source program. Use knob [2] to select the program source, use knob [3] to select the program bank and number, and use knob [4] to select the EG number.

④ Press the [ENTER] key, and the EG settings that you selected in step ③ will be copied to EG3 of the program in the edit buffer. If you decide not to copy, press the [EXIT] key.

Example: Copying effect settings

Effect Copy is convenient when you wish to use the effect settings of a program in a MultiSet, etc. The following procedure is an example of using program effect settings in a MultiSet.

① Make sure that a MultiSet has been called into the edit buffer.

② Press the [FX] key to access the Multi Fx section.

③ Press the [JUMP] key, and then press knob [1] (Set Up).

④ Press the [UTILITY] key, and then press knob [4] (Cpy Prg). The utility menu will appear.
In the Fx Set Up page, Fx1, Fx2, Mst.Fx and Mst.EQ settings will all be copied. In other pages, individual effects will be copied.

⑤ Select the copy source effect. Rotate knob [2] to select the source, and rotate knob [3] to select the bank and number.

⑥ Press the [ENTER] key, and the effect settings of the MultiSet that was called into the edit buffer will be copied. To cancel the copy operation, press the [EXIT] key.

Parameter Editing Guide

Program Edit mode
MultiSet Edit mode
Arpeggio mode
MIDI mode
Global mode

Effect Type
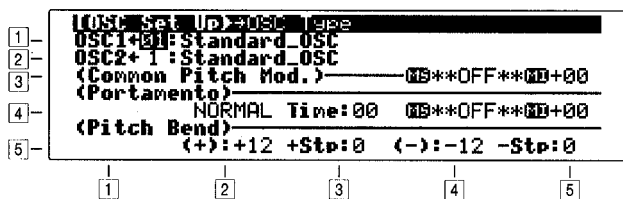
Program Edit

MultiSet Edit

Arpeggia

MIDI

Global

Effect Type

1. OSC section

The oscillator is the section which creates the "waveform," which is the most basic element that determines the tone. The Z1 is able to generate waveforms in a variety of ways.

OSC Set Up page

❑ Select the Oscillator Type

1-1 OSC1 (Oscillator 1 Type) .... [01...13]
Select the oscillator type for oscillator 1.

01: Standard OSC
02: Comb Filter OSC
03: VPM OSC (Variable Phase Modulation OSC)
04: Resonance OSC
05: Ring Modulation OSC
06: Cross Modulation OSC
07: Sync Modulation OSC
08: Organ Model
09: Electric Piano Model
10: Brass Model
11: Reed Model
12: Plucked String Model
13: Bowed String Model

⚠ If a type **10** to **13** is used, it will not be possible to use OSC2 (Oscillator 2 Type).

2-1 OSC2 (Oscillator 2 Type) .... [1...9]
Select the oscillator type for oscillator 2 (refer to OSC1).

❑ Modifying the oscillator pitch over time (Common Pitch Mod.)

3-4 Common Pitch Mod. Source .... (Mod. Source List 1)
Select the modulation source (refer to p.104) that will simultaneously modulate the pitches of oscillators 1 and 2, and the sub-oscillator.

3-5 Common Pitch Mod. Intensity .... [–99...+99]
Specify the depth and direction of the effect regulated by "Common Pitch Mod. Source."

❑ Specify the way in which Portamento is applied (Portamento)

Specify the way in which Portamento will be applied. (Portamento is an effect which causes the pitch to change smoothly from the pitch of one note to the pitch of the next note.) The settings you make here will be valid when the front panel [PORTAMENTO] key is on. The [PORTAMENTO] key switches portamento on/off for each program.

4-2 Portamento Mode .... [NORMAL, FINGERED]
NORMAL   Portamento will always apply, regardless of the playing method.
FINGERED Portamento will apply only to notes played legato (i.e., when the next note is pressed before the previous note is released).

4-3 Portamento Time .... [0...99]
Specify the portamento time. Higher values will cause the pitch to change more slowly.

4-4 Portamento Time Mod. Source .... (Mod. Source List 1]
Select a modulation source (refer to p.104) which will control "Portamento Time."

4-5 Portamento Time Mod. Intensity .... [–99...+99]
Specify the way in which the portamento time will be controlled by the "Portamento Time Mod. Source." With positive (+) settings, the portamento time will become longer. With negative (–) settings, the portamento time will become shorter.

❑ Specify the width of pitch bender control (Pitch Bend)

5-2 PB Intensity (+X) .... [–60...+24]

Specify the amount of pitch change (in semitones) that will occur when the pitch bender is moved in the positive (+) direction. With positive (+) settings, the pitch will rise. With negative (–) settings, the pitch will fall. With a setting of 12, the pitch will change one octave.

5-3 PB Step (+X) .... [0,/8, /4, /2, 1 ... 12]

Specify the way in which the pitch will change when the pitch bender is moved in the positive (+) direction.

0 (Continuous)	The pitch will change smoothly.
/8 (1/8)	The pitch will change in steps of 1/8th of a semitone.
/4 (1/4)	The pitch will change in steps of 1/4th of a semitone.
/2 (1/2)	The pitch will change in steps of 1/2 of a semitone.
1...12	The pitch will change in steps of the specified number of semitones (maximum of one octave).

**5-4 PB Intensity (–X) .... [–60...+24]**

Specify the amount of pitch change (in semitones) that will occur when the pitch bender is moved in the negative (–) direction.

5-5 PB Step (–X) .... [0,/8, /4, /2, 1 ... 12]

Specify the way in which the pitch will change when the pitch bender is moved in the negative (–) direction (refer to "Step(+)").

⚠ If the width of change specified for "PB Step(+X)/ (–X)" is greater than the pitch specified for "PB Intensity(+X)/(–X)," the pitch will not change.

OSC1 page
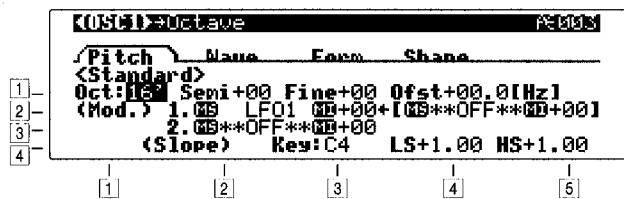
Pitch tab

❑ Specify the basic pitch of oscillator 1 (Pitch)

1-1 Octave .... [32'...4']

Specify the basic pitch of oscillator 1 in steps of an octave. **32'** is two octaves below, **16'** is one octave below, **8'** is standard pitch, and **4'** is one octave above.

1-2 Semi Tone .... [–12...+12]

Adjust the basic pitch specified by "Octave" in semitone steps.

1-3 Fine Tune .... [–50...+50 cents]

Make fine adjustments to the pitch in one-cent steps.

1-4 Frequency Offset .... [–10.0...+10.0 Hz]

Make fine adjustments to the pitch in 0.1 Hz steps.

❑ Modulate the pitch (Pitch Modulation)

2-1 Pitch Mod.1 Source .... (Mod.Source List 1)

Select a modulation source (see p.104) which will modify the pitch (e.g., apply vibrato).

2-2 Pitch Mod.1 Intensity .... [–99...+99]

Specify the depth and direction of the pitch change that will be controlled by "Pitch Mod.1 Source."

2-3 Pitch Mod.1 Int.Controller .... (Mod.Source List 1)

Specify the controller (see p.104) which will control the "Pitch Mod.1 Intensity."

2-4 Pitch Mod.1 Int.Control Intensity .... [–99...+99]

Specify the depth of the pitch modulation effect controlled by "Pitch Mod.1 Int.Controller."

3-1 Pitch Mod.2 Source .... (Mod.Source List 1)

**3-2 Pitch Mod.2 Intensity .... [–99...+99]**

Refer to the above "Pitch Mod.1 Source" and "Pitch Mod.1 Intensity."

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❑ Specify how pitch will change in relation to the keyboard (key)

4-3 Center Key .... [C–1...G9]

Specify the key at which Lower/Higher keyboard tracking will begin to apply.

4-4 Lower Slope .... [–1.00...+2.00]

Specify the depth and direction of the pitch change that will occur for notes below the "Center Key."

4-5 Higher Slope .... [–1.00...+2.00]

Specify the depth and direction of the pitch change that will occur for notes above the "Center Key."
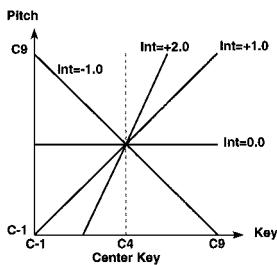
If "Lower Slope" and "Higher Slope" are set to values of +2.0, playing a note one octave above the "Center Key" will sound a pitch that is two octaves higher. With a setting of –1.0, playing a note one octave above will sound a pitch that is one octave lower. With a setting of 0.0, pitches in the specified area will be fixed. If you want pitches to correspond with the keyboard in the normal fashion, set these parameters to +1.0.

OSC2 page

Here you can make settings for the oscillator type, basic pitch, pitch keyboard tracking, and pitch modulation of oscillator 2. The parameters of oscillator 2 are the same as for oscillator 1. (Refer to the explanation of the OSC1 page).

Settings specific to each oscillator type

Here you can make settings which are specific to each oscillator type. The oscillator type is selected in OSC1/2 of the OSC Set Up page.

Standard OSC

This oscillator produces the waveforms used by an analog synthesizer (sawtooth wave, pulse wave, triangle wave) and sine wave. Sawtooth wave, pulse wave and triangle wave waveforms can be modified using waveform modulation. You can specify either sawtooth wave or pulse wave as the main waveform, and mix triangle wave or sine wave with this for output. The level of these three waveforms can be adjusted independently.

In addition, wave shaping can be applied to the output of this oscillator.

Waveform modulation

Pulse width modulation (PWM) is a function found on analog synthesizers that modulates the width of a pulse waveform over time. On the Z1, "waveform modulation" allows you to create this type of modulation not only on a pulse wave, but also on sawtooth waves or triangle waves.

Sawtooth wave

Waveform modulation will modify a sawtooth waveform as shown below, creating time-variant change in the sound. When modulation is 0, the basic sawtooth waveform will be produced, and when it is **99**, a sawtooth wave of double the frequency will be produced. If the modulation value is a negative number, a different effect will result than with positive settings.
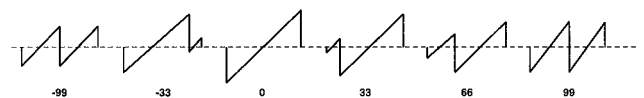
Pulse wave

Waveform (pulse width) modulation will modify a pulse waveform as shown below, creating time-variant change in the sound. When modulation is **0**, a square wave will be produced, and when it is **99**, the pulse width will be 0, meaning that there will be no sound. If the modulation value is a negative number, the results will be inverted.
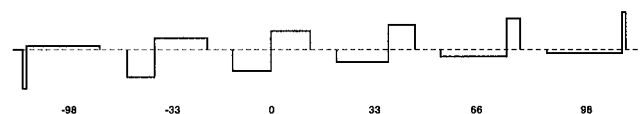

Ramp wave

Waveform modulation will modify a ramp wave as shown below, creating time-variant change in the sound.

When modulation is **0**, a triangle wave will result, and as the modulation value increases, the waveform will become a ramp wave (a waveform in which the slope is broken in two). At a modulation value of **50**, a trapezoidal wave will

result, and at a value of 99 the waveform will once again be a triangle wave. If the modulation value is a negative number, the results will be inverted.

Compared to sawtooth or pulse waves, this waveform produces a strong fundamental with fewer overtones, making it particularly suitable for bass sounds etc.
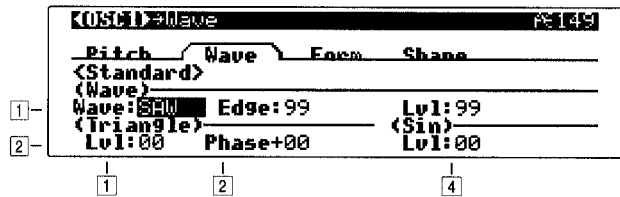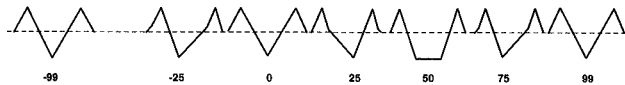
Wave tab

1-1 Wave Select ....[SAW, PULSE]

Select the main waveform. Select either **SAW** (sawtooth wave) or **PULSE** (pulse wave).

1-2 Wave Edge.. [0...99]

Adjust the amount of high-range overtones for the main waveform. As the pitch rises, this effect will become stronger, and in the low range there will be little effect. Lower settings of this parameter will produce a more mellow sound, and in the vicinity of 0 the volume will also decrease.

1-4 Wave Level.. [0...99]

Specify the output level of the main waveform.

2-1 Triangle Level .... [0...99]

Specify the output level of the triangle waveform. It will be output mixed with the main waveform.

2-2 Triangle Phase Shift .... [−99...+99]

Specify the phase difference between the main waveform and the triangle and sine waveforms. (The triangle and sine waveforms will always be in phase with each other.)

2-4 Sine Level .... [0...99]

Specify the output level of the sine waveform. It will be output mixed with the main waveform.
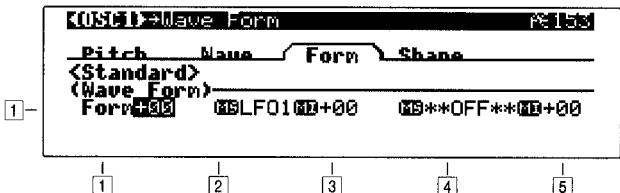
Wave Form tab

1-1 Wave Form .... [−99...+99]

Specify the waveform. For the way in which this value will affect the waveform, refer to the diagrams shown on the previous page for sawtooth wave, pulse wave, and ramp wave.

1-2 Wave Form Mod.LFO ....[LFO1...LFO4]

Select the source LFO for waveform modulation. LFO settings are made in the LFO section.

**1-3 Wave Form Mod.LFO Intensity .... [−99...+99]**

Specify the depth and direction of the waveform modulation that will be controlled by the LFO specified in "Wave Form Mod.LFO."

1-4 Wave Form Mod.Source .... (Mod.Source List 1)

Select the waveform modulation source.

1-5 Wave Form Mod.Intensity .... [−99...+99]

Specify the depth and direction of the waveform modulation controlled by the "Wave Form Mod.Source." For negative settings, the polarity of the modulation source will be inverted.
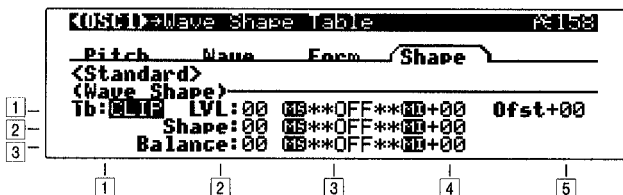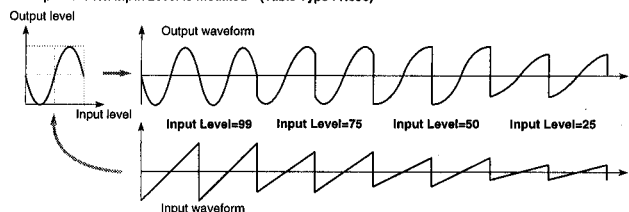
Wave Shape tab

1-1 Wave Shape Table ....[CLIP, RESO]

Select the wave shaping table that will modify the input waveform. Depending on the selection of CLIP (clip type) or RESO (resonant type), the waveform will change as shown in the diagram (2-2 Wave Shape).

1-2 Wave Shape Input Level .... [0...99]

Specify the level of the signal that is input from the standard oscillator to the wave shaping table.

Example of when Input Level is modified (Table Type : Reso)

1-3 Wave Shape Input Level Mod.Source .... (Mod.Source List 1)

Select the modulation source which will control "Wave Shape Input Level." (see p.104)
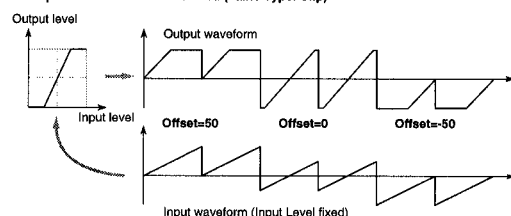
1-4 Wave Shape Input Level Mod.Intensity .... [−99...+99]

Specify the depth and direction of the effect of "Wave Shape Input Level Mod.Source."

1-5 Wave Shape Offset................................ [−99...+99]

Specify an offset amount that will be added to the signal specified by "Wave Shape Input Level."

Example of when Offset is modified (Table Type: Clip)

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2-2 Wave Shape .... [0...99]

Specify the characteristics of the table which will modify the input waveform. The characteristics of the table will change as follows.

Shape of the wave shaping table and the Shape parameter

CLIP type

Output of the clip type table when a sawtooth waveform is input

Waveform before being input to the table

Resonant type

Output of the resonance type table when a sawtooth wave is input

Waveform before being input to the table
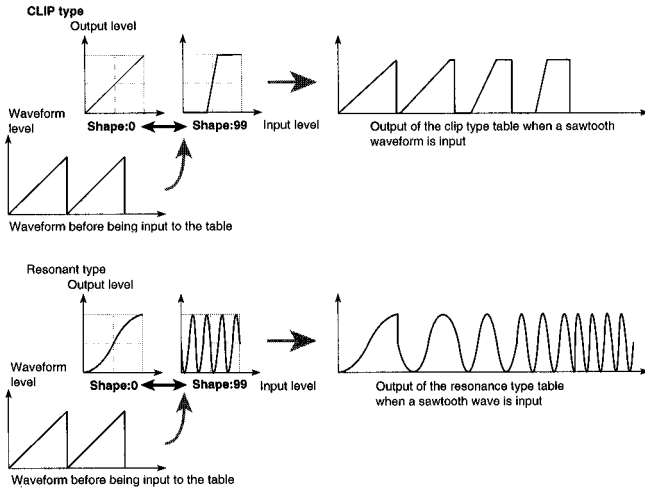
2-3 Wave Shape Mod.Source .... (Mod.Source List 1)

Select a modulation source (see p.104) that will control "Wave Shape."

2-4 Wave Shape Mod.Intensity .... [–99...+99]

Specify the depth and direction of the effect of "Wave Shape Mod.Source."

3-2 Wave Shape Balance .... [0...99]

Specify the balance between the signal that has passed through the wave shaping table and the output signal from the standard oscillator. With a setting of **99**, it will be only the output of the wave shaping table.

3-3 Wave Shape Balance Mod.Source .... (Mod.Source List 1)

Select a modulation source (see p.104) that will control "Wave Shape Balance."

3-4 Wave Shape Balance Mod.Intensity .... [–99...+99]

Specify the depth and direction of the effect of "Wave Shape Balance Mod.Source."

COMB Filter OSC

In this oscillator, the signal from the other oscillator waveform or the noise generator is sent through a comb filter, and the feedback level of the comb filter is varied in order to produce tonal change. When noise is input, raising the feedback of the comb filter will gradually change the sound into a pitched tone.

Comb Oscillator

Example of when noise is input

As the Feedback value increases, the sound will become more pitched.
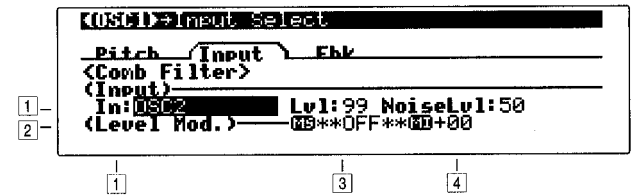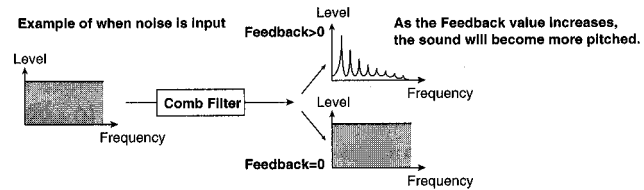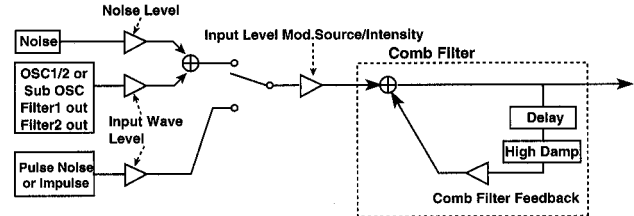
Input tab

1-1 Input Select .... [OSC2(1)+NOISE, SubOSC+NOISE, Filter1+NOISE, Filter2+NOISE, PULSE_NOISE, IMPULSE]

Select the signal that will be input to the comb filter.

Example of when an Impulse is input

As the Feedback is increased, the decay time will become longer.
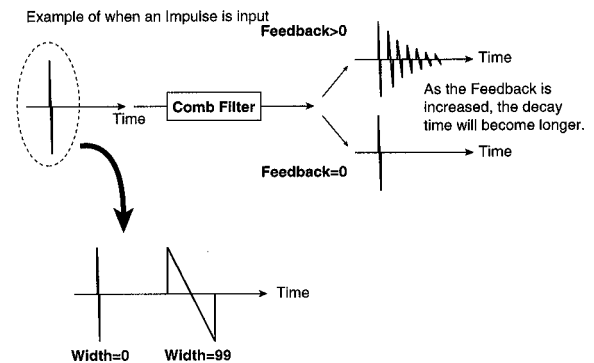
1-3 Input Wave Level .... [0...99]

If "Input Select" has been set to **OSC2(1)+NOISE, SubOSC+NOISE, Filter1+NOISE** or **Filter2+ NOISE**, you can specify the volume level of the other oscillator or the sub-oscillator which will be input to the comb filter.

If "Input Select" has been set to **PULSE_NOISE** or **IMPULSE**, you can specify the volume level of the

PULSE_NOISE or IMPULSE that will be input to the comb filter.

1-4 Noise Level .... **[0...99]**
This parameter will be available only if "Input Select" has been set to **OSC2(1)+NOISE, SubOSC+NOISE, Filter1+NOISE** or **Filter2+NOISE**. It specifies the volume level of the noise generator output which will be input to the comb filter.

1-4 Width .... **[0...99]**
This parameter will be available only if "Input Select" has been set to **PULSE_NOISE** or **IMPULSE**. It specifies the length of time that the **PULSE_NOISE** or **IMPULSE** will last after being triggered.

2-3 Input Level Mod.Source .... **(Mod.Source List 1)**
Select a modulation source (see p.104) that will control the volume level of the signal being input to the comb filter. The volume level is set by the "Input Wave Level" or the "Noise Level."

2-4 Input Level Mod.Intensity .... **[-99...+99]**
Specify the depth and direction of the effect of "Input Level Mod.Source."

Feedback tab

1-1 Comb Filter Feedback .... **[0...99]**
Specify the amount of feedback for the comb filter. If this value is high, the resonance of the comb filter will be high, and the tone will have a clear sense of pitch. Conversely, if this value is low, the input signal will be output without change, and if the input signal is only noise, the output signal will have no sense of pitch.

1-3 Feedback Mod.1 Source .... **(Mod.Source List 1)**
Select a modulation source (see p.104) that will control "Comb Filter Feedback."

1-4 Feedback Mod.1 Intensity .... **[-99...+99]**
Specify the depth and direction of the effect of "Feedback Mod.1 Source."

2-3 Feedback Mod.2 Source .... **(Mod.Source List 1)**

2-4 Feedback Mod.2 Intensity .... **[-99...+99]**
Refer to the above "Feedback Mod.1 Source" and "Feedback Mod.1 Intensity."

3-2 High Damp .... **[0...99]**
Specify the amount of attenuation that will be applied to the high-frequency component of the feedback signal within the comb filter.
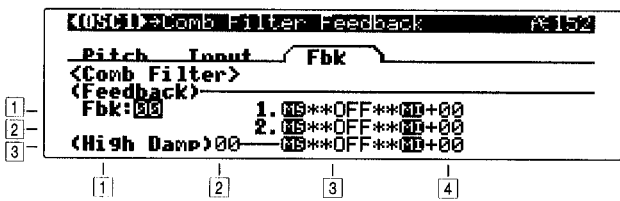As this value is increased, the tone will become more mellow. Conversely, decreasing this value will produce a brighter tone.

3-3 High Damp Mod.Source .... **(Mod.Source List 1)**
Select a modulation source (see p.104) that will control "High Damp."

3-4 High Damp Mod.Intensity .... **[-99...+99]**
Specify the depth and direction of the effect of "High Damp Mod.Source."VPM OSC

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VPM OSC

The output of a carrier is phase-modulated by a modulator, and output through wave shape processing.

By controlling the wave shaping parameters and the feedback gain, tonal changes that are different than simple phase modulation can be produced.
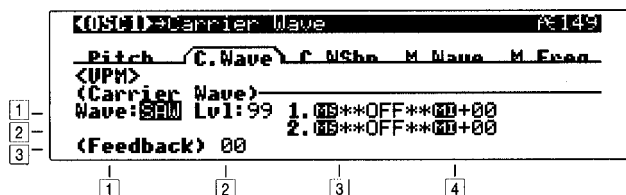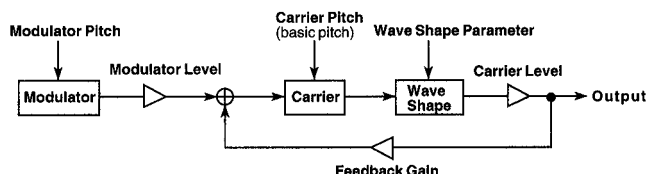
Carrier Wave tab

1-1 Carrier Wave .... [SAW, SQU, TRI, SIN]

Select the carrier waveform.

1-2 Carrier Level .... [0...99]

Specify the output level of the carrier. This will determine the output level of the VPM oscillator.

1-3 Carrier Level Mod.1 Source .... (Mod.Source List 1)

Select a modulation source (see p.104) that will control the carrier level.

1-4 Carrier Level Mod.1 Intensity .... [–99...+99]

Specify the depth and direction of the effect of "Carrier Level Mod.1 Source."

2-3 Carrier Level Mod.2 Source .... (Mod.Source List 1)

2-4 Carrier Level Mod.2 Intensity .... [–99...+99]

Refer to the above "Carrier Level Mod.1 Source" and "Carrier Level Mod.1 Intensity."

3-2 Feedback .... [0...99]

Specify the amount of the output after wave shaping that will be fed back to the carrier.
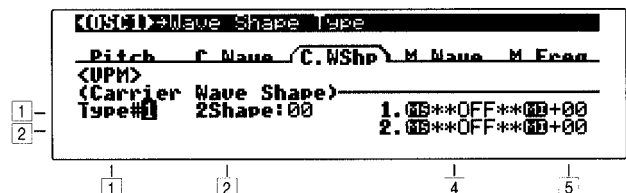
Carrier Wave Shape tab

**1-1 Type** .... [1, 2]

With a setting of **1**, the signal after wave shaping will be output without further change. If "Wave Shape" is set to the minimum value, the phase modulated signal will be output essentially without change.

With a setting of **2**, a rounded waveform will be obtained regardless of the "Wave Shape" value.

1-2 Wave Shape .... [0...99]

Specify the number of cycle of wave shaping. As this value is increased, the number of cycles will increase, causing more overtones to be added to the high-frequency range of the sound.

Table variation
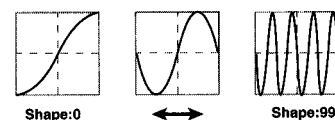
1-4 Wave Shape Mod.1 Source .... (Mod.Source List 1)
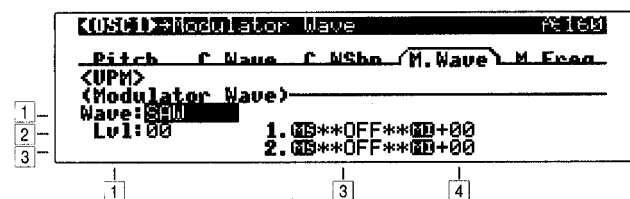
Select a modulation source (see p.104) that will control the "Wave Shape" value.

1-5 Wave Shape Mod.1 Intensity .... [–99...+99]

Specify the depth and direction of the effect of "Wave Shape Mod.1 Source."

2-4 Wave Shape Mod.2 Source .... (Mod.Source List 1)

2-5 Wave Shape Mod.2 Intensity .... [–99...+99]

Refer to the above "Wave Shape Mod.1 Source" and "Wave Shape Mod.1 Intensity."

Modulator Wave tab

1-1 Modulator Wave .... [SAW, SQU, TRI, SIN, OSC2(1), Sub OSC, Filter 1, Filter 2]

Select the modulator waveform. Select the other oscillator OSC2(1) or the sub-oscillator etc.

2-1 Modulator Level .... [0...99]

Specify the output level of the modulator. This setting will determine the amount of modulation that is applied to the carrier.

2-3 Level Mod.1 Source .... (Mod.Source List 1)

Select a modulation source (see p.104) that will control the "Modulator Level."

2-4 Level Mod.1 Intensity .... [–99...+99]

Specify the depth and direction of the effect of "Level Mod.1 Source." Mod.1 Source."