

Roland®

A-90
EXPANDABLE CONTROLLER

Owner's Manual

Volume 1

Volume 2

A-90

EXPANDABLE CONTROLLER

Owner's Manual

Volume 1

Introduction

Thank you, and congratulations on your choice of the Roland A-90/A-90EX Expandable Controller.

How to Use This Owner's Manual (Volume 1)

This owner's manual (Volume 1) explains the basic operations of the A-90 and A-90EX. When you need a more detailed explanation (in order to make full use of the many functions of the A-90/A-90EX), please go on to read the corresponding material in the Owner's Manual Volume 2, after glancing at the brief explanations here.

This volume is divided into three main chapters. Please read them in the order that best suits your needs.

Chapter 1: Using the A-90 as a Stage Piano

The A-90EX, which is a specialized A-90 with a built-in VE-RD1 voice expansion board, can be used as a 64-voice stage piano. This chapter explains how to operate the A-90EX as a stage piano, from basic operation to creating sounds.

* If you are using an A-90 equipped with the VE-RD1, please begin by reading Chapter 3.

Chapter 2: The A90/EX as a Master Keyboard

This chapter explains using the A-90/EX as a MIDI master keyboard, from basic operation to creating performances.

Chapter 3: About the Voice Expansion Board

In this chapter, the method of installation and precautions to take when using the A-90 equipped with a voice expansion board (models VE-RD1, VE-JV1, VE-GS1) is explained. Please read this chapter first when using any unit from the A-90 series which is equipped with a voice expansion board.

Conventions in this manual

- This manual is for use with both the A-90 and the A-90EX. In the text, distinctions between units are made by their names, as follows:

A-90Indicates only the model A-90, which is not equipped with the VE-RD1;

A-90EX.....Indicates model A-90EX and the A-90 equipped with the VE-RD1;

A-90/EXIndicates both models A-90EX and A-90.



- Characters and numerals enclosed in square brackets [] indicate buttons (switches) on the A-90/EX's Panel. For example, [ENTER] indicates the Enter button, and [1] indicates the numeric key 1.

- CURSOR [◀ | ▶] or [INC]/[DEC] etc. indicate that you should press one or the other button.

- About the Screen

Please be aware that the content of the illustrations appearing in this manual may differ slightly from the settings you see when you start using your unit.

Before using this unit, carefully read the sections entitled: "IMPORTANT SAFETY INSTRUCTIONS" (p. 2), "USING THE UNIT SAFELY" (p. 3), and "IMPORTANT NOTES" (p. 5). These sections provide important information concerning the proper operation of the unit. The manual should be saved and kept on hand as a convenient reference.

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
ATTENTION: RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIE		
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.		



The lightning flash with 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 persons.



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.

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING - When using electric products, basic precautions should always 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, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.
3. This product should be used only with a cart or stand 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 only 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 service 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.

For the USA

This product may be equipped with a polarized line plug (one blade wider than the other) . This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.

For Canada

For Polarized Line Plug

CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.
ATTENTION: POUR ÉVITER LES CHOCs ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU' AU FOND.

For the U.K.

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

BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
 The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.
 The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.
 Under no circumstances must either of the above wires be connected to the earth terminal of a three pin plug.

USING THE UNIT SAFELY

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

About ⚠ WARNING and ⚠ CAUTION Notices

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

About the Symbols

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

ALWAYS OBSERVE THE FOLLOWING

⚠ WARNING

- Before using this unit, make sure to read the instructions below, and the Owner's Manual. ⚠
- Do not open or perform any internal modifications on the unit. (The only exception would be where this manual provides specific instructions which should be followed in order to put in place user-installable options; see p. 43.) ⊘
- Avoid damaging the power cord. Do not bend it excessively, step on it, place heavy objects on it, etc. A damaged cord can easily become a shock or fire hazard. Never use a power cord after it has been damaged. ⊘
- In households with small children, an adult should provide supervision until the child is capable of following all the rules essential for the safe operation of the unit. ⚠
- Protect the unit from strong impact. (Do not drop it!) ⚠
- Do not force the unit's power-supply cord to share an outlet with an unreasonable number of other devices. Be especially careful when using extension cords—the total power used by all devices you have connected to the extension cord's outlet must never exceed the power rating (watts/amperes) for the extension cord. Excessive loads can cause the insulation on the cord to heat up and eventually melt through. ⊘
- Before using the unit in a foreign country, consult with your dealer, or qualified Roland service personnel. ⚠
- Always turn the unit off and unplug the power cord before attempting installation of the Voice Expansion Board (p. 43). ⦿

⚠ CAUTION

- Always grasp only the plug on the power-supply cord when plugging into, or unplugging from, an outlet or this unit. ⚠
- Try to prevent cords and cables from becoming entangled. Also, all cords and cables should be placed so they are out of the reach of children. ⚠
- Never climb on top of, nor place heavy objects on the unit. ⊘
- Never handle the power cord or its plugs with wet hands when plugging into, or unplugging from, an outlet or this unit. ⊘
- Before moving the unit, disconnect the power plug from the outlet, and pull out all cords from external devices. ⦿
- Before cleaning the unit, turn off the power and unplug the power cord from the outlet (p. 10). ⦿
- Whenever you suspect the possibility of lightning in your area, pull the plug on the power cord out of the outlet. ⦿
- Install only the specified Voice Expansion boards (VE series). Remove only the specified screws (p. 43). ⚠

Table of Contents

IMPORTANT NOTES5

Panel Descriptions6

Chapter 1 Using the A-90EX as a Stage Piano

Before Performing9

Connecting the Necessary Equipment9

Turning the Power On10

Turning the Power Off10

Now Let's Play Some Sounds10

Switching Performances and Playing10

Let's Try Layering Sounds11

Adding Expression to Sounds Using Controllers12

Adding Changes to Pitch12

Adding Vibrato to Sounds12

Using the Hold Pedal12

Transposing Keyboard Ranges13

Changing Tones with the Keyboard14

Selecting Monophonic Sound14

Adding Portamento Effect14

Changing Volume and Other Parameters 114

Changing the Timbre with the Slider15

Changing Volume and Other Parameters 215

Creating Sounds16

Combining Sounds16

Determining Ranges17

Changing the Touch of the Keys19

Balancing Out the Zones20

Setting the Volume20

Setting Placement (Pan)21

Changing Patch Settings21

Setting the Pitch21

Changing Sounds' Rise and Fall (Attack and Decay)22

Changing Sound Brightness24

Adding Effects24

Adding Reverb24

Adding Chorus25

Equalizing25

Returning to Performance Mode/Recording Settings26

Chapter 2 The A-90/EX as a Master Keyboard

Before Performing27

Connecting the Necessary Equipment27

Turning the Power On27

Turning the Power Off28

Setting Up the A-90/EX and External MIDI Equipment28

Playing External MIDI Devices29

Adjusting the Volume29

Let's Try Layering Sounds29

Adding Expression to the Sound Using Controllers30

Adding Changes to Pitch30

Adding Vibrato to Sounds30

Using the Hold Pedal30

Transposing Keyboard Ranges31

Changing Tones with the Keyboard32

Selecting Monophonic Sound32

Adding Portamento Effect32

Changing Volume and Other Parameters 132

Changing the Timbre with the Slider33

Changing Volume and Other Parameters 233

Changing Settings34

Combining Sounds34

Setting the Transposition of Each Zone35

Deciding Ranges36

Changing the Touch of the Keys38

Balancing Out the Zones39

Setting the Volume39

Setting Placement (Pan)39

Adding Portamento to Each Zone40

Adding Effects40

Adding Reverb40

Adding Chorus41

Return to Manual Mode / Recording Settings41

Switching and Playing Performances42

Chapter 3 About the Voice Expansion Board

Installing the Voice Expansion Board43

About Coordinating the Voice Expansion Board44

Settings for Voice Expansion Board45

With the VE-RD145

With the VE-JV1 and VE-GS145

Reference46

A-90EX Performance List (Factory set)46

VE-RD1 Patch List46

IMPORTANT NOTES

In addition to the items listed under "IMPORTANT SAFETY INSTRUCTIONS" and "USING THE UNIT SAFELY" on pages 2 and 3, please read and observe the following:

Power Supply

- Do not use this unit on the same power circuit with any device that will generate line noise (such as an electric motor or variable lighting system).
- Before connecting this unit to other devices, turn off the power to all units. This will help prevent malfunctions and/or damage to speakers or other devices.

Placement

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

Maintenance.....

- For everyday cleaning wipe the unit with a soft, dry cloth or one that has been slightly dampened with water. To remove stubborn dirt, use a mild, non-abrasive detergent. Afterwards, be sure to wipe the unit thoroughly with a soft, dry cloth.
- Never use benzene, thinners, alcohol or solvents of any kind, to avoid the possibility of discoloration and/or deformation.

Repairs and Data.....

- Please be aware that all data contained in the unit's memory may be lost when the unit is sent for repairs. Important data should always be backed up Memory card, or written down on paper (when possible). During repairs, due care is taken to avoid the loss of data. However, in certain cases (such as when circuitry related to memory itself is out of order), we regret that it may not be possible to restore the data, and Roland assumes no liability concerning such loss of data.

Memory Backup

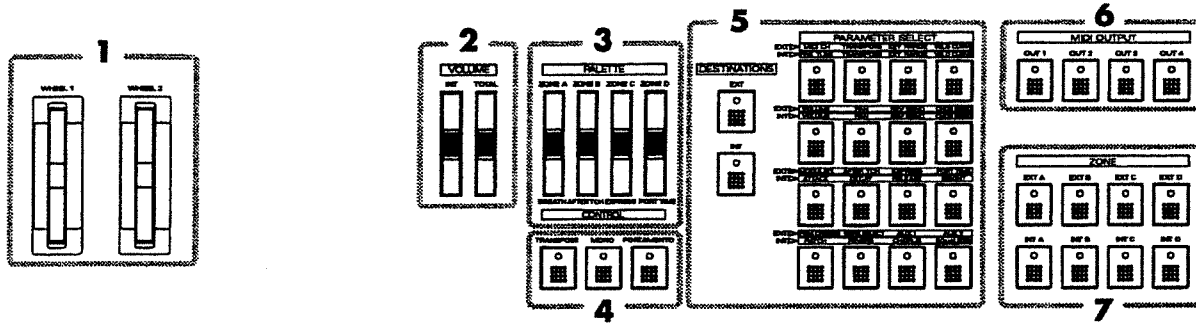
- This unit contains a battery which powers the unit's memory circuits while the main power is off. When this battery becomes weak, the message shown below will appear in the display. Once you see this message, have the battery replaced with a fresh one as soon as possible to avoid the loss of all data in memory. To have the battery replaced, consult with your dealer, or qualified Roland service personnel.

" Internal Battery LOW! "

Additional Precautions.....

- Please be aware that the contents of memory can be irretrievably lost as a result of a malfunction, or the improper operation of the unit. To protect yourself against the risk of losing important data, we recommend that you periodically save a backup copy of important data you have stored in the unit's memory on a Memory card.
- Unfortunately, it may be impossible to restore the contents of data that was stored on a Memory card once it has been lost. Roland Corporation assumes no liability concerning such loss of data.
- Use a reasonable amount of care when using the unit's buttons, sliders, or other controls; and when using its jacks and connectors. Rough handling can lead to malfunctions.
- Never strike or apply strong pressure to the display.
- When connecting/disconnecting all cables, grasp the connector itself—never pull on the cable. This way you will avoid causing shorts, or damage to the cable's internal elements.
- A small amount of heat will radiate from the unit during normal operation.
- To avoid disturbing your neighbors, try to keep the unit's volume at reasonable levels. You may prefer to use headphones, so you do not need to be concerned about those around you (especially when it is late at night).
- When you need to transport the unit, package it in the box (including padding) that it came in, if possible. Otherwise, you will need to use equivalent packaging materials.
- Use only the specified expression pedal (EV-5; sold separately). By connecting any other expression pedals, you risk causing malfunction and/or damage to the unit.

Panel Descriptions



Front Panel

1. WHEEL 1/2

These are wheel controllers for assigning various parameters and functions. The wheels have been assigned with pitch bend and modulation as the initial settings (Volume 1: p.12, 30, Volume 2: p.23).

2. VOLUME Sliders

INT VOLUME adjusts the initial volume settings of any installed voice expansion board (Volume 1: p.10). TOTAL VOLUME adjusts the overall volume while the relative proportions of each zone are preserved. (Volume 1: p.20, 39).

3. PALETTE CONTROL Sliders

These are slider controllers for assigning various parameters and functions. For the initial settings, Breath, Aftertouch, Expression, and Portamento Time have been assigned (Volume 1: p.14, 15, 32, 33, Volume 2: p.23). When using PARAMETER SELECT, you use the PALETTE SLIDER to prepare the chosen parameter (Volume 1: p.11).

4. TRANSPOSE/MONO/PORTAMENTO Switch

TRANSPOSE Switch is used to transpose the entire keyboard (Volume 1: p.13, 31, Volume 2: p.26). MONO/POR-TAMENTO Switch is a switch controller for assigning various parameters and functions. For the initial settings, Mono/Poly Mode switching and Portamento On/Off switching have been assigned (Volume 1: p.14, 32, 40, Volume 2: p.23).

5. PARAMETER SELECT/DESTINATIONS Buttons

These are used to switch on and off various settings in each zone. With the DESTINATIONS buttons, you select either internal or external zones, and you use PARAMETER SELECT to choose the parameters you wish to set.

6. MIDI OUTPUT Switches

Switch on or off each MIDI OUT (Volume 2: p.14).

7. ZONE Switches

Switch each zone on or off (Volume 1: p.11, 29, Volume 2: p.14).

8. LCD Cover

By removing this cover, you can install the voice expansion control board (Volume 1: p.43).

9. Display

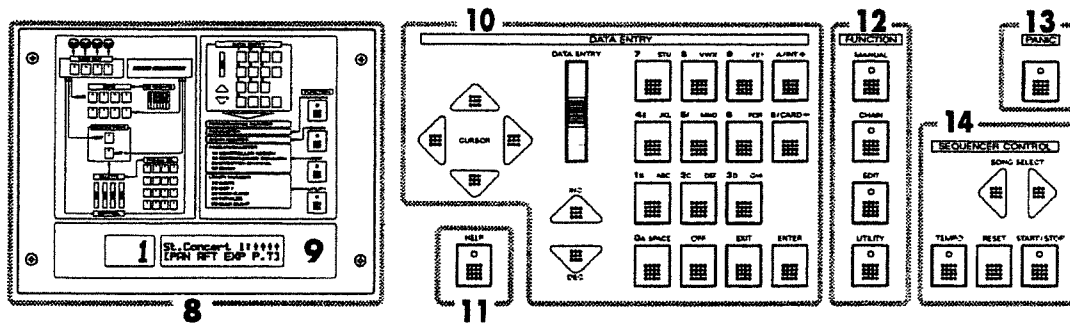
This displays various information corresponding to the current operation.

10. DATA ENTRY

This is used for selecting performances, entering various values, menu operations, etc. (Volume 2: p.9).

11. HELP Button

You can use this button to get all kinds of information on what you are currently working on, such as the meaning of the current screen, limits of possible values, the status of controller assignments, and the current values of various settings (Volume 2: p.15).



Side Panel

12.FUNCTION Buttons

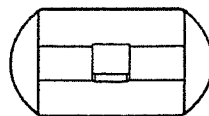
These buttons allow you to switch between operation modes (Volume 2: p.7). The button indicator of the selected operation mode will be lit. During ordinary performances (Performance mode), the indicator will not be lit.

13.PANIC Button

You can use this button at such times as when you can't get sounds from a connected MIDI device or voice expansion board to stop, or when you want to send the A-90EX's current settings (Volume 2: p.15).

14.SEQUENCER CONTROL

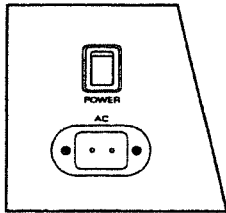
This is used when the unit is connected to an external MIDI sequencer control (Volume 2: p.39).



Pitch Bend/Modulation Lever

This alters the pitch and adds vibrato. This is used for assigning various parameters and functions, according to the settings (Volume 1: p.12, 30, Volume 2: p.23).

Rear Panel

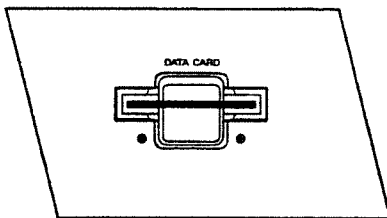


Power Switch

Turns power to the unit on and off.

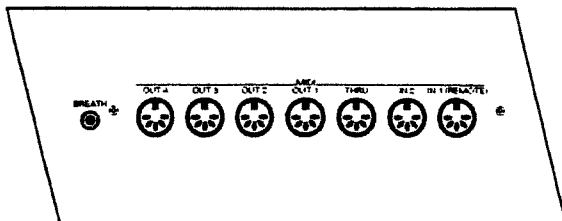
AC Inlet

The power cord is plugged in here.



DATA CARD SLOT

Optional memory cards (M-512E) are insert here.



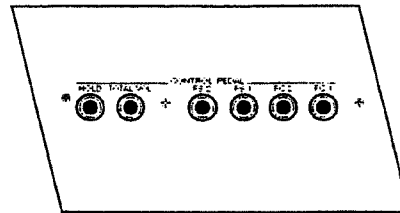
BREATH Jack

This jack is where the breath controller is connected. With the breath controller you can assign a variety of parameters and functions (Volume 2: p.23).

MIDI Connector

This connector is where you connect a separate MIDI device when you want to send and receive MIDI information.

* Use the IN 2 connector to send out information exactly as it was received.



HOLD Jack

When you connect the included Pedal Switch (DP-6) here, you can use it as a hold pedal (Volume 1: p.12, 30, Volume 2: p.26).

TOTAL VOLUME

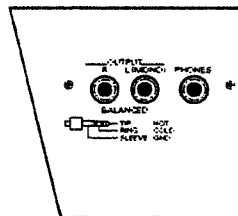
When you connect the optional Expression Pedal (EV-5/EV-10) here, it works the same as the TOTAL VOLUME slider.

FS 1/2 Jack

This jack is for use in connecting optional pedal switches (DP-2/DP-6). With the connected pedal switch you can assign a variety of parameters and functions (Volume 2: p.23).

FC 1/2 Jack

This jack is for use in connecting optional expression pedals (EV-5/EV-10). With an expression pedal connected you can assign various parameters and functions (Volume 2: p.23). You can also connect optional pedal switches (DP-2/DP-6) to this jack.



OUTPUT R/L(MONO) Jack

The stereo output of the voice expansion voice signal is sent to an amplifier or mixer through these jacks. When sending monaural output, please use only the L jack (Volume 1: p.9, 27). This also corresponds to the Balance output (Volume 2: p.15).

PHONES Jack

This jack is where headphone sets (e.g., RH-20/80/120) are connected. Through the headphones you can hear sounds from the voice expansion. When using headphones you may already have, check first to make sure they have an impedance of 8-150 Ohms.

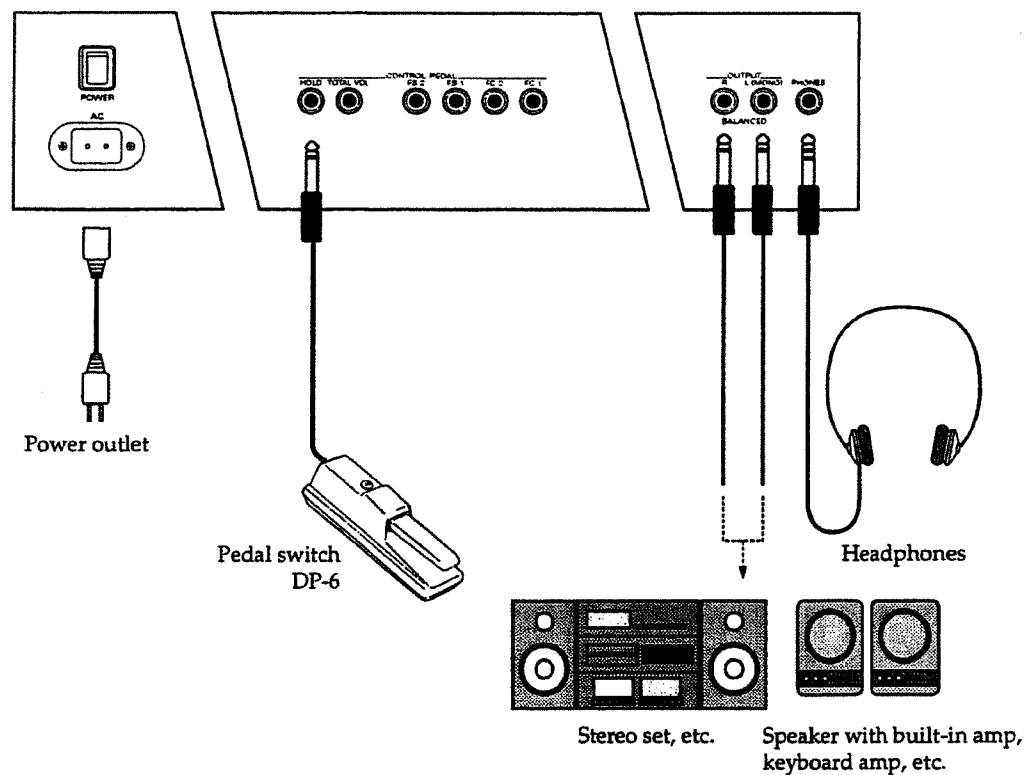
Chapter 1 Using the A-90EX as a Stage Piano

While being a MIDI master keyboard, the A-90EX can also be used as a stage piano, since it already has the VE-RD1 voice expansion board (a board designed specially for the A-90). This chapter explains the basic operation of the A-90EX when it is used as a stage piano.

Before Performing

Connecting the Necessary Equipment

The A-90EX contains no internal amplifier or built-in speakers. In order to make its output audible, you need either an amplifier or audio set, or a set of headphones. Please connect external devices to the A-90EX while referring to the figure below.



* Audio connector cables (e.g., PJ-1M) are not included. Please purchase these at a specialized dealer.

1. Before making any connections, please confirm that power to all equipment is turned off.
 - * Connecting equipment with the power on can become the cause of various problems, for example damaged (blown) speakers.
2. After connecting the AC cord to the A-90, plug the other end into a power outlet.
3. Connect audio cables as shown in the diagram. If using headphones, insert the plug into the PHONES jack. Connect the pedal switch (DP-6) at this time, as well.

* To get the maximum performance from your A-90EX, we recommend that you use stereo output, but if you are going to be sending out monaurally, please connect the output cable to the L/MONO jack.

Turning the Power On

1. Before turning on the power, please confirm the following:
 - All peripheral devices are properly connected
 - The volume of the A-90 (the slider at the far left of the panel), as well as the volume of any amplifier or mixer that is connected, is turned down completely.
2. Turn on the power switch on the rear panel of the A-90.
 - * In order to protect the internal circuits, please refrain from playing any sounds immediately after turning the power on.
3. Turn on the power of any amplifiers you have connected.
4. While playing sounds from the A-90, adjust the volume of the unit itself, as well as any amplifier or mixer that you have connected, to suitable levels.



* For more details about TOTAL VOLUME, please refer to "Setting the Volume: p.20".

Turning the Power Off

1. When turning off the power, first make sure the volume of the A-90 and amplifiers is turned completely down.
2. Turn off the power to connected amps or mixers.
3. Turn off power to the A-90.

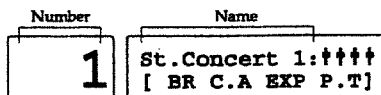
Now Let's Play Some Sounds

Switching Performances and Playing.....

In the A-90, as previously mentioned, sixty-four types of settings are built-in. These settings are called "Performances".

Performances include settings which specify which of the 128 Tones (Patches) furnished with the VE-RD1 will be used, so it is possible to switch tones depending on the Performances you switch.

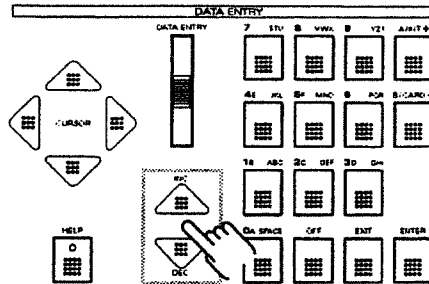
1. Please check that the screen resembles the figure below. In the display window, the currently selected Performance number appear in the left screen, and in the upper section of the right screen is shown the name of the Performance. (For more about other information shown in the display, please see p.9 of the Volume 2.)



If the screen differs from this, please check the following:

- That there are no indicators lit on the FUNCTION buttons (if any indicator is lit, please turn it off by pressing that button).
- If there are no indicators lit by either the DESTINATIONS button or PARAMETER SELECT button (if any indicator is lit, please turn it off by pressing that button).

2. Now, play the keyboard to produce sounds. This condition is called the Performance Mode. This is the default mode when the power is turned on.
3. By pressing DATA ENTRY [INC]/[DEC], you select other Performances. [INC] increases the number, [DEC] decreases it.



In order to switch quickly through performance numbers, press one of the [INC]/[DEC] buttons while the other button is depressed.

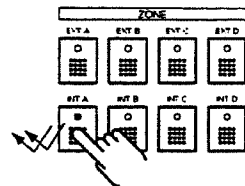
* For more about the Performances that came with your A-90EX when it was shipped from the factory, please see "Reference p.46" in the Volume 1.

Let's Try Layering Sounds

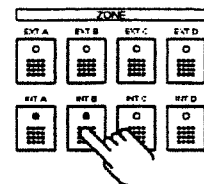
The A-90EX has four zones (parts) in which internal sound sources are controlled.

According to which zone a patch supplied by the VE-RD1 is assigned to, you can assemble four different tones independently. Let's switch among the four zones and compare the differences.

1. By pressing DATA ENTRY [INC]/[DEC], choose Performance " 1 ".
2. Press ZONE SWITCH [INT A] twice in rapid succession (this is called double clicking). The indicator should be lit, and only the [INT A] switch will be on.



3. When you play the keyboard, only sounds from Zone A of the internal sound source will be produced.
4. Let's listen to sounds from the remaining zones in just the same way.
 - * At this point, even if you press EXT A-D, no sound will be made. (see chapter 2)
5. Next, let's layer and listen to sounds from multiple zones. Turn these on by pressing [INT A] and [INT B] (indicators lit).



6. In the same way, let's try combinations with other zones (INT A-D).

Proceeding in this fashion, we can produce and play new sounds depending on the way we combine multiple zones.

About the Keyboard's Polyphonic Capabilities

The VE-RD1 is capable of generating 64 voices at the same time. The maximum number of polyphonic notes that you will be able to obtain at any particular time, however, will vary depending on the total number of voices that are assigned to the Patches being used.

For example, only 32 polyphonic notes will be available if the Patch being used is composed of two voices. Note also that the maximum number of polyphonic notes you can obtain will also be reduced if you sound more than one zone at the same time.

For more about the number of voices of each patch in VE-RD1, please see p. 46 "VE-RD1 Patch List" of the Volume 1.

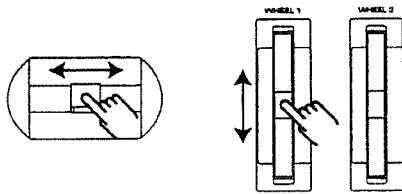
Adding Expression to Sounds Using Controllers

The A-90EX is equipped with many controllers able to assign various functions. Let's try actually using some of them.

* The effects you get by using controllers may differ depending on settings such as the performance you've chosen or the tone. If the effects are difficult to understand, please choose another performance.

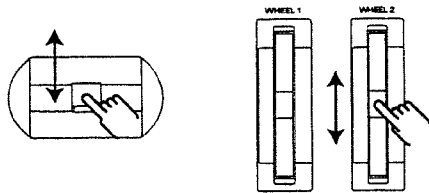
Adding Changes to Pitch

Let's try moving the Pitch Bend/Modulation Lever as well as WHEEL 1 while playing the keyboard. With the lever, moving it to the right raises the pitch, and moving the lever to the left lowers the pitch. When you use the wheel, rotating the wheel away from you raises the pitch, and moving the wheel toward you lowers it. This is called pitch bend.



Adding Vibrato to Sounds

Let's try moving the Pitch Bend/Modulation Lever and WHEEL 2 while playing the keyboard. When you use the lever, moving it away from you increases vibrato, and moving it toward you reduces it. With the wheel as well, rotating it away from you increases the vibrato, and moving the wheel toward you reduces it. This is called the modulation effect.



When you move the lever away from you while moving it left and right, you can get both effects, pitch bend and modulation, simultaneously.

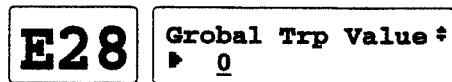
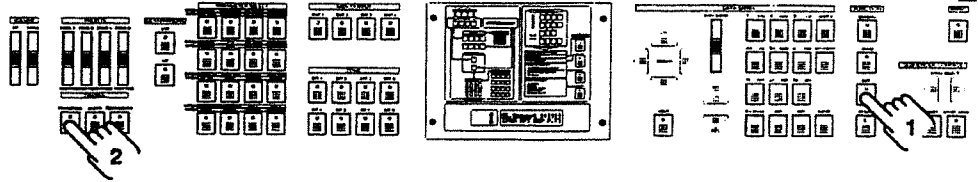
Using the Hold Pedal.....

When you plug the pedal switch (e.g., the DP-6 included with this unit) into the HOLD jack on the rear panel, then for as long as you step on the pedal, you can cause notes to continue to play (hold), even if you remove your hands from the keyboard. However, if you've selected a tone which fades even when the keys are not released, then that tone can still fade, even if you press the pedal.

Transposing Keyboard Ranges

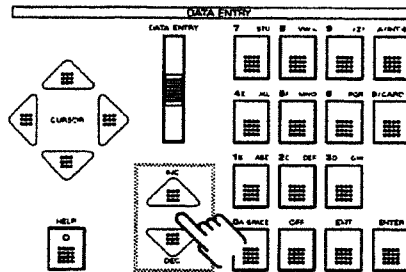
You can transpose ranges on the keyboard three octaves up or down in half-step increments (-36 to +36 half steps). This is known as the transpose function. You can use this when you play bass or instruments with wide ranges, such as the trumpet or clarinet, in the same range as is printed on sheet music.

1. Press the FUNCTION [EDIT] button, and continue by pressing [TRANPOSE].



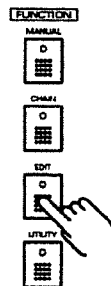
* Regarding Edit Mode, please see p.8 in the Volume 2.

2. In the same manner as when we selected a Performance, by pressing DATA ENTRY [INC]/[DEC], determine the interval you want to transpose by.

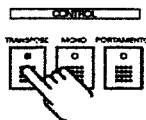


* When pressing both [INC]/[DEC] the values change rapidly, stopping at 0.

3. Press [EDIT], and you return to Performance Mode.



4. By pressing [TRANPOSE], you switch transpose on and off. When it is switched to on, you can transpose as instructed above.



The transposition just now set transposes in all zones, so it is called global transpose. Distinct from global transpose, you can also set transpositions for each zone separately (Volume 1 "Setting the Pitch": p.21)

* The global transpose setting does not change even if the Performance is changed or the power is restored.

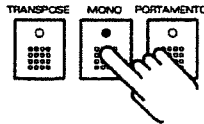
Changing Tones with the Keyboard

Depending on how strongly you press the keys (velocity), the volume and how the notes sound can change. Also, after the keys have been depressed, when played strongly (aftertouch), the sound may be altered.

Selecting Monophonic Sound

Ordinary tones sound with harmony, or a number of sounds played simultaneously (polyphonic). You can make this appear as if it were only one sound (monophonic). This is effective when using tones of monophonic instruments (such as saxophones or flutes).

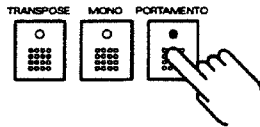
Pressing [MONO] switches between monophonic and polyphonic modes.



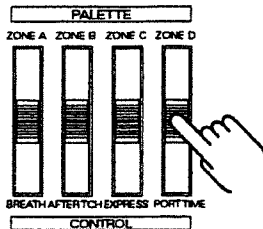
Adding Portamento Effect

The effect whereby the pitch glides smoothly from one note to the next is called the portamento effect. When matched with monophonic mode, an effect resembling the way a violin bow sounds can be produced.

1. Pressing [PORTAMENTO] switches the portamento effect on and off.

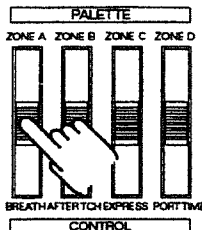


2. The speed at which one note glides to the next is changed with the PORT TIME on the CONTROL slider. The more you move the slider up, the slower the glide.



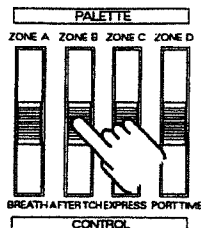
Changing Volume and Other Parameters 1

With the BREATH control slider you can change the volume and tone. Actually, exactly what you are able to adjust depends on the currently selected Performance or tone.



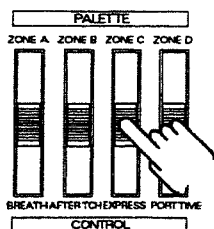
Changing the Timbre with the Slider.....

Whenever the keyboard is played, you can obtain a change in the way the sound is produced (an effect called aftertouch) when you continue to apply pressure on keys after they are played. You can also obtain this same effect by manipulating the slider. Try moving the "AFTER TCH" CONTROL slider after playing the keys. The effect deepens the more you move the slider up.



Changing Volume and Other Parameters 2.....

By moving the EXPRESSION control slider, you can change volume and tone. Actually, exactly what you are able to adjust depends on the currently selected .



Creating Sounds

Now that you understand the basics for using the unit as a stage piano, let's next go ahead and try making some sounds, so you can create the sounds that you like.

Combining Sounds

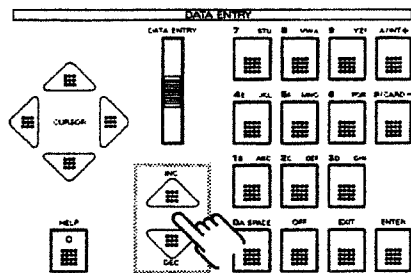
In the four zones, VE-RD1 patches are assigned; while in a Performance, settings are made on the combination of the four zones.

You can change the tone by switching one patch that has been assigned to a zone with another patch, or by altering the combination of zones.

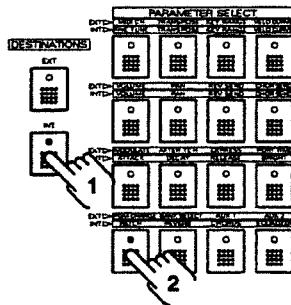
* For more about the VE-RD1 patches, please see p.46 VE-RD1 patch list.

So, let's select patches for each zone.

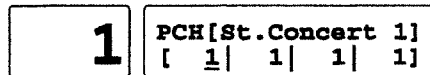
1. Press DATA ENTRY [INC]/[DEC] to select Performance " 1 ".



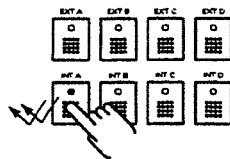
2. Choose an internal zone by pressing DESTINATIONS [INT], and continue by pressing PARAMETER SELECT [PATCH].



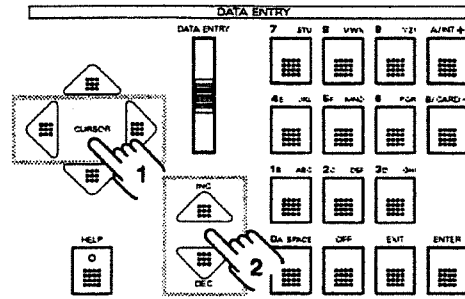
Now, displayed in order in the lower part of the right screen are the patches for the internal zones A, B, C, and D. In the left screen, a zone patch with a cursor (underline) is displayed, and the name of that patch appears in the upper part of the right screen.



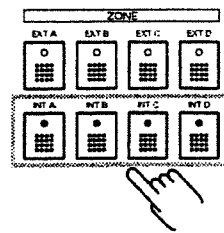
3. First, select the patch for internal zone A. As we only want to hear the sound from zone A, turn on only ZONE switch [INT A].



- By pressing the CURSOR buttons [◀]/[▶] move the cursor to internal zone A, press DATA ENTRY [INC]/[DEC], and select a patch (1–128).



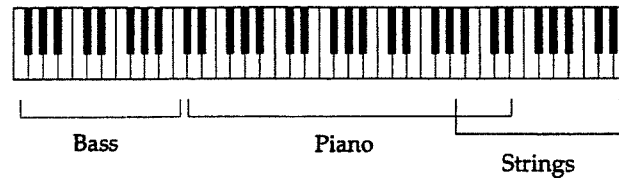
- After you have decided on a patch, repeat steps 3–4 to choose patches for the remaining zones B–D.
- Let's combine internal zones A–D and listen to the results.



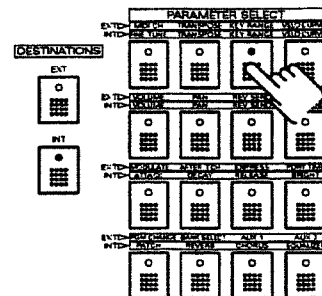
- * When you have decided on a combination of sounds, it is not necessary to use all four of the zones. If there is a zone you are not using, be sure to turn off the ZONE switch for that zone.

Determining Ranges

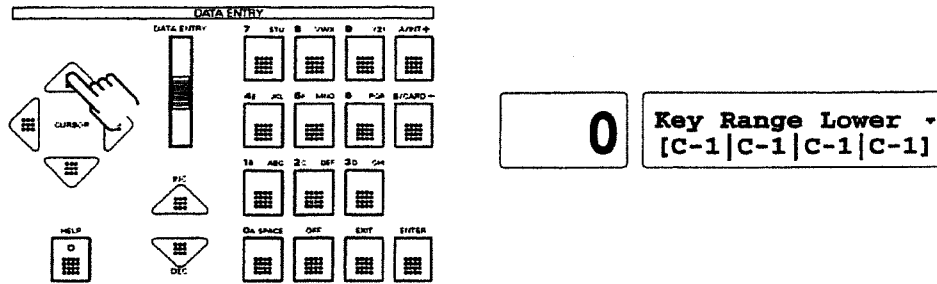
Determine the range of each zone (the limits within which sounds can be played). For example, if you want to play with bass in the left hand and piano in the right, having set patches of bass in zone A and piano in zones B, make your settings so that zone A will sound in the range below C3, and zone B will sound in the range above C3. At this point, all four zones are set to sound on the entire keyboard, so you will be able to hear all the tones layered.



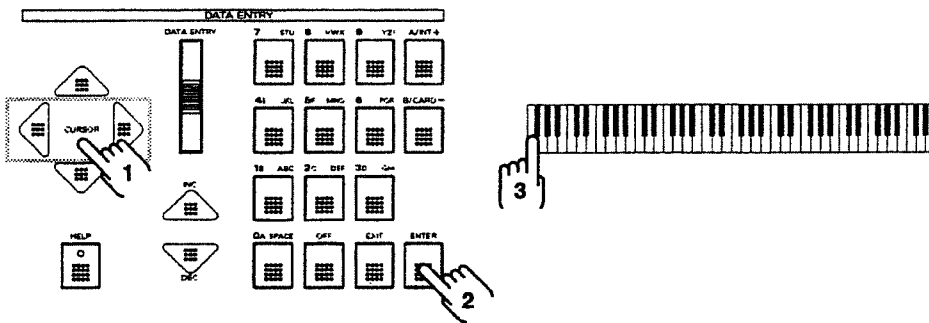
- Press PARAMETER SELECT [KEY RANGE]. (If DESTINATIONS [INT] is not on, press [INT] as well.)



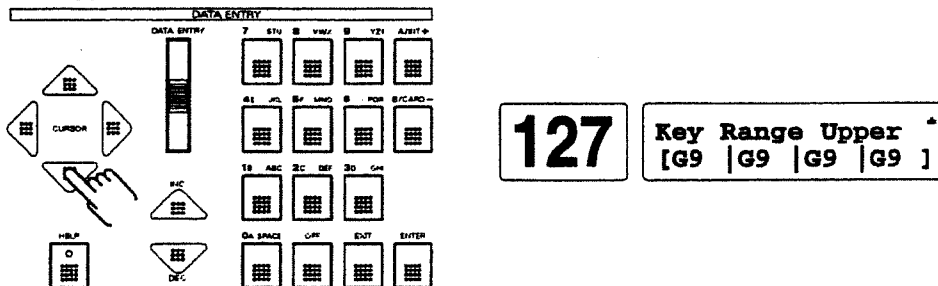
- First, set the lower limit for each zone you want to sound. Press the CURSOR button [▲], and the Key Range Lower screen will appear. The lower limits for the internal zones A, B, C, and D will appear in order from the left in the display.



- Choose zones by pressing the CURSOR buttons [◀]/[▶], and then, while holding down [ENTER], press the key for the desired lower limit.

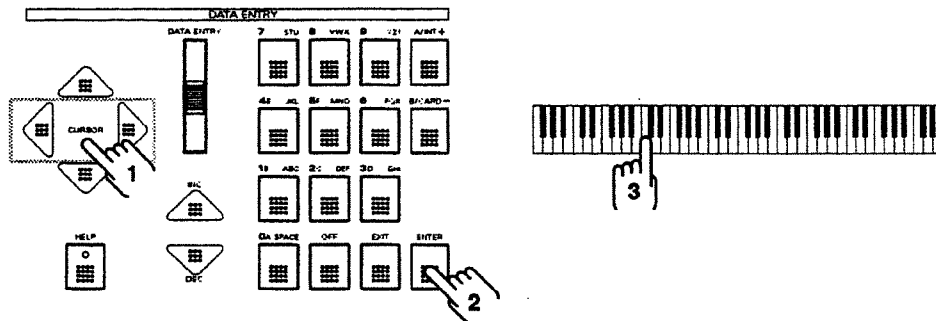


- Next, set the upper limit for each zone you want to sound. Press the CURSOR button [▼], and the Key Range Upper screen will appear. The upper limits for the internal zones A, B, C, and D will appear in order from the left in the display.



- Choose zones by pressing the CURSOR buttons [◀]/[▶], and then, while holding down [ENTER], press the key for the desired upper limit.

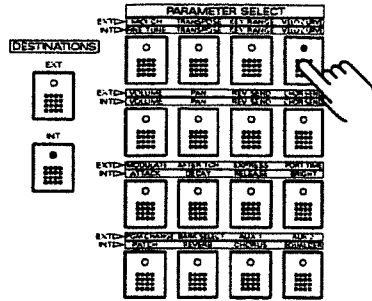
With this, sounds for each zone will be produced only between the set lower and upper limits.



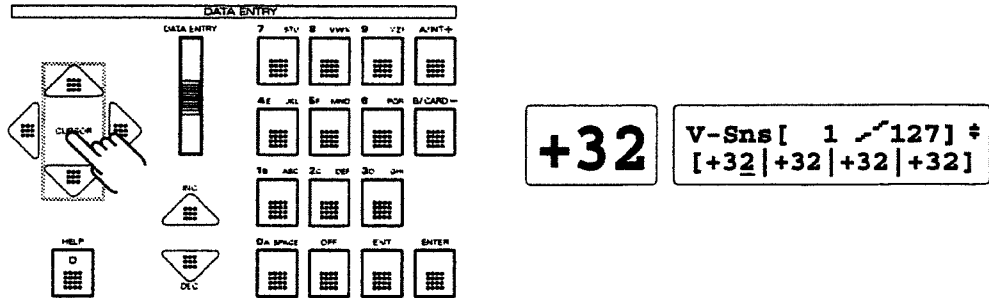
Changing the Touch of the Keys.....

Setting the heaviness of the key's touch.

1. Press PARAMETER SELECT [VELO CURVE]. (If DESTINATIONS [INT] is not on, press [INT] as well.)

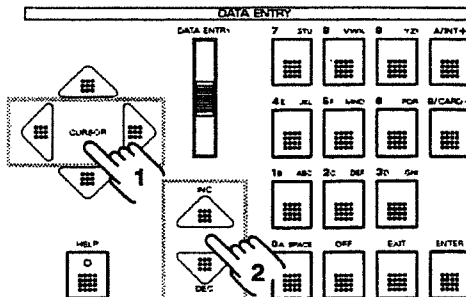


2. Set the Velocity Sensitivity for each zone. Press the CURSOR buttons [▲]/[▼], and the V-Sns (Velocity Sensitivity) screen will appear. The Velocity Sensitivity for the internal zones A, B, C, and D will appear in order from the left in the display.



Velocity sensitivity affects the dynamics of the keyboard (Touch). The higher the value is, the heavier the touch, and the closer to zero the lighter the touch becomes. (+32 is the standard value. Zero is the absolute lightest (in this case, there will be no change in the velocity relative to how hard the keys are played; it is always at the maximum). If you end up with opposite values, then the correspondence between how strongly the keys are played and the actual velocity is reversed (playing hard makes it quiet, playing softly makes it loud).

3. Choose zones by pressing the CURSOR buttons [◀]/[▶], press DATA ENTRY [INC]/[DEC], and the velocity sensitivity is set.

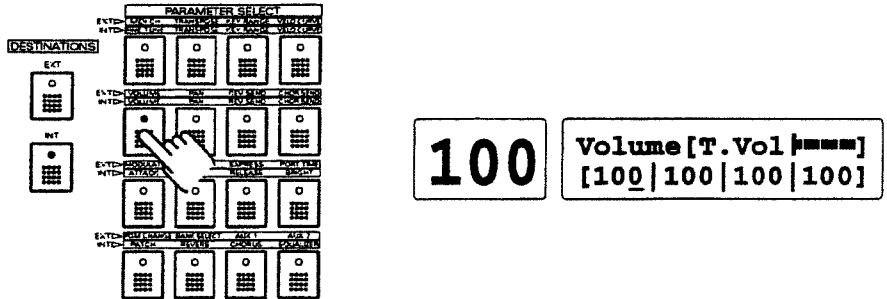


Balancing Out the Zones

Setting the volume and placement of each zone.

Setting the Volume

1. Press PARAMETER SELECT [VOLUME]. (If DESTINATIONS [INT] is not on, press [INT] as well.)

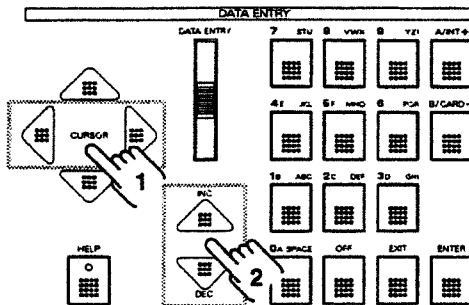


Now, displayed in order in the lower part of the right screen are the volume levels for the internal zones A, B, C, and D. In the left screen, volume is displayed with a cursor (underline), and TOTAL VOLUME appears in the upper part of the right screen.

- * TOTAL VOLUME changes the volume while preserving the balance of each zone (this includes zones from external MIDI devices). INT VOLUME is the volume of the final output of the internally-installed voice expansion board.



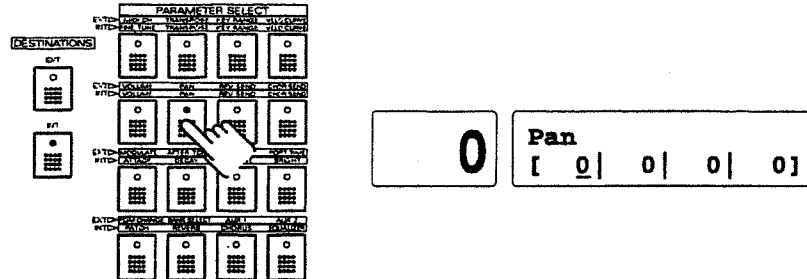
2. Choose zones by pressing the CURSOR buttons [◀]/[▶], press DATA ENTRY [INC]/[DEC], and the volume is set.



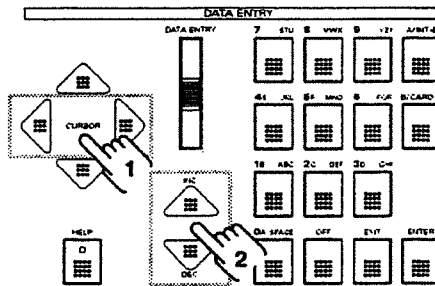
- * When TOTAL VOLUME is not at the maximum level, the maximum volume that can be set for each zone will be the same value as that for TOTAL VOLUME. We recommend setting TOTAL VOLUME to the maximum level.

Setting Placement (Pan)

1. Press PARAMETER SELECT [PAN]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen in order from the left is the pan for each of the internal zones A, B, C, and D.



2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by using DATA ENTRY [INC]/[DEC], set the pan.



Changing Patch Settings

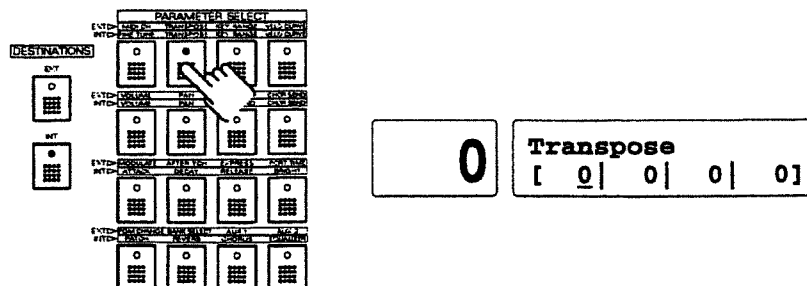
Let's try changing the settings in each zone of patches that have been switched.

Setting the Pitch

For each zone you can get a detune effect, where the pitch is shifted slightly, as well as a fixed harmony effect.

First, set the general pitch with the transpose in each zone.

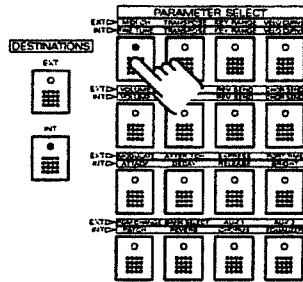
1. Press PARAMETER SELECT [TRANPOSE]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the transposition for each of the internal zones A, B, C, and D.



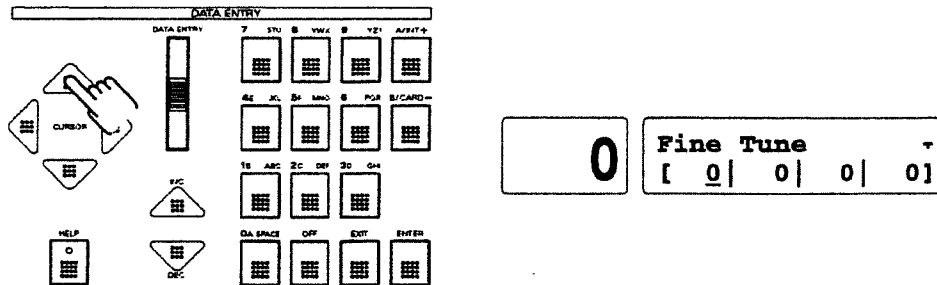
2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by using DATA ENTRY [INC]/[DEC], set the pitch in half-tone units (-36 to +36 half-tones).

Next, finely adjust the transposed pitch with Fine Tune.

3. Press PARAMETER SELECT [FINE TUNE]. (If DESTINATIONS [INT] is not on, press [INT] as well.)



4. Press the CURSOR [▲] to go to the Fine Tune screen. Shown in the screen, in order from the left, is the fine tune for each of the internal zones A, B, C, and D.

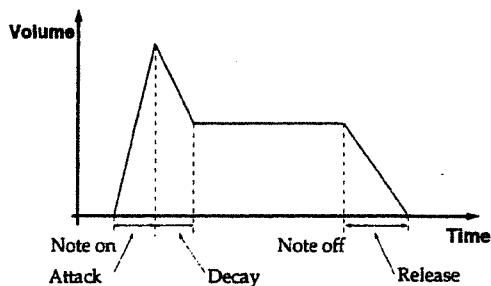


5. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the pitch in one-cent units (-50 to +50 cents).

* One cent is 1/100th of a half-tone.

Changing Sounds' Rise and Fall (Attack and Decay)

From the time a musical instrument begins a sound, the volume changes as time passes. Here, we can set three changes: the elapsed time between when a key is struck to when the highest volume is reached (Attack Time); the time between when the highest volume is reached and when the volume no longer changes (Decay Time); and the time from when the key is released to when the sound stops (Release Time).

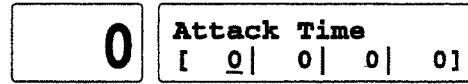
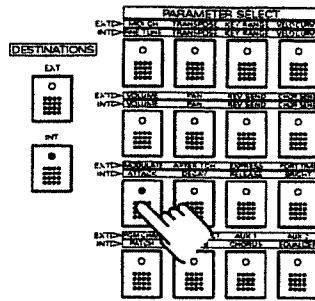


These values are adjusted from the patches' original values using +/-.

* You cannot make changes beyond the VE-RD1's maximum and minimum values. For example, if the patch's original value is a maximum value, the sound will not change, even when you press a + value.

First, let's set the attack volume.

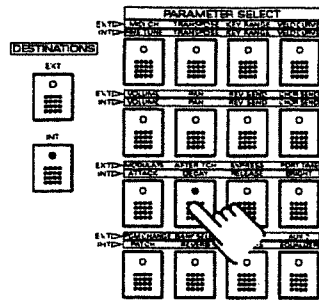
1. Press PARAMETER SELECT [ATTACK]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the attack time for each of the internal zones A, B, C, and D.



- Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the attack time. If you want to speed up the volume's rise, reduce the value, and if you want to slow it down, increase the value.

Next, let's set the decay time.

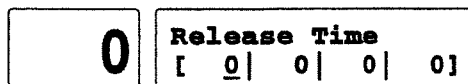
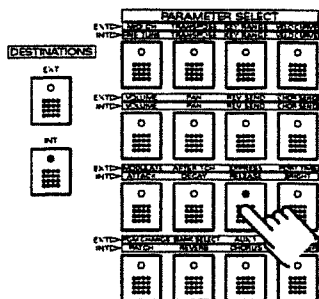
- Press PARAMETER SELECT [DECAY]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the decay time for each of the internal zones A, B, C, and D.



- Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the decay time. If you want to shorten the time between the maximum and fixed volume, reduce the value, and if you want to lengthen it, increase the value.

Finally, let's set the release time.

- Press PARAMETER SELECT [RELEASE]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the release time for each of the internal zones A, B, C, and D.



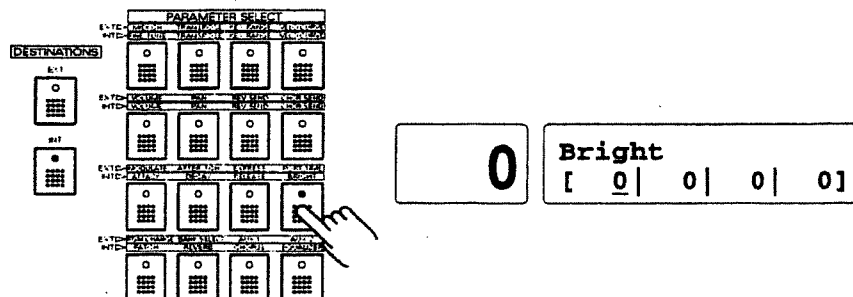
- Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the release time. If you want to shorten the time for the sound to disappear, reduce the value, and if you want to lengthen it, increase the value.

Changing Sound Brightness

Let's set the brightness of the tone. As with the previously mentioned parameter, the values of this parameter are adjusted from the patches' original values using +/-.

* You cannot make changes beyond the VE-RD1's maximum and minimum values.

1. Press PARAMETER SELECT [BRIGHT]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the sound brightness for each of the internal zones A, B, C, and D.



2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the sound brightness. If you want to make the sound brighter, increase the value, and if you want to round out the sound more, reduce the value.

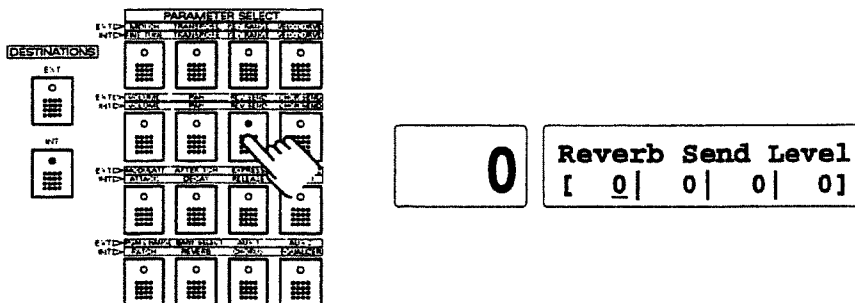
Adding Effects

The VE-RD1 comes with three effects - Chorus, Reverb, and Equalizer.

Adding Reverb

Set the conditions for added reverb (Reverb Send Level) in each zone.

1. Press PARAMETER SELECT [REV SEND]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the reverb send level for each of the internal zones A, B, C, and D.



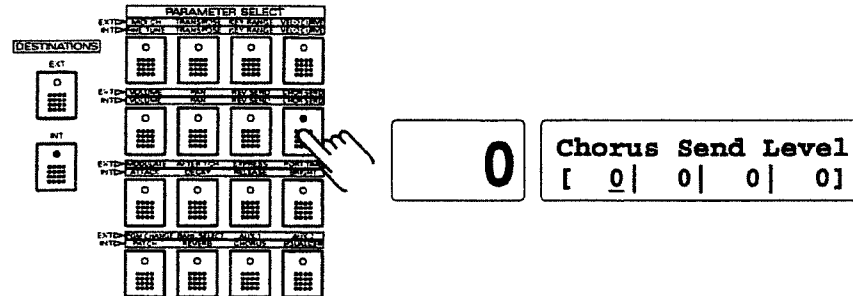
2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the reverb send level. The higher the value you select, the bigger the reverb effect.

Double clicking the PARAMETER SELECT [REV SEND] will cause the indicator to flash and the Reverb Send Levels of all the four Zones to turn to zero. Double clicking it again will cause the indicator to stop flashing and the Reverb Send Level to return to the previous levels. Using this operation, you can switch on/off the reverb effect. (When set to off, it will remain off even when Performances are changed. It will be returned to on, when the unit is switched off once then on again.)

Adding Chorus

Set the starting conditions for the chorus (Chorus Send Level) in each zone.

1. Press PARAMETER SELECT [CHOR SEND]. (If DESTINATIONS [INT] is not on, press [INT] as well.) Shown in the screen, in order from the left, is the chorus send level for each of the internal zones A, B, C, and D.



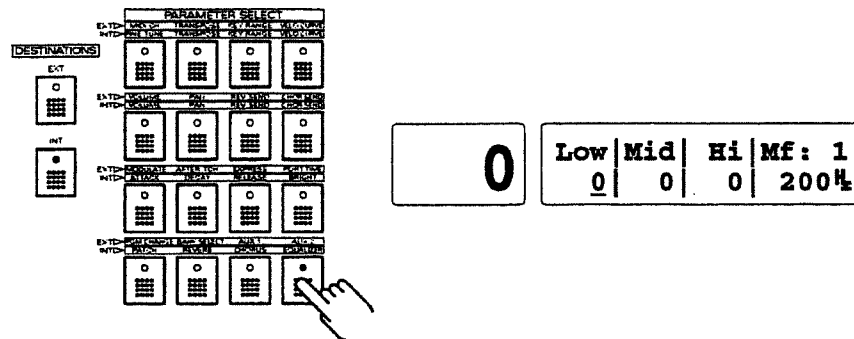
2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the chorus send level. The higher the value you select, the bigger the chorus effect.

Double clicking the PARAMETER SELECT [CHOR SEND] will cause the indicator to flash and the Chorus Send Levels of all the four Zones to turn to zero. Double clicking it again will cause the indicator to stop flashing and the Chorus Send Level to return to the previous levels. Using this operation, you can switch on/off the chorus effect. (When set to off, it will remain off even when Performances are changed. It will be returned to on when the unit is switched off once then on again.)

Equalizing

The equalizer is added to the final output.

1. Press PARAMETER SELECT [CHOR SEND]. (If DESTINATIONS [INT] is not on, press [INT] as well.)



Starting at the left of the display screen, Low (low frequency volume), Mid (Midrange frequency volume), Hi (high frequency volume), and Mf (midrange bandwidth center) are shown.

2. Choose parameters by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the values of each parameter.

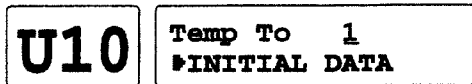
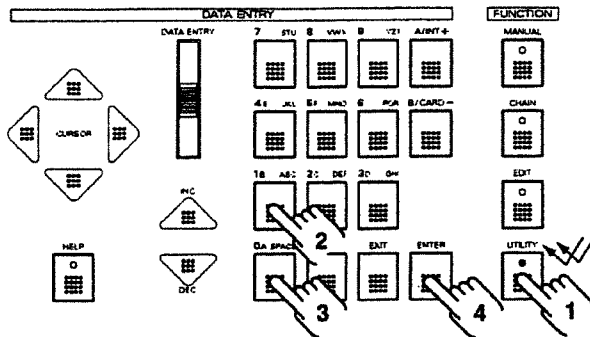
Returning to Performance Mode/Recording Settings

Up to this point, we have made various settings using PARAMETER SELECT. After pressing a PARAMETER SELECT button, or a DESTINATIONS button that is on, you can return to the original Performance mode.

However, if while in just this state the power is turned off, or you switch to another Performance, the settings you put so much effort into making will be erased. Therefore, you will want to save various settings as a Performance.

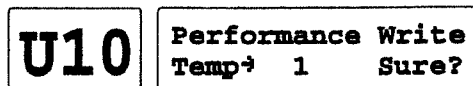
* Zone switch conditions are also saved as Performances. Be careful about switching between on and off when making listening comparisons.

1. Double click the FUNCTION [UTILITY] button, and with the numeric keypad press [1][0][ENTER].



* For more about Utility mode, please see p.8, 44 in the Volume 2.

2. Before saving, designate a Performance number using DATA ENTRY [INC]/[DEC].
 - * Any Performance existing in the location where you want to save the new Performance will be overwritten and erased.
3. When the location where you want to save the new Performance is all ready, press [ENTER]. A confirmation message appears on the screen. If all is ready for the save, press [ENTER]. If you want to cancel the operation, press [EXIT].



4. When the save is completed, "Complete" appears in the display, and you are returned to the previous mode. Afterwards, you will be able to call up this Performance number.

The results of the settings in Chapter 1 affect only the internally installed VE-RD1 (excluding functions such as Global Transpose and Zone Switch, among others). Regarding settings of MIDI devices connected externally, please see Chapter 2, and other settings related to the voice expansion board in Chapter 3.

Chapter 2 The A-90/EX as a Master Keyboard

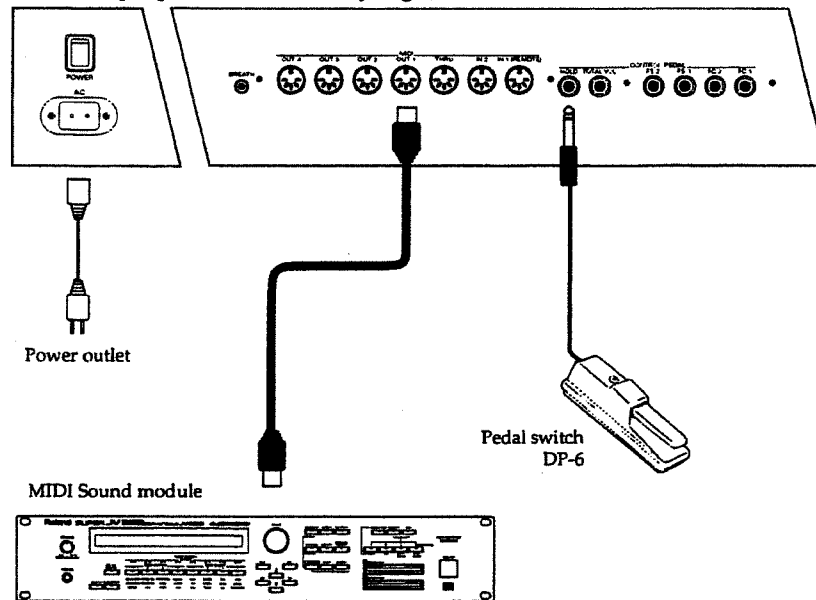
The A-90/EX, with four zones (with the A-90/EX, parts are called zones) for external MIDI equipment (making a maximum of eight), four independent MIDI output channels, and furnished with numerous controllers, can freely manage MIDI systems. In this chapter, basic operations of the A-90/EX as a master keyboard and the control of externally connected MIDI devices is explained.

Before Performing

Connecting the Necessary Equipment

Please connect external devices to the A-90EX referring to the figure below.

At this point, we will connect a multitimbral sound generator (a MIDI sound source that can play back multiple parts simultaneously: e.g., JV-1080 or XP-50).



* MIDI cables (e.g., MSC-15) are not included. Please purchase these at a specialized dealer.

1. Before making any connections, please confirm that power to all equipment is turned off.
2. After connecting the AC cord to the A-90, plug the other end onto a power outlet.
3. Connect MIDI cables as shown in the diagram. Also connect the pedal switch (DP-6).
4. Connect the keyboard amplifiers, audio sets, headphones, etc., necessary for any external MIDI equipment you have connected. For more details on these, please read the user's manuals included with each piece of equipment.

Turning the Power On

1. Before turning on the power, please confirm the following:
 - All MIDI devices are properly connected
 - The volume of any external MIDI equipment, as well as the volume of any amplifier or mixer that is connected, is turned down completely.
2. Turn on the power switch on the rear panel of the A-90/EX.
3. Turn on the power switch of the external MIDI devices.
4. Turn on the power to any amplifiers that are connected.

Turning the Power Off

1. When turning of the power, first make sure the volume of the MIDI equipment and amplifiers is turned completely down.
2. Turn off the power to connected amps or mixers.
3. Turn off power to the A-90/EX and external MIDI devices.

Setting Up the A-90/EX and External MIDI Equipment.....

1. In order to have control of external MIDI equipment, put the external MIDI equipment in multitimbral mode, and match the receive channels for each part. Match each one - Part 1: Channel 1, Part 2: Channel 2, Part 3: Channel 3, and Part 4: Channel 4.

* For more about external MIDI equipment, please consult the user's manual included with each device.

2. Press the FUNCTION [MANUAL] button, and make sure that the display screen on the A-90/EX looks like the next figure.



With the A-90/EX, you can save 64 kinds of various settings for controlling external MIDI equipment. These settings are called Performances.

Ordinary performances employ Performance mode, where a Performance is chosen and then played, but in order to improve the efficiency of explanations about the basic operation of the A-90/EX as a master keyboard, select manual mode as directed in step 2 above.

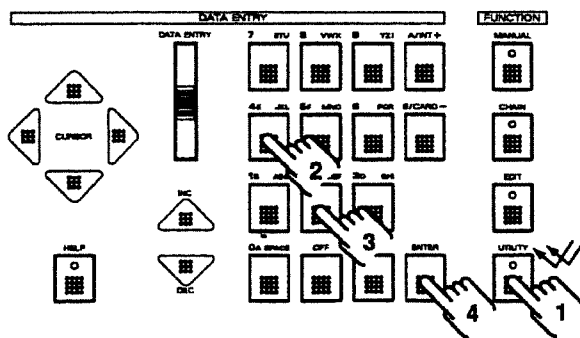
Manual Mode

In manual mode, the following characteristics are present:

- You cannot switch Performances;
- Settings are saved, even if the power is turned off (settings are ordinarily renewed, so it is not necessary to carry out any special operation to save them).
- Other than the above, it is the same as Performance mode.

After changing settings in Manual mode, then switching to some other mode, if you later return to the Manual mode, the previous status will be restored, so it is very convenient. For a more detailed explanation, please see p.7 in the Volume 2.

3. Initialize the Manual mode. Press the FUNCTION [UTILITY] button twice in rapid succession (this is called double clicking). Next, press [4][2][ENTER] on the numeric keypad.



U42 Init Manual Perf
INITIAL DATA → Man

4. When you press [ENTER] twice, preparation is complete.

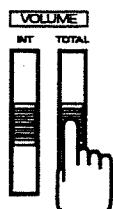
* For more about initiating Utility mode as well as Manual mode, please see p.8, 49 in the Volume 2.

Playing External MIDI Devices

Adjusting the Volume

While first playing the A-90/EX, adjust the levels of external MIDI devices and any amplifiers or mixers to appropriate levels.

- * The volume of external MIDI devices can be controlled using the TOTAL VOLUME on the A-90/EX. For a detailed explanation on how to adjust it, please see "Setting the Volume", p.39 in the Volume 1.

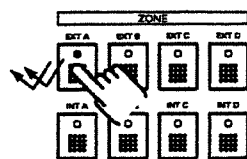


- * If there is no sound, please check the following:
 - Check whether the MIDI equipment receive channels are matched.
- * INT VOLUME does not affect external MIDI equipment. Please see p.6 in the Volume 1.

Let's Try Layering Sounds

The A-90/EX has four zones in which connected MIDI devices are controlled. Each zone corresponds to a separate MIDI device, so you can treat each of the four different tones (sound sources) independently. Let's switch back and forth among the four zones and compare the differences in the sounds.

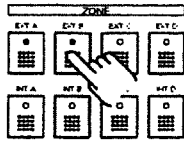
1. Press the Zone switch [EXT A] twice in rapid succession (this is called double clicking). The indicator will be lit, and only the [EXT A] switch will be on.



2. When you play the keyboard, only sounds from external Zone A (Part 1, with the MIDI receive channel set at 1) will be played. The ZONE switch is for switching on and off the output of performance information in each zone.

- * The relationship between zones and connected devices is as follows:
 - External Zone A → Part 1, with MIDI receive channel set at 1;
 - External Zone A → Part 2, with MIDI receive channel set at 2;
 - External Zone A → Part 3, with MIDI receive channel set at 3;
 - External Zone A → Part 4, with MIDI receive channel set at 4.
- * These assignments can be changed. Please see p.16 in the Volume 2.

3. In the same way, let's listen to the sounds in the other zones (EXT B–D).
 - * Right now, even if you press INT A–D, there will be no sound (refer to Chapter 1).
4. Next, let's layer sounds from more than one zone and listen to that. Press [EXT A] and [EXT B] to turn those on (the indicators will be lit).



5. In the same way, let's try combinations with other zones (EXT A–D).

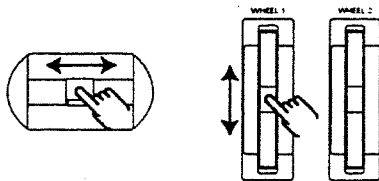
Adding Expression to the Sound Using Controllers

Your is equipped with numerous controllers that can assign various functions. Let's try using some of them.

- * The effects you get by using controllers may differ depending on settings such as the tone you've chosen. If the effects are difficult to understand, please choose another tone (Volume 1 "Combining Sounds": p.34)

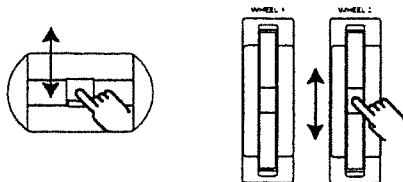
Adding Changes to Pitch

Let's try moving the Pitch Bend/Modulation Lever as well as WHEEL 1 while playing the keyboard. With the lever, moving it to the right raises the pitch (how high the note is), and moving the lever to the left lowers the pitch. When you use the wheel, rotating the wheel away from you raises the pitch, and moving the wheel toward you lowers it. This is called pitch bend.



Adding Vibrato to Sounds

Let's try moving the Pitch Bend/Modulation Lever and WHEEL 2 while playing the keyboard. When you use the lever, moving the it away from you increases vibrato, and moving the it toward you lowers it. With the wheel as well, rotating it away from you increases the vibrato, and moving the wheel toward you lowers it. This is called modulation effect.



When you move the lever away from you while moving it left and right, you can get both effects, pitch bend and modulation, simultaneously.

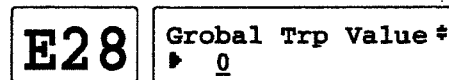
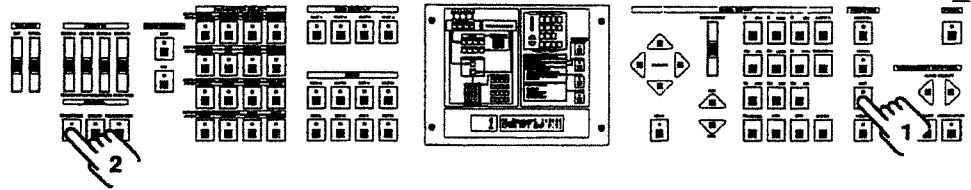
Using the Hold Pedal.....

When you plug the pedal switch (e.g., the DP-6 included with this unit) into the HOLD jack on the rear panel, then for as long as you step on the pedal, you can make sounds continue to play (hold), even if you remove your hands from the keyboard. However, if you've selected a tone which fades naturally, even when the keys are not released, then that tone can still fade, even if you press the pedal.

Transposing Keyboard Ranges

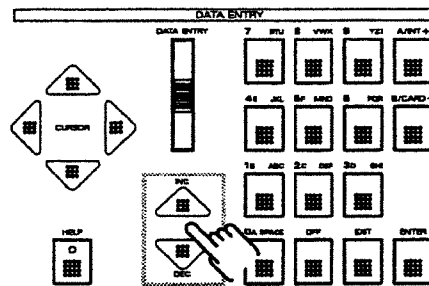
You can transpose ranges on the keyboard three octaves up or down in half-step increments (-36 to +36 half-tones). This is known as the transpose function. You can use this when you play bass or instruments with wide ranges, such as the trumpet or clarinet, in the same range as is printed on sheet music.

1. Press the FUNCTION [EDIT] button, and continue by pressing [TRANPOSE].



* Regarding Edit Mode, please see p.8 in the Volume 2.

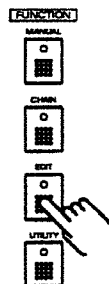
2. In the same manner as when we selected a Performance, by pressing one of the DATA ENTRY [INC]/[DEC] buttons, determine the interval you want to transpose by. [INC] increases the number of half-steps, [DEC] decreases it.



If you want to quickly change the size of the interval, press one of the [INC]/[DEC] buttons while holding down the other.

* When pressing both [INC]/[DEC] buttons, the values change rapidly, stopping at 0.

3. Press [EDIT], and you are returned to Performance mode.



4. Pressing [TRANPOSE] switches the transpose function on and off. When it is on, you can transpose as instructed above.

The transposition just now set transposes in all zones, so it is called global transpose. Distinct from global transpose, you can set transpositions of each zone separately (Volume 1 "Setting the Transposition of Each Zone: p.35)

* The global transpose setting does not change even if the Performance is switched or the power is restored.

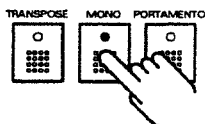
Changing Tones with the Keyboard

Depending on how strongly you press the keys (velocity), the volume and how the notes sound can change. Also, after the keys have been depressed, when played strongly (aftertouch), the sound may be altered.

Selecting Monophonic Sound

Ordinary tones sound with harmony, or a number of sounds played simultaneously (polyphonic). You can make this appear as only one sound (monophonic). This is effective when using tones of monophonic instruments (such as saxophones or flutes).

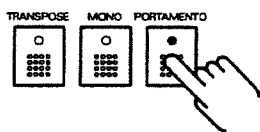
Pressing [MONO] switches between monophonic and polyphonic modes.



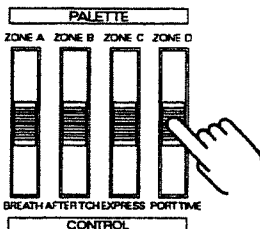
Adding Portamento Effect

The effect of the tuning gliding smoothly from when one sound is first played to when the next one is played is called portamento effect. When matched with monophonic mode, an effect resembling the way a violin slide sounds is produced.

1. Pressing [PORTAMENTO] switches the portamento effect on and off.

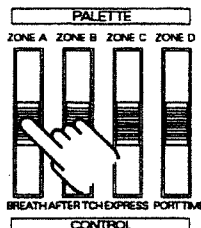


2. The speed at which one note glides to the next is changed with the PORT TIME slider in the CONTROL sliders. The more you move the slider up, the slower the glide.



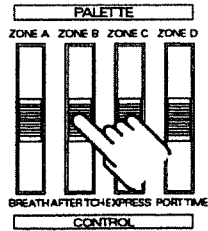
Changing Volume and Other Parameters 1

With the BREATH control slider you can change volume and tone. Actually, exactly what you are able to adjust may differ depending on the settings on the connected MIDI device.



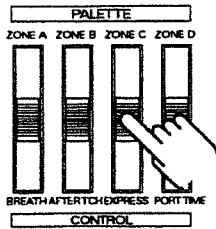
Changing the Timbre with the Slider

Whenever the keyboard is played, you can obtain a change in timbre (an effect called aftertouch) when you continue to apply pressure on keys after they are played. You can also obtain this same effect by manipulating the slider. Try moving the "AFTER TCH" CONTROL slider after playing the keys. The effect deepens the more you move the slider up.



Changing Volume and Other Parameters 2.....

By moving the EXPRESSION CONTROL slider, you can change the volume and tone of sounds. Actually, exactly what you are able to adjust depends on the settings on the connected MIDI device.



Changing Settings

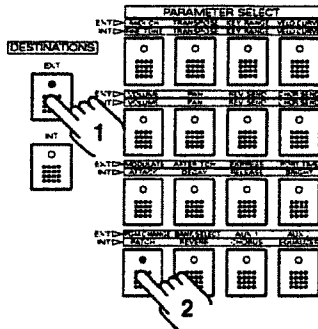
Now that you understand the main operation of this device as a master key board, let's go ahead and learn how to change settings and control external MIDI devices to your liking.

Combining Sounds

In each zone where external MIDI equipment is controlled, you can designate the tone for each external MIDI device's part. The combination of the four zones is set in Performance.

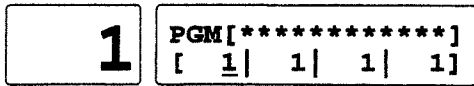
Let's try changing a zone's designated tone for another one, and changing the combination of zones.

1. Select an external zone by pressing DESTINATIONS [EXT], and continue by pressing PARAMETER SELECT [PGM CHANGE].

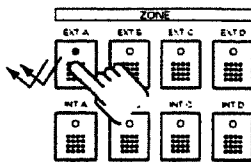


Now, in the lower part of the right screen the program numbers for external zones A, B, C, and D will appear in order from the left in the display.

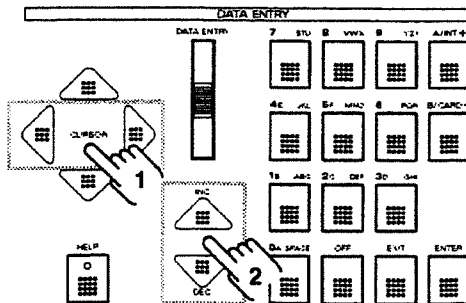
* Tone names may appear in the upper part of the right screen (Volume 2: p.33).



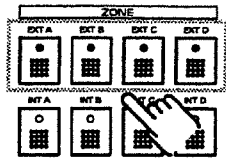
2. First, select the program number for external zone A. As we want to hear sounds only from external zone A, only turn on ZONE switch [EXT A].



3. By pressing the CURSOR buttons [◀]/[▶] move the cursor to external zone A, press DATA ENTRY [INC]/[DEC], and select a program number (1-128).



4. After you have decided on a program number, repeat steps 2. to 3. to designate program numbers for the remaining zones B–D.
5. Let's combine external zones A–D and listen to the results.

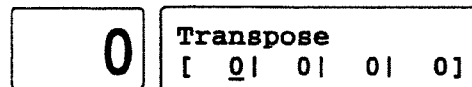
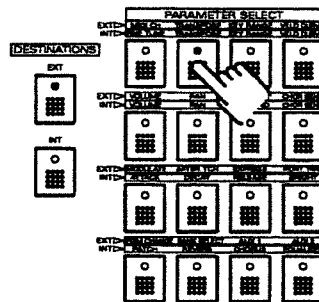


- * When you have decided on a combination of sounds, it is not necessary to use all four of the zones. If there is a zone you are not using, be sure to turn off the ZONE switch for that zone.
- * You can also designate numbers other than program numbers with Bank Select Number (Volume 2: p.29).

Setting the Transposition of Each Zone.....

Set the transposition of each zone, and you can get a subtle harmony effect in the fixed sound.

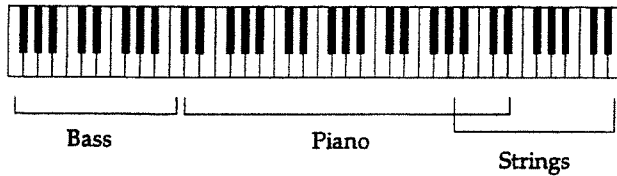
1. Press PARAMETER SELECT [TRANPOSE]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.) The transposition for the external zones A, B, C, and D will appear in order from the left in the display.



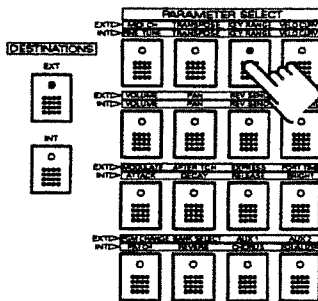
2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and then, pressing DATA ENTRY [INC]/[DEC], set the pitch in half-tone increments (-36 to +36 half-tones).

Deciding Ranges

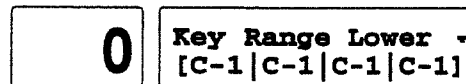
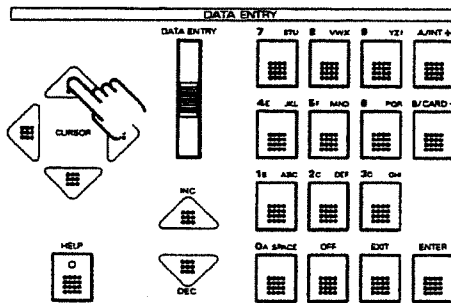
Determine the range of each zone (the limits within which sounds can be played). For example, if you want to play with bass in the left hand and piano in the right, having set patches of bass in zone A and piano in zones B, make your settings so that zone A will sound in the range below C3, and zone B will sound in the range above C3. At this point, all four zones are set to sound on the entire keyboard, so you will be able to hear all the tones layered.



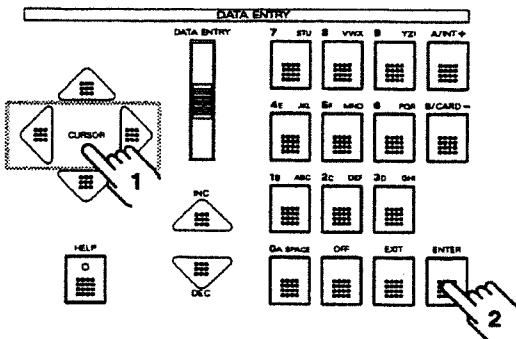
1. Press PARAMETER SELECT [KEY RANGE]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.)



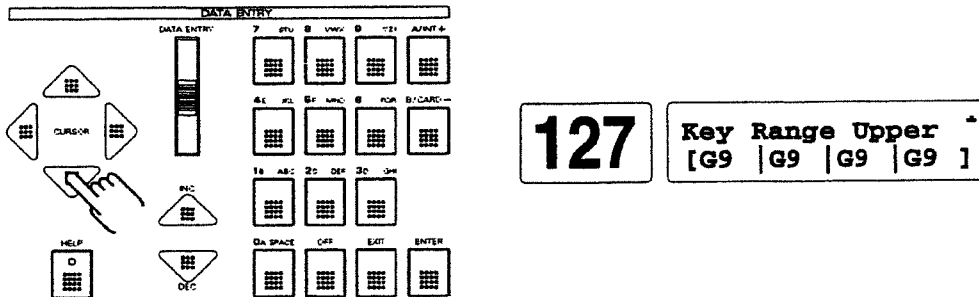
2. First, set the lower limit for each zone you want to sound. Press the CURSOR button [▲], and the Key Range Lower screen will appear. The lower limits for the internal zones A, B, C, and D will appear in order from the left in the display.



3. Choose zones by pressing the CURSOR buttons [◀]/[▶], and then, while holding down [ENTER], press the key for the desired lower limit.

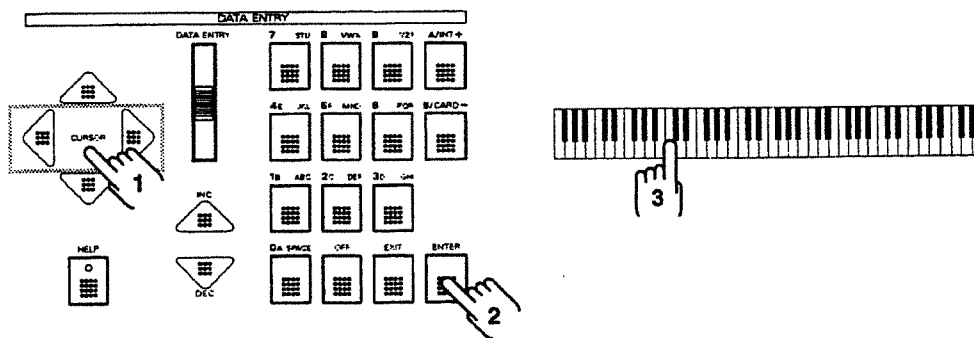


4. Next, set the upper limit for each zone you want to sound. Press the CURSOR button [▼], and the Key Range Upper screen will appear. The upper limits for the internal zones A, B, C, and D will appear in order from the left in the display.



5. Choose zones by pressing the CURSOR buttons [◀]/[▶], and then, while holding down [ENTER], press the key for the desired upper limit.

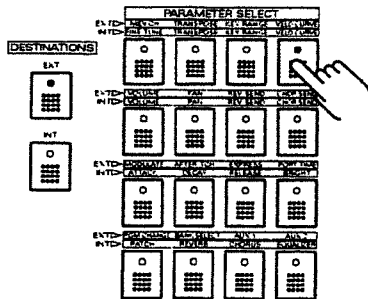
With this, sounds for each zone will be produced only between the set lower and upper limits.



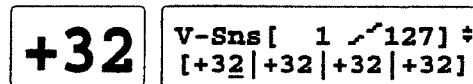
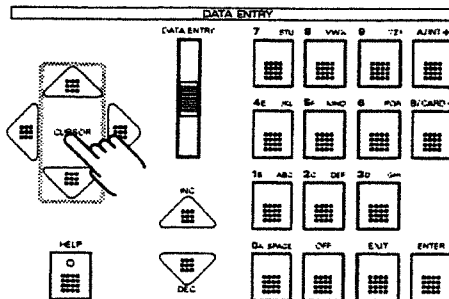
Changing the Touch of the Keys.....

Setting the heaviness of the key's touch.

1. Press PARAMETER SELECT [VELO CURVE]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.)



2. Set the Velocity Sensitivity for each zone. Press the CURSOR buttons [▲]/[▼], and the V-Sns (Velocity Sensitivity) screen will appear. The Velocity Sensitivity for the external zones A, B, C, and D will appear in order from the left in the display.



Velocity sensitivity affects the dynamics of the keyboard (Touch). The higher the value is, the heavier the touch, and the closer to zero the lighter the touch becomes. (+32 is the standard value. Zero is the absolute lightest (in this case, there will be no change in the velocity relative to how hard the keys are played; it is always at the maximum). If the values' plus or minus signs become reversed, then the connection between how strongly the keys are played and the actual velocity is flip-flopped (playing hard makes it quiet, playing softly makes it loud).

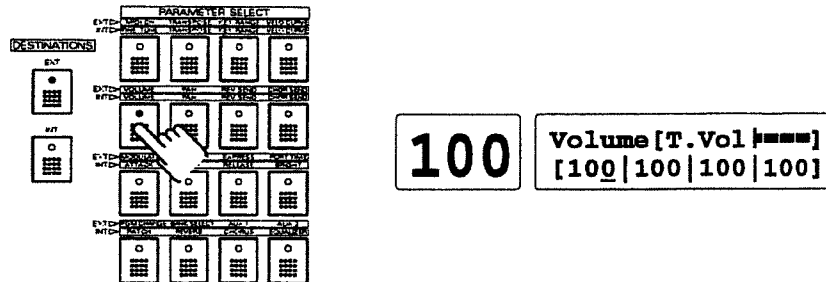
3. Choose zones by pressing the CURSOR buttons [◀]/[▶], press DATA ENTRY [INC]/[DEC], and the velocity sensitivity is set.

Balancing Out the Zones

Setting the volume and placement of each zone.

Setting the Volume

1. Press PARAMETER SELECT [VOLUME]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.)



Now, displayed in order in the lower part of the right screen are the volume levels for the external zones A, B, C, and D. In the left screen, volume is displayed with a cursor, and TOTAL VOLUME appears in the upper part of the right screen.

- * TOTAL VOLUME changes the volume while preserving the balance of each zone (this includes zones from voice expansion boards). INT VOLUME is the volume of the final output of the voice expansion board, so it has no effect on external MIDI devices.

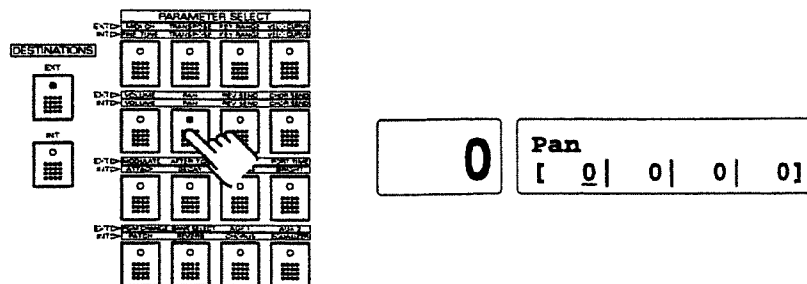


2. Choose zones by pressing the CURSOR buttons [◀]/[▶], press DATA ENTRY [INC]/[DEC], and the volume is set.

- * When TOTAL VOLUME is not at the maximum level, the maximum volume that can be set for each zone will be the same value as that for TOTAL VOLUME. We recommend setting TOTAL VOLUME to the maximum level.

Setting Placement (Pan)

1. Press PARAMETER SELECT [PAN]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.) Shown in the screen in order from the left is the pan for each of the external zones A, B, C, and D.

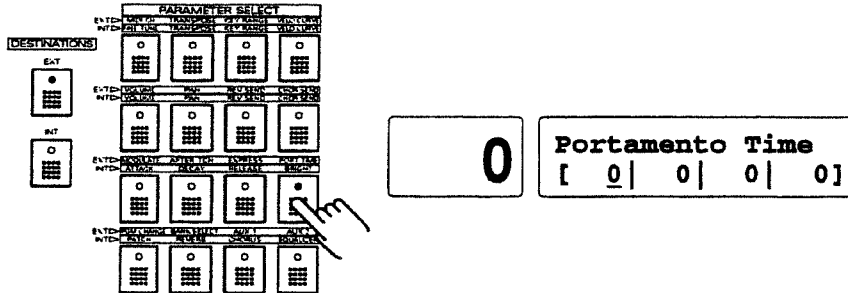


2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by using DATA ENTRY [INC]/[DEC], set the pan.

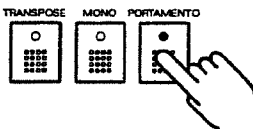
Adding Portamento to Each Zone

You can set the portamento time for each zone.

1. Press PARAMETER SELECT [PORT T]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.) Shown in the screen in order from the left is the portamento time for each of the external zones A, B, C, and D.



2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by using DATA ENTRY [INC]/[DEC], set the portamento time.
3. By pressing [PORTAMENTO], you can switch the portamento effect on and off.



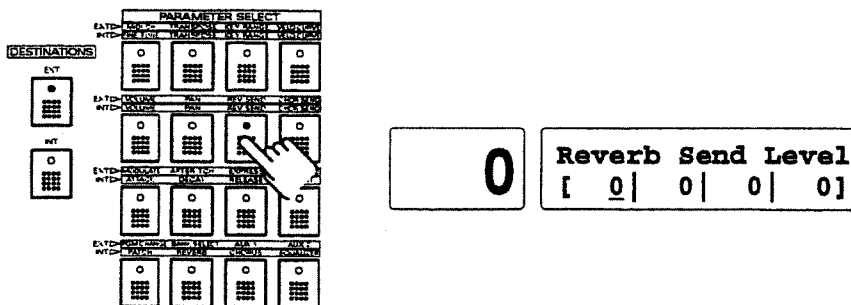
Adding Effects

Set the starting conditions for the built-in effects of any external MIDI devices (depending on the type of device, in some cases it may not match). For more details, please read the user's manual included with each device.

Adding Reverb

Set the conditions for added reverb (Reverb Send Level) in each zone.

1. Press PARAMETER SELECT [REV SEND]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.)



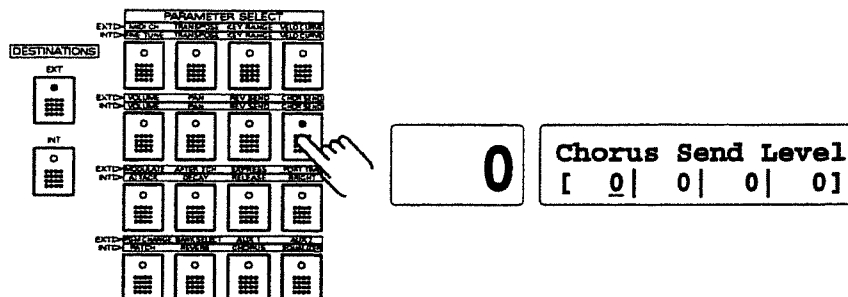
2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the reverb send level. The higher the value you select, the bigger the reverb effect.

Double clicking the PARAMETER SELECT [REV SEND] will cause the indicator to flash and the Reverb Send Levels of all the four Zones to turn to zero. Double clicking it again will cause the indicator to stop flashing and the Reverb Send Level to return to the previous levels. Using this operation, you can switch on/off the reverb effect. (When set to off, it will remain off even when Performances are changed. It will be returned to on when the unit is switched off then on again.)

Adding Chorus

Set the conditions for added chorus (Chorus Send Level) in each zone.

1. Press PARAMETER SELECT [CHOR SEND]. (If DESTINATIONS [EXT] is not on, press [EXT] as well.)



2. Choose zones by pressing the CURSOR buttons [◀]/[▶], and by pressing DATA ENTRY [INC]/[DEC], set the chorus send level. The higher the value you select, the bigger the chorus effect.

Double clicking the PARAMETER SELECT [CHOR SEND] will cause the indicator to flash and the Chorus Send Levels of all the four Zones to turn to zero. Double clicking it again will cause the indicator to stop flashing and the Chorus Send Level to return to the previous levels. Using this operation, you can switch on/off the chorus effect. (When set to off, it will remain off even when Performances are changed. It will be returned to on when the unit is switched off once then on again.)

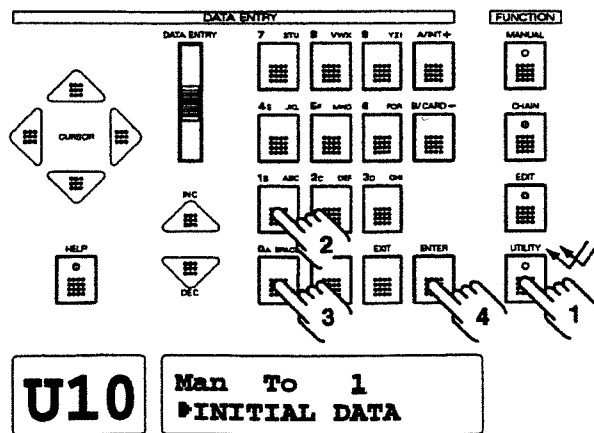
Returning to Manual Mode/Recording Settings

Up to this point, we have made various settings using PARAMETER SELECT. After pressing a PARAMETER SELECT button, or a DESTINATIONS button that is on, you can return to the original Manual mode.

Because the settings we have made up to this point have been saved automatically as manual mode settings, these settings cannot be used in Performance mode. Therefore, please save these settings as a Performance.

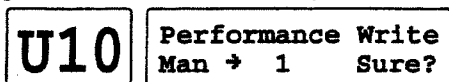
* Zone switch conditions are also saved as Performances. Be careful about switching between on and off when making listening comparisons.

1. Double click the FUNCTION [UTILITY] button, and with the numeric keypad press [1][0][ENTER].



* For more about Utility mode, please see p.8, 44 in the Volume 2.

2. Before saving, designate a Performance number using DATA ENTRY [INC]/[DEC].
 - * Any Performance existing in the location where you want to save the new Performance will be overwritten and erased.
3. When the saving process is all ready, press [ENTER]. A confirmation message appears on the screen. If all is ready for the save, press [ENTER]. If you want to cancel the operation, press [EXIT].
4. When the save is completed, "Complete" appears in the display, and you are returned to the previous mode. Afterwards, you will be able to call up this Performance number.

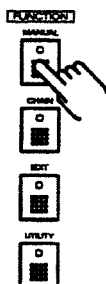


Switching and Playing Performances

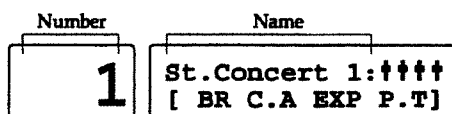
Let's play something while switching Performances in Performance mode.

* Performance mode is the initial state when power is turned on.

1. Switch off FUNCTION [MANUAL] and return to Performance mode.



2. Please confirm that the display window looks like the following. The number of the selected Performance appears in the left screen, and in the upper part of the right screen the Performance name is shown (for more about other displayed information, please see p.9 in the Volume 2).



If the screen appears differently than the above, please check the following.

- Whether there are any indicators lit on the FUNCTION buttons (if any indicators are lit, please turn off the indicators by pressing those buttons);
 - Whether either the DESTINATIONS or PARAMETER SELECT button indicators are lit (if any indicators are lit, please turn off the indicators by pressing those buttons).
3. When you play the keyboard, sound will be produced. This state is called Performance mode.
 - * At this point, according to the Performance, MIDI equipment may not sound.
 4. By pressing DATA ENTRY [INC]/[DEC], let's select some previously saved settings.
In Performance mode, the ability to select performances, and the automatic saving of setting changes (if the power is cut, or if the Performance is switched, the change will not have any effect), it is the same as manual mode. The method (operation) of saving settings is the same as with manual mode.



The results of the settings made in Chapter 2 affect only externally-connected MIDI equipment (excluding such functions as Global Transpose and ZONE Switch). For settings related to the internally-installed VE-RD1 please read Chapter 1, and for other information about settings for the voice expansion board, please read Chapter 3.

Chapter 3 About the Voice Expansion Board

While the A-90/EX is a MIDI master keyboard, with the installed voice expansion board, it can be used as a stage piano, a synthesizer, or a GS sound source keyboard. In this chapter, precautions to be taken for the installation of the internal voice expansion board will be explained.

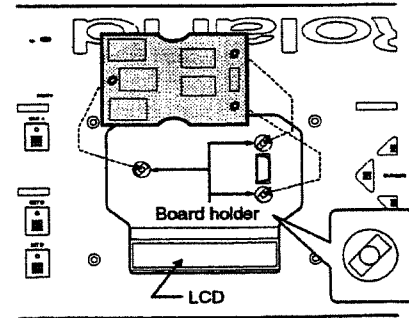
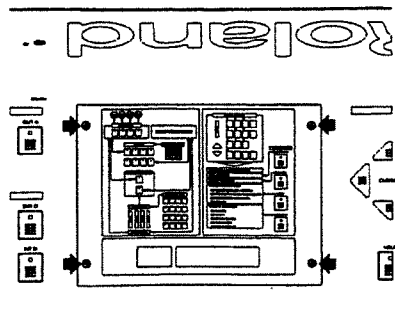
- * Voice expansion boards (VE-RD1 (comes built-in with the A-90EX), VE-JV1, VE-GS1) are sold separately.
- * First please read the user's manual that comes with the voice expansion board.

Installing the Voice Expansion Board

- Always turn the unit off and unplug the power cord before attempting installation of the Voice Expansion Board. 
- Install only the specified Voice Expansion boards (VE series). Remove only the specified screws. 

To avoid the risk of damage to internal components that can be caused by static electricity, please carefully observe the following whenever you handle the board.

- Before you touch the board, always first grasp a metal object (such as a water pipe), so you are sure that any static electricity you might have been carrying has been discharged.
 - When handling the board, grasp it only by its edges. Avoid touching any of the electronic components or connectors.
1. With a screwdriver, unscrew the four corner screws of the center LCD cover on the front of the A-90/EX, and remove the LCD cover.
 - * Please take care not to touch the LCD (liquid crystal display) inside.
 2. Connect the board holder as shown on the diagram.
 - * Do not touch any of the printed circuit pathways or connection terminals.
 3. Securely insert the board's connector into the connector in the A-90/EX. At this point, the three board holder pins should be protruding through the board's three holes.
 - * Never use excessive force when installing a Voice Expansion Board. If it doesn't fit properly on the first attempt, remove the board and try again.
 4. Using the locking tool included with the board, turn the board holder clockwise just 1/4 of a turn, and the board will be fixed to the unit.
 - * When Voice Expansion Board installation is complete, double-check your work.
 5. Finally, attach the LCD cover.



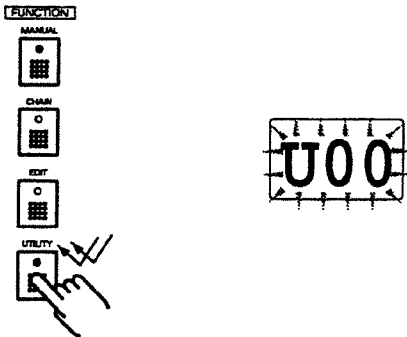
- * If you ever need to remove the board, after turning off power to the A-90/EX, remove the board by reversing the order of the steps used to install the board.

About Coordinating the Voice Expansion Board

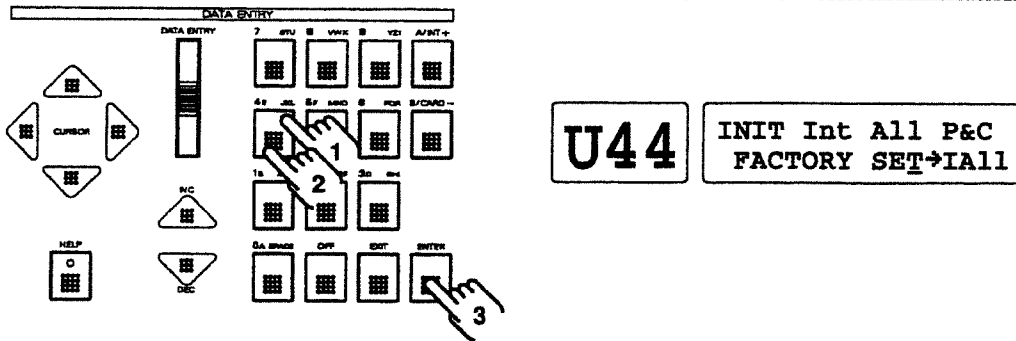
The A-90/EX can initialize settings that have been saved internally to match settings in the voice expansion.

* If settings that have been saved internally are written over, they will be erased. Please be sure to make a backup using any necessary memory card or other means.

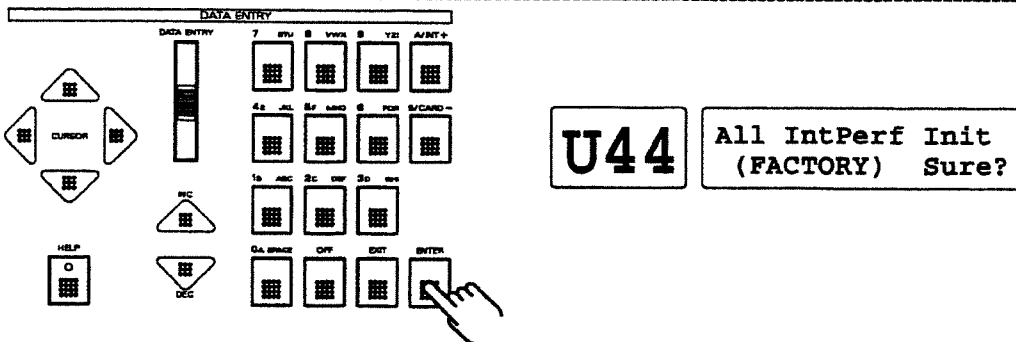
1. Turn on power to the A-90EX.
2. Press the FUNCTION [UTILITY] button twice in succession.



3. Press [4][4][ENTER] on the numeric keypad.



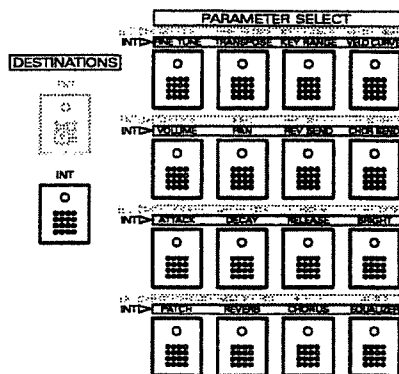
4. If it is all right to initialize, press [ENTER] twice.



Settings for Voice Expansion Board

With the VE-RD1

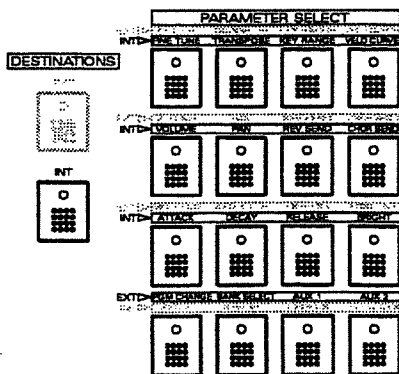
The VE-RD1 is used exclusively with the A-90, so all settings may be made with PARAMETER SELECT.



For more details, please see chapter 1 in the Volume 1 and Volume 2 p.53.

With the VE-JV1 and VE-GS1

The VE-JV1 and the VE-GS1 are not designed specifically for the A-90. This means that PARAMETER SELECT sets some items differently from the VE-RD1.



For more details, please see p.53 in the Volume 2.

Reference

A-90EX Performance List (Factory Set)

No.	Name	No.	Name	No.	Name	No.	Name
1	St.Concert 1	17	E.Grand 80	33	Pno & Str	49	Warm Strings
2	St.Concert 2	18	RD1000 Pno3	34	Pno & Choir	50	Syn.Str 1
3	St.Concert 3	19	E.Grand	35	Pno & Hmng	51	Syn.Str 2
4	St.SemiGrd 1	20	Suitcase	36	Piano/Bass	52	OB Soft Pad
5	St.SemiGrd 2	21	Mr.Suitcase	37	SoftDist Bee	53	LFO Strings
6	Euro Piano 1	22	Stage Rhodes	38	E.Organ	54	A90 Prologue
7	Euro Piano 2	23	DynoRhodes 1	39	Perc Bee	55	Beauty Vox
8	Semi Grand 1	24	DynoRhodes 2	40	60s Organ x3	56	Synth Vox x4
9	Semi Grand 2	25	DynoRhodes 3	41	Vibe&Marimba	57	Pulse Vox
10	Semi Grand 3	26	Wurly	42	Clavi x3	58	A90 Hamming
11	Full Grand 1	27	E.Piano 1	43	PulseKey x3	59	Dawn 2 Dusk
12	Full Grand 2	28	E.Piano 2	44	BrassSect x4	60	Flange Pad 1
13	Full Grand 3	29	D50 EP	45	Bass&Lead 1	61	7th Sand
14	JV80 Piano	30	D50 Stack	46	Bass&Lead 2	62	E.Pno Pad
15	Bright Piano	31	Stack X	47	Bass&Lead 3	63	Sweep Waltz
16	Honky Tonk	32	Stack Piano	48	St.Strings	64	LFO Pad x4

VE-RD1 Patch List

No.	Name	V	No.	Name	V	No.	Name	V	No.	Name	V
1	St.Concert 1	2	33	SA E.Grand 1	1	65	60s Organ 2	1	97	Square Pad	2
2	St.Concert 2	2	34	SA E.Grand 2	3	66	Sqr Organ	2	98	EPno Pad	2
3	St.Concert 3	2	35	CP E.Grand	2	67	Vibe	2	99	7th Sand	4
4	St.Concert 4	2	36	SA Rhodes 1	2	68	Warm Vibes	2	100	Sweep Pad	2
5	St.Concert 5	2	37	SA Rhodes 2	3	69	AmbienceVibe	3	101	A90 Prologue	2
6	St.Concert 6	2	38	Suitcase	2	70	Dyna Marimba	1	102	A90 Rand Pad	2
7	St.Concert 7	2	39	STAGE Rhodes	1	71	Clav 1	2	103	LFO Strings	2
8	St.Concert 8	2	40	Mr.Suitcase	3	72	Clav 2	2	104	A-90 Aurora	3
9	St.Concertff	1	41	Rhodes p	1	73	Clav 3	2	105	A-90 Waltz	4
10	St.SemiGrd 1	2	42	Rhodes m	1	74	Juno Clav	1	106	A-90 Strobe	2
11	St.SemiGrd 2	2	43	Rhodes f	1	75	Poly Synth	2	107	Foiled Again	1
12	St.SemiGrd 3	2	44	DynoRhodes 1	3	76	Pulse Key 1	3	108	Beauty Vox	2
13	St.SemiGrd 4	2	45	DynoRhodes 2	3	77	Pulse Key 2	1	109	Syn Vox 1	1
14	Euro Piano 1	1	46	Wurly	1	78	Square Key	2	110	Syn Vox 2	1
15	Euro Piano 2	1	47	Wurly p	2	79	St.Strings	2	111	Angel Ooohz	2
16	Euro Piano 3	2	48	Wurly mf	2	80	Warm Strings	2	112	Heaven	1
17	Euro Piano 4	2	49	Wurly f	2	81	Slow Strings	2	113	Sawteeth	3
18	Full Grand 1	2	50	D-50 EPiano1	1	82	Strings	1	114	Pulse Lead	4
19	Full Grand 2	2	51	D-50 EPiano2	2	83	OB Thick Pad	3	115	Synth Lead 1	2
20	Full Grand 3	2	52	D-50 Stack	4	84	OB Soft Pad	3	116	Synth Lead 2	1
21	Full Grand 4	2	53	Like Dee	2	85	Soft Pad	1	117	GR Lead	2
22	Full Grand 5	2	54	FM EPiano 1	3	86	Pulse Pad	4	118	20 Years ago	3
23	Full Grand 6	2	55	FM EPiano 2	4	87	SynStrings 1	2	119	SquareLead	2
24	Semi Grand 1	1	56	FM EP 3_1	1	88	SynStrings 2	2	120	Finger Bass1	1
25	Semi Grand 2	1	57	FM EP 3_2	1	89	SynStrings 3	1	121	Finger Bass2	2
26	Semi Grand 3	2	58	FM EP 3_3	1	90	After Rave	2	122	Pick Bass	1
27	Semi Grand 4	2	59	FM EP 3_4	1	91	JP-8Haunting	4	123	Ac.Bass	2
28	Semi Grand 5	2	60	B-3 Organ 1	2	92	Synth Brass1	2	124	Wonder Bass	2
29	Semi Grand 6	2	61	B-3 Organ 2	2	93	Synth Brass2	1	125	Super JX Bs	2
30	JV80 Piano 1	2	62	B-3 Organ 3	1	94	Synth Brass3	1	126	Synth Bass	1
31	JV80 Piano 2	2	63	B-3 Organ 4	1	95	Synth Brass4	1	127	Rubber Bass	2
32	JV80 Piano 3	2	64	60s Organ 1	1	96	Dawn 2 Dusk	3	128	Pedal Bass	2

V : number of voices

For EU Countries

Apparatus containing Lithium batteries

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved feilagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Eksplosjonsfare ved feilaktig skifte av batteri.
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.
Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

VARNING

Explosionsfara ved feilaktigt batteribyte.
Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

For EU Countries



This product complies with the requirements of European Directives EMC 89/336/EEC and LVD 73/23/EEC.

For the USA

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

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

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

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

For Canada

NOTICE

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

AVIS

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

A-90

EXPANDABLE CONTROLLER

Owner's Manual

Volume 2

Introduction

We want to take a moment to thank you for your purchase of the Roland A-90/A-90EX Expandable MIDI Controller.

Its 88-note hammer-action keyboard, outstanding ease of use, and ability to make use of all types of MIDI messages make the A-90/A-90EX a valuable asset in complicated MIDI systems ranging from studio and stage use to DTM (Desk Top Music) applications at home. What's more, use of the special VE-RD1 Voice Expansion Board (available separately for the A-90 and built into the A-90EX) allows use as a 64-voice stage piano. Use of an additional Voice Expansion Board (the VE-JV1 or VE-GS1, both sold separately) allows the controller to be used as a synthesizer or GS sound-source keyboard.

To get the most out of the many excellent features this controller has to offer, and to ensure many years of trouble-free service, we urge you to read through this Owner's Manual (Volume 2) thoroughly.

The A-90/A-90EX can handle many types of MIDI messages, but depending on the MIDI device that is connected, it may not always be possible to make full use of the functions of the A-90/A-90EX. Be sure to also read the user's manual that comes with the MIDI instrument or device that you are connecting.

How to Use This Owner's Manual (Volume 2)

This owner's manual (Volume 2) should be used by the users who have already mastered the basic operations for the A-90/A-90EX, so that they can utilize the more sophisticated functions of the device. Please read the Volume 1 first, before reading this manual.

Conventions in this manual

- This manual is for use with both the A-90 and the A-90EX. In the text, distinctions between units are made by their names:

A-90.....Indicates only an A-90 which is not equipped with a VE-RD1;

A-90EX.....Indicates an A-90EX and an A-90 equipped with a VE-RD1;

A-90/EX.....Indicates both an A-90EX and an A-90.

- Characters and numerals enclosed in square brackets [] indicate buttons (switches) on the A-90/EX's Panel. For example, [ENTER] indicates the Enter button, and [1] indicates the numeric key 1.
- CURSOR [◀]/[▶] or [INC]/[DEC] etc. indicate that you should press one or the other button.
- About the Screen
Please be aware that the content of the illustrations appearing in this manual may differ slightly from the settings you see when you start using your unit.

Features of the A-90/EX

Outstanding Expandability

In addition to being a high-performance MIDI master keyboard, the A-90/EX can be upgraded with a Voice Expansion Board (the VE series, available separately) which allows the unit to function as a synthesizer or a keyboard with an internal GS sound source. In particular, when the VE-RD1 Voice Expansion Board for the A-90 (sold separately for the A-90 and built into the A-90EX) is installed, the A-90/EX can be used as a 64-voice stage piano that makes full use of the features of its 88-note hammer-action keyboard.

Sophisticated MIDI Control

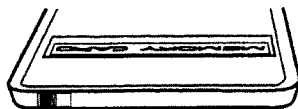
Two MIDI IN, four completely independent MIDI OUT, a rich array of controllers, a maximum of eight Zones (four each for Voice Expansion Boards and for external output), a sequencer controller, and other features give you absolute control of virtually any MIDI system.

Fast and Simple Operation

To make it possible to edit a variety of settings in real time, many parameters have been assigned to panel buttons. In addition, the currently selected parameter is assigned to a PALETTE slider, allowing the target parameter to be edited quickly and directly.

Using DATA Cards

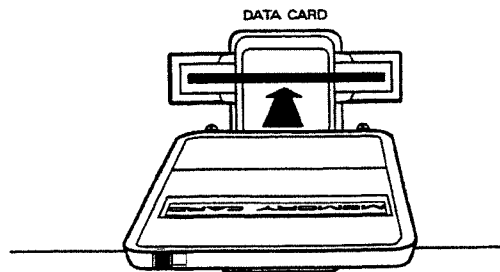
- New memory cards do not yet have their battery installed. Before a memory card can be used, you first need to insert the battery (refer to the instructions supplied with the memory card).
- Memory cards are equipped with a PROTECT switch, which when turned on protects your data from accidental erasure. It is recommended that the switch be kept at the ON position, and switched to OFF only at the times you wish to write new data onto the card.
- Carefully insert the memory card all the way in—until it is firmly in place.



On ← → Off

- When the battery in an memory card is nearly worn out, the message below will be shown in the display. Refer to the instructions supplied with the memory card and promptly replace the battery to avoid the loss of the data on it.

"Data Card Battery LOW!"



- Never touch the terminals of the memory card. Also, avoid getting the terminals dirty.

Table of Contents

Chapter 1 Learning to Use the A-90/EX

(Read This First)

Structure of the A-90/EX	5
Basic Structure of the A-90/EX	5
About Memory	6
Selective Use of the Five Modes	7
Stage Use — 1	7
Studio Use	7
Stage Use — 2	8
Making Settings in Greater Detail	8
Saving Settings	8
Using the DATA ENTRY and PALETTE Sliders	9
DATA ENTRY	9
The PALETTE Slider	11
Choosing the Desired Item in the Edit Mode or Utility Mode	12
Following the Menus to Choose an Item	12
Using Shortcuts to Jump to the Desired Item	13
Switching the MIDI OUT On and Off	14
Switching the Zones On and Off	14
The Help Function	15
When a Sound Won't Stop Playing (Panic Function)	15
OUTPUT Jack Connects	15

Chapter 2 A Wide Variety of Settings

Settings for MIDI Input and Output	16
Setting MIDI Channels for the Zones	16
Setting the Output Destinations for the MIDI Messages from the Zones	17
Making the Settings in the Edit Mode	17
Making Settings Directly from the Panel	18
Controlling the A-90/EX with an External MIDI Keyboard	19
Setting the Zones to Control	19
Isolating Externally Controlled Zones from the A-90/EX's Keyboard	20
Isolating a Performance from an External Device	21
Directly Controlling a MIDI Instrument Connected to the A-90/EX from Another External MIDI Instrument	21
Applying MIDI Messages from an External MIDI Instrument to the Settings for the Zones	22
Assigning Functions to Controllers	23
Settings for Other Controllers	25

The TOTAL VOLUME Slider	25
The TOTAL VOLUME Pedal	25
The HOLD Pedal	26
Global Transpose	26

Changing the Settings for the Zones (PARAMETER SELECT)

Applying Modulation to Zones (External Zones)	27
Applying Aftertouch to Zones (External Zones)	27
Applying Expression to Zones (External Zones)	28
Changing the Touch of the Keyboard	28
Selecting the Tones for the Zones (External Zones — Bank Select)	29
Using the AUX1 and AUX2 Buttons with Parameters Assigned	30
Assigning Parameters	30
Using the AUX Buttons	32

Displaying the Tone Names for a Sound Source

Setting Maps for the Zones	33
Creating a Name Map	34

Using Performances Arranged in Sequence (Chain Mode)

Creating a Chain	35
Using Chains	36

Other System Settings

Displaying Values While Using PARAMETER SELECT	37
Setting the operating environment for the A-90/EX	38
LCD Contrast	38
Double-click Speed	38

Chapter 3 Controlling External MIDI Instruments Other Than Sound Sources

Controlling an External Sequencer

Setting the MIDI OUT for Connecting the Sequencer	39
Controlling a Sequencer	40

Controlling an External Effects Device

Setting MIDI Channels for Controlling an Effector	41
Setting the MIDI OUT for Connecting the Effector	42
Making the Settings for the Effector	42
Assigning Note Messages Sent to an Effector or Rhythm Machine to the Keyboard	43

Chapter 4 Organizing Your Settings

Saving to Memory.....	44
Saving Settings in the Temporary Area As a Performance	44
Saving Settings in the Manual Mode As a Performance	45
Saving a New or Edited Chain.....	45
Saving the Entire Contents of Internal Memory to a Memory Card	46
Saving from Internal Memory to a Memory Card	46
Copying Settings from a Memory Card to Internal Memory	46
Swapping the Settings in Internal Memory with those on a Memory Card.....	46
Giving Names to Settings	47
Naming a Performance	47
Naming Settings in the Manual Mode.....	47
Copying Settings	47
Copying a Performance	47
Copying a Chain	48
Returning to the Factory Default Settings	49
Initializing Performances or Chains in the Temporary Area.....	49
Initializing Settings in the Manual Mode	50
Initializing the System Settings.....	50
Initializing the Internal Memory.....	51
Sending the Contents of Internal Memory As MIDI Messages	52

Chapter 5 Controlling the On-board Sound Source

About Voice Expansion Boards.....	53
The VE-RD1.....	53
The VE-GS1	53
The VE-JV1.....	53
Items That PARAMETER SELECT Can Handle ...	53
The VE-RD1	53
Reverb Settings.....	54
Chorus Settings	55
The VE-GS1 and VE-JV1.....	56
Controlling the Built-in Sound Source with an External Sequencer.....	57
Using the Voice Expansion Board As an Independent Sound Source.....	57
Setting the Master Tune in the Voice Expansion Board.....	58

Chapter 6 Supplementary Materials

If You Think There Might Be a Problem.....	59
If an Error Message Appears	60
Shortcut Numbers	61
MIDI Implementation.....	63
MIDI Implementation Chart.....	76
Specifications	77
Index	78

Chapter 1 Learning to Use the A-90/EX

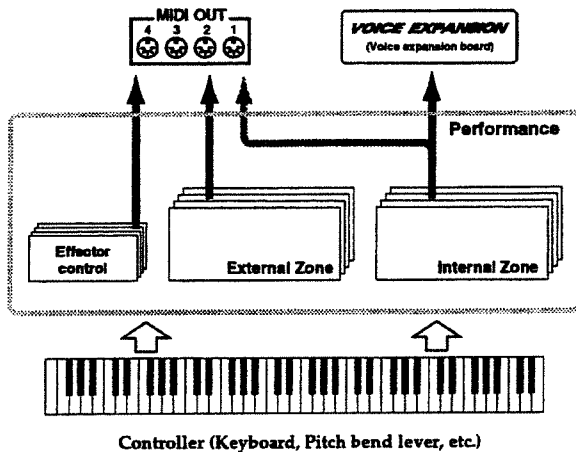
(Read This First)

This chapter provides an overview of the A-90/EX and describes some handy functions that couldn't be covered in the Introductory Volume.

Structure of the A-90/EX

Basic Structure of the A-90/EX

The following shows how the A-90/EX is structured.



Controllers

The controllers are the sliders on the keyboard's front panel and the pedals that plug into the rear panel. Performance data from these controllers is sent to the various Zones.

External Zones (EXT A and B)

These Zones control MIDI instruments connected to the MIDI OUT (1 through 4).

A MIDI channel is set for each Zone. Performance data is processed at this Zone and sent as MIDI messages to the MIDI instrument with the same channel setting.

You can freely assign any MIDI OUT to send the settings for a particular Zone.

Internal Zones (INT A and B)

These Zones control the Voice Expansion Board, if one is installed in the A-90.

A MIDI channel is set for each Zone, and Parts which have the same channel as the Voice Expansion Board can be controlled.

Built-in Patches in the Voice Expansion Board can be played when performance data from the keyboard is received (by making this Zone setting match).

* Depending on the setting, performance data can also be sent to a MIDI OUT.

The PARAMETER SELECT section is used to select both internal and external Zone settings which are then controlled in real time with the four sliders in the PALETTE section.

Effector Control (EFFECTOR 1 to 4)

These are used to control effectors connected to the MIDI OUT connectors.

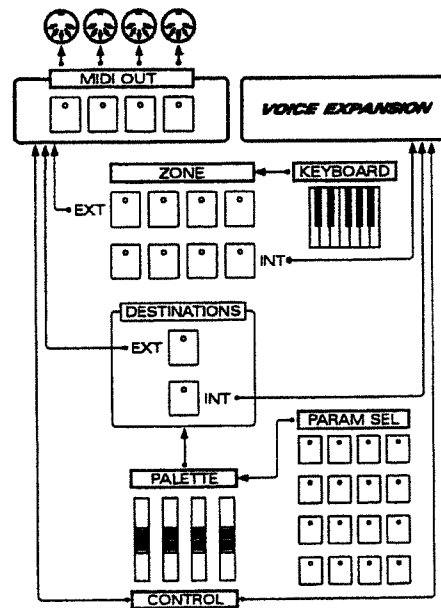
Performance (Internal : 1-64, Memory card: 65-128)

A collection of settings for the four internal Zones, the four external Zones, and the effector controls is called a "Performance."

With the A-90/EX, you can save 64 Performances in internal memory, as well as saving 64 additional Performances on a memory card (available separately).

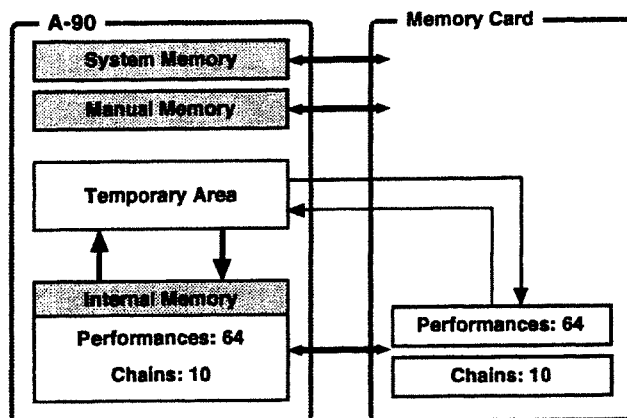
By switching Performances, you can instantly make settings for the entire MIDI system with the A-90/EX at its core.

The block diagram printed on the left-hand side of the unit's LCD cover shows the basic structure of the A-90/EX.



About Memory

Performances and other settings are stored in memory. The A-90/EX has the following types of memory.



Temporary Area

This is where Performance settings and Chain settings selected using the panel buttons are stored. When playing tones from an installed Voice Expansion Board or controlling a connected MIDI instrument, the sounds are played or the MIDI instrument is controlled according to the settings in the temporary area.

When settings are changed, the data stored in long-term (Internal) memory is not altered directly. Instead, a copy of that data in the temporary area is changed.

Because any settings in the temporary area are in fact temporary, they are lost if the power is switched off or other settings are called up.

If you want to save the settings in the temporary area, you need to save them in another type of memory.

Internal Memory

This memory is for storing Performance and Chain settings. Settings for up to 64 Performances and 10 Chain settings can be saved here.

System Memory

This memory stores the settings for System Parameters, which determine the operating environment of the A-90/EX. Changing a setting alters the System Parameters directly, so data is always updated and remains in memory even if the power is switched off.

Manual Memory

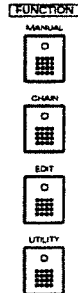
This memory is used to store a Performance setting used in the Manual mode. In the Manual mode, the Performance settings are manipulated and changed directly, so data is always updated and remains in memory even if the power is switched off.

Memory Card (Available Separately)

A memory card can store up to 64 Performances and 10 Chain settings, and is treated the same as internal memory. A memory card can also be used to store the contents of all types of memory in the A-90 (except the temporary area).

Selective Use of the Five Modes

The A-90 Series has five modes, each of which can be selected with the FUNCTION buttons on the panel. This section describes the features of each of these modes.



Stage Use — 1 (Switching Settings — Performance Mode).....

This is the mode that is enabled when the A-90 is powered up. The Performance mode is handy for switching settings (Performances) while playing on stage. You can change to the Performance mode from any other mode by again pressing the FUNCTION button that corresponds to the mode you want to exit.

Here are some of the features of this mode.

- A variety of controllers can be used to control external MIDI instruments or a Voice Expansion Board.
- Performances can be switched.
- You can change the setting in real time using PARAMETER SELECT.
- Settings can be made in even greater detail when in the Edit mode.
- Settings that have been changed are lost when the Performance is switched or the power is turned off, unless they have been saved as a new Performance (System settings are saved automatically).
- The sequencer controls can be used to control an external sequencer.

Studio Use (Use As a Controller Without Calling Up Settings — Manual Mode)

Pressing FUNCTION [MANUAL] (so the indicator lights) activates the Manual mode. When you're in this mode, you can't switch between Performances, but any settings you change are saved automatically. That makes the Manual mode very convenient when you're using the A-90/EX on stage to create a Performance while controlling an external MIDI instrument. To go back to the original mode, just press [MANUAL] again (so the indicator goes out).

Here are some of the features of this mode.

- A variety of controllers can be used to control external MIDI instruments or a Voice Expansion Board.
- Settings can be made in even greater detail when in the Edit mode.
- You can change the setting in real time using PARAMETER SELECT.
- Settings that have been changed are saved automatically. This means that if you turn off the power while work is in progress, or switch to the Performance mode and change Performances, you can always start up again right where you left off when you switch back to the Manual mode.
- The sequencer controls can be used to control an external sequencer.

Stage Use — 2 (Calling Up Settings Continuously — Chain Mode).....

Pressing FUNCTION [CHAIN] (so the indicator lights) activates the Chain mode. When you're in this mode, you can call up a chain (or sequence) of the Performances you need. That makes this mode convenient when you want to switch Performances to match songs or progressions during an on-stage performance. To go back to the original mode, just press [CHAIN] again (so the indicator goes out).

Here are some of the features of this mode.

- A variety of controllers can be used to control external MIDI instruments or a Voice Expansion Board.
- Performances can be switched in the sequence set for the Chain.
- Chains can be switched.
- Chains can be created.
- Settings can be made in even greater detail when in the Edit mode. (Performance-related settings cannot be changed.)
- A Chain that has been created is lost when the Chain is switched or the power is turned off, unless you've saved it as a new Chain (System settings are saved automatically).
- The sequencer controls can be used to control an external sequencer.

Making Settings in Greater Detail (Edit Mode)

Pressing FUNCTION [EDIT] (so the indicator lights) activates the Edit mode. When you're in this mode, you can change (edit) the values for various settings (parameters). The Edit mode uses a menu format that ensures easy selection of the desired parameter. Shortcut numbers are available for each item so you can also use the numeric keypad to choose the item you want. To go back to the original mode, just press [EDIT] again (so the indicator goes out).

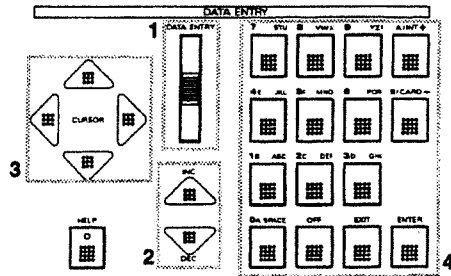
Saving Settings (Utility Mode)

Pressing FUNCTION [UTILITY] (so the indicator lights) activates the Utility mode. This mode lets you do things like saving settings that have been changed, copying settings, and initializing settings that have been saved. The Utility mode uses a menu format that ensures easy selection of the desired parameter. Shortcut numbers are available for each item so you can also use the numeric keypad to choose the item you want. To go back to the original mode, just press [UTILITY] again (so the indicator goes out).

Using the DATA ENTRY and PALETTE Sliders

The A-90/EX offers several handy methods for selecting numbers or changing menus when you're changing settings or choosing a Performance.

DATA ENTRY



1. The DATA ENTRY Slider

This slider is used to make a numerical value higher or lower. When selecting a Performance Number, the setting isn't "locked in" until you press [ENTER].

2. The INC/DEC buttons

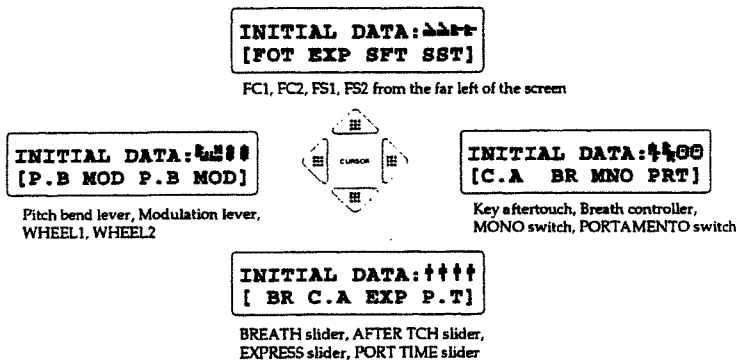
These keys work like the DATA ENTRY slider to make a numerical value higher or lower. If you want to change a value rapidly, hold down one of these keys and press the other one.

3. CURSOR buttons

These buttons are used to change pages when a menu is displayed, and to select parameters.

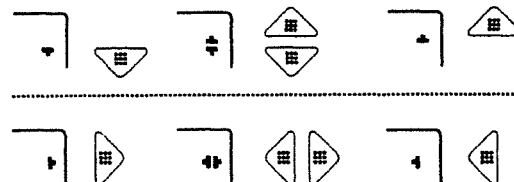
[When in the Performance Mode or the Manual Mode]

This shows the functions assigned to the current controller.



[When Using the PARAMETER SELECT]

The CURSOR buttons [◀]/[▶] are used to select an item (cursor movement). When "▲"/"▼" is displayed in the right-hand corner of the screen, the CURSOR buttons [▲]/[▼] can be used to select the page. When "◀"/"▶" is displayed, the CURSOR buttons [◀]/[▶] can be used for page selection.



[When in the Chain Mode]

The CURSOR buttons [◀]/[▶] are used to switch Performances in a Chain, and the CURSOR buttons [▲]/[▼] are used to put the Chain in an editing mode.

[When in the Edit Mode/When in the Utility Mode]

The CURSOR buttons [◀]/[▶] are used to move the cursor and to select an item, and the CURSOR buttons [▲]/[▼] are used to switch the menu. When "■"/"■" is displayed in the right-hand corner of the screen, the CURSOR buttons [▲]/[▼] can be used to select the page. When "■"/"■" is displayed, the CURSOR buttons [◀]/[▶] can be used for page selection.

4. Numeric Keypad

[When in the Performance Mode]

◆ Choosing a Performance

Use the [0] to [9] keys to input the Performance Number, then press [ENTER] to confirm. You can cancel the setting by pressing [EXIT] before you press [ENTER].

1-64: Performance in the internal memory

65-128: Performance in the memory card

◆ Choosing the Lower Digit of a Performance Number (When Performance Number is shown in the display in the way of GBN: see p.38)

Use the [1] to [8] keys to choose the lower digit of the Performance Number.

[When Using the PARAMETER SELECT]

For the currently selected Parameter, you can input a numeric value with the [0] to [9] keys and confirm the value by pressing [ENTER]. To input a positive or negative number, first use [A/INT]/[B/CARD] to select either "+" or "-", then input the value with the [0] to [9] keys and press [ENTER] to confirm the value. You can cancel the setting by pressing [EXIT] before you press [ENTER].

Depending on the Parameter, it may be possible to disable the Parameter by pressing [OFF]. (The value of the setting remains unchanged.) Each press of [OFF] toggles between disabled and enabled.

[When in the Manual Mode]

The numeric keypad cannot be used.

[When in the Chain Mode]

◆ Choosing a Chain

Use [A/INT]/[B/CARD] to choose a Group (Internal or Card), use the [0] to [9] keys to input the Chain Number, then press [ENTER] to confirm. You can cancel the setting by pressing [EXIT] before you press [ENTER]. Pressing [0] select the Chain Number "10."

◆ Choosing a Performance During Chain Editing

The buttons that can be used are the same as in the Performance mode.

[When in the Edit Mode]

◆ Entering Numeric Values

For the currently selected Parameter, you can input a numeric value with the [0] to [9] keys and confirm the value by pressing [ENTER]. To input a positive or negative number, first use [A/INT]/[B/CARD] to select either "+" or "-", then input the value with the [0] to [9] keys and press [ENTER] to confirm the value. You can cancel the setting by pressing [EXIT] before you press [ENTER].

Depending on the Parameter, it may be possible to disable the Parameter by pressing [OFF]. (The value of the setting remains unchanged.) Each press of [OFF] toggles between disabled and enabled.

◆ Entering Text (Inputting a Performance Name or Name Map)

The letters of the alphabet are assigned to the keys from [0] to [9], with two or three letters assigned to each key. (The assigned letters are shown above and to the right of each button.) Pressing a button repeatedly cycles through the sequence of the assigned number and letters. The [0] key is assigned "0" and a space. Holding down [A/INT] while pressing a button causes upper-case letters to be input. You can erase the letter under the cursor by pressing [B/CARD].

* The cursor does not move when text is input. Use the CURSOR buttons to move the cursor.

◆ When Assigning Exclusive Messages to the AUX1/2 buttons

Data is entered two bytes (two digits) at a time, in hexadecimal format. The digits 0 to 9 can be entered directly, but letters A through F must be entered by holding down [A/INT] while pressing the key with the corresponding letter shown at the upper left of the key. For instance, the hexadecimal value "7F" is entered by pressing [7], then [A/INTERNAL] + [5], then [ENTER]. The value is placed just before the current position of the cursor.

◆ Moving Among Menu Screens

Use [ENTER] to change to the currently selected menu item, and [EXIT] to return to the previous menu.

[When in the Utility Mode]

◆ Choosing a Performance

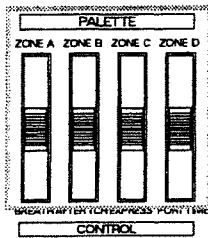
The buttons that can be used are the same as in the Performance mode.

◆ Moving Among Menu Screens

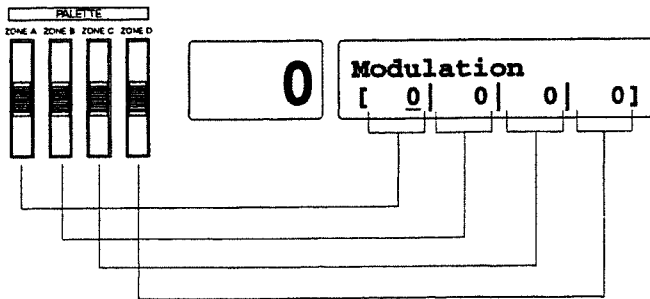
Use [ENTER] to change to the currently selected menu item, and [EXIT] to return to the previous menu.

* The DATA ENTRY buttons have a different touch response than other buttons. (This design is to make data entry easier.)

The PALETTE Slider



During a performance, this slider is used as a controller, but when PARAMETER SELECT is in use, it is used as the PALETTE slider to change Zones and parameter values directly. The items shown on the screen are affected in sequence, starting from the left.

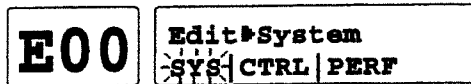


Choosing the Desired Item in the Edit Mode or Utility Mode

The screens in the Edit mode or the Utility mode use a menu format that lets you choose the items you want. You can also use shortcut numbers assigned to items and menus to jump to the item you want. This section describes some specific methods for choosing desired items. Operation is the same in either mode.

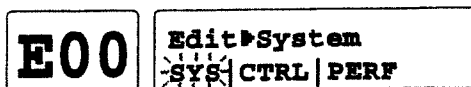
Following the Menus to Choose an Item

1. Selecting the Edit mode or the Utility mode calls up the menu screen (Top Menu).



- When you switch to another mode from the Edit mode or the Utility mode, the unit retains the last screen you saw in the Edit or Utility mode. This means that the Top Menu screen may not necessarily be what you see when you enter the Edit or Utility mode. If you want the Top Menu screen, just press [EXIT] several times until it appears.

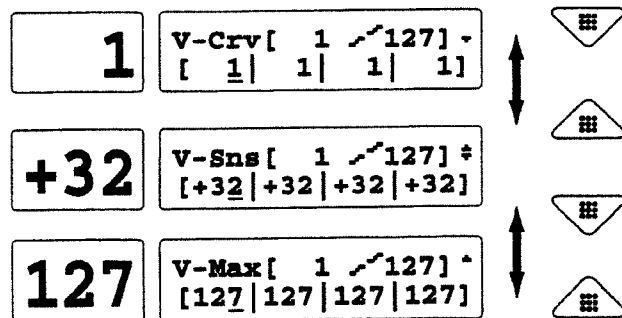
2. Use the CURSOR buttons [◀]/[▶] to make the item you want start to flash, and then press the CURSOR button [▼] or [ENTER].



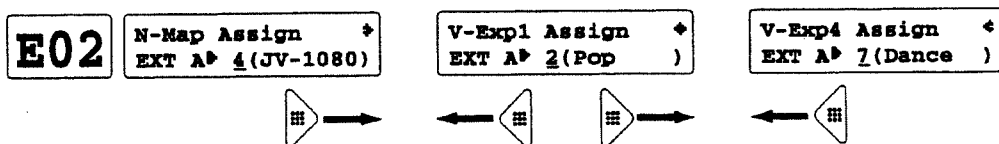
If the menu screen continues, repeat step 2.

Changing the Page

If "▶" is displayed in the upper-right area of the right-hand screen it means there is a next page. "◀" means there is a previous page. Press the CURSOR button [▼] to go to the next page or [▲] to go to the previous page.

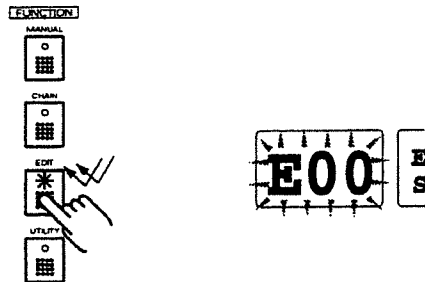


If "◀" or "▶" is shown, it means that there are one or more items that couldn't fit on the screen, so the page has been split. Press the CURSOR buttons [◀] or [▶] to see the split page.

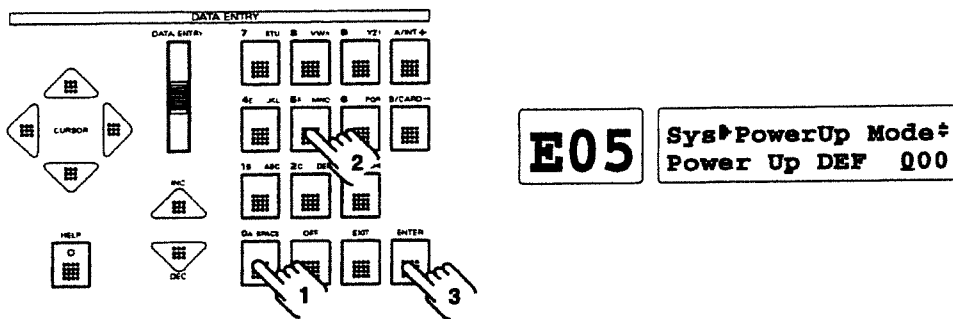


Using Shortcuts to Jump to the Desired Item

1. Depending on the mode you want, double-click the [EDIT] or [UTILITY] FUNCTION button. (You double-click a button by pressing it twice in rapid succession.) This makes the button's indicator flash, and the display on the left-hand screen flashes as well.



2. Use the numeric keypad to input the shortcut number for the item you want, then press [ENTER]. This makes the shortcut number appear in the left-hand screen and jumps to the desired item.



How Menus and Shortcut Numbers Are Indicated

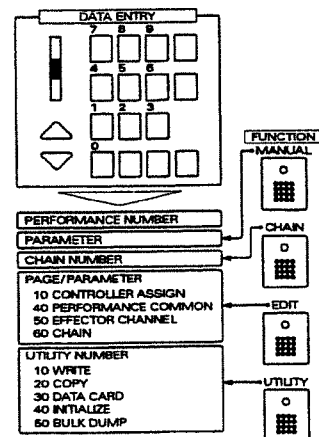
In the explanations that appear in this manual, the menus that are must be chosen until the desired parameter appears on-screen and the assigned shortcut number are given at the start of the item.

Here's an example: (EDIT: PERF: COMMON, E43)

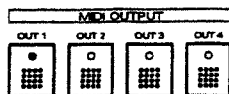
This means that in the Edit mode, you choose "PERF" from the first menu and "COMMON" from the next menu. "43" is the shortcut number.

* A list of shortcut numbers appears on p.61 to 62 of the Volume 2.

The block diagram printed on the right-hand side of the unit's LCD cover shows typical parameters and shortcut numbers for the different modes. This makes a handy reference for when you're making settings.



Switching the MIDI OUT On and Off



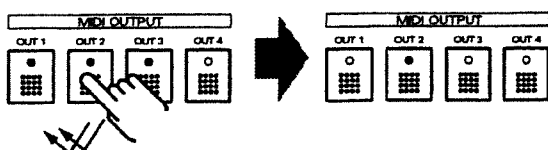
The MIDI OUTPUT switches let you turn the A-90/EX's corresponding MIDI OUT on and off. When a MIDI OUTPUT switch has been turned off, no MIDI messages are output from the corresponding MIDI OUT.

To switch on a MIDI OUT, just press the corresponding MIDI OUTPUT switch (so the indicator lights). Each press of one of these switches turns the corresponding MIDI OUT on or off.

If you want to switch on just one MIDI OUT, double-click the corresponding switch. The other three MIDI OUT are switched off.

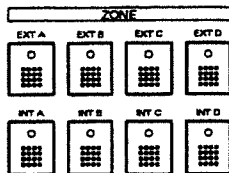
Double clicking the switch again returns the settings to their previous state (as long as no other MIDI OUTPUT switch has been pressed since you double clicked the first one).

The state of the switches is automatically saved as a system setting, and remains in memory even after the power is switched off.



* Even if the MIDI OUTPUT switch is turned off during performance, the sound currently being played will not be cut.

Switching the Zones On and Off

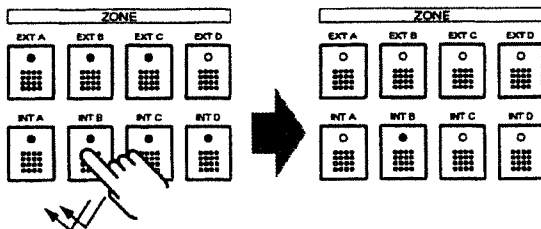


The ZONE switches let you turn the A-90/EX's corresponding Zones (internal and external) on and off. When a ZONE switch has been turned off, no performance information from the controllers or keyboard is output (however, changes made with PARAMETER SELECT are output). To switch on a Zone, just press the corresponding ZONE switch (so the indicator lights). Each press of one of these switches turns the corresponding Zone on or off.

If you want to switch on just one Zone (both internal and external), double-click the corresponding switch. The other three Zones are switched off.

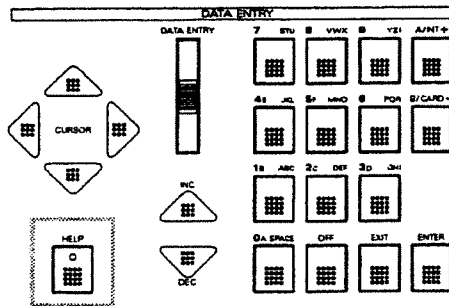
Double clicking the switch again returns the settings to their previous state (as long as no other ZONE switch has been pressed since you double clicked the first one).

The state of the ZONE switches can be saved as a Performance setting (see Volume 1 p.26 and Volume 2 p.44). Unless you save the settings, they become invalid when you switch off the power or switch Performances. (If you're in the Manual mode, however, the settings are saved automatically.)



* Even if the ZONE switch is turned off during performance, the sound currently being played will not be cut.

The Help Function



With the context-sensitive Help function, pressing [HELP] calls up a wide range of information about the current screen, including meanings, possible ranges for values, controller assignments, and the current values for many different settings.

When a button has been pressed and an indicator is flashing, the CURSOR buttons [◀]/[▶] can be used to select an item, and pressing [HELP] again displays more details about the item. To return to the original mode, just press [HELP] once more.

When a Sound Won't Stop Playing (Panic Function)

[PANIC]



The Panic function can be used when the A-90EX's Voice Expansion Board or an externally connected MIDI instrument won't stop playing because of some operation. To use the Panic function, just press [PANIC]. What happens next depends on how you press this button. Read on to learn more.

One press : Note Off and Hold Off MIDI messages are sent for the sounds currently being played by the keyboard, and the A-90/EX's current settings are sent.

Double-click: MIDI messages for Volume (127), Note Off for all sounds (C-1 to G9), Pitch Bend (center), Channel Aftertouch (0), Modulation (0), and Hold 1 (0) are sent to all MIDI channels, and the A-90/EX's current settings are sent.

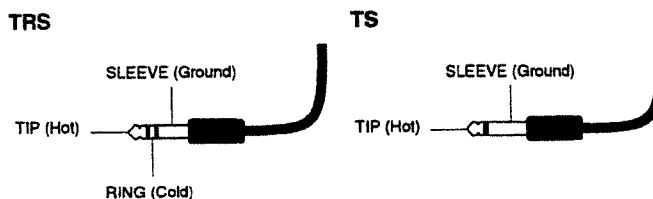
* If you want to send the current settings for the A-90/EX, press [PANIC] once without playing any keys on the keyboard, and the current settings alone will be sent.

The [PANIC] indicator flashes while the Panic function is working. During this time, all other operations are disabled, and no information is received by MIDI IN.

OUTPUT Jack Connects

The A-90/EX's OUTPUT jacks (audio output jacks for the Voice Expansion Board) can be used for either balanced or unbalanced output.

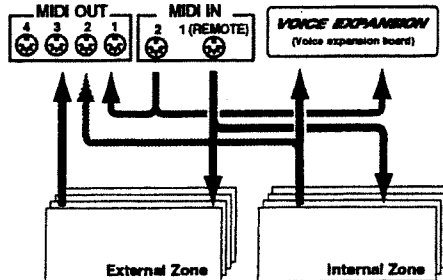
For balanced output, use a cable with a standard balanced type (TRS type) plug. For unbalanced output, use a cable with a standard unbalanced type (TS type) plug.



Chapter 2 A Wide Variety of Settings

Settings for MIDI Input and Output

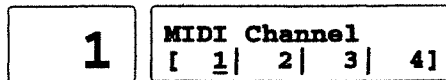
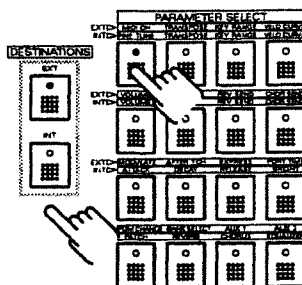
The A-90/EX lets you freely assign the performance data from the Zones to any of the four independent MIDI OUT, and assign performance data from the two MIDI IN to the Zones and MIDI OUT.



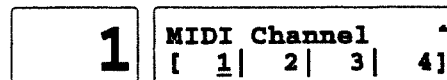
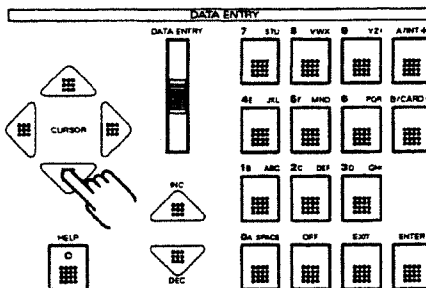
Setting MIDI Channels for the Zones

This sets the MIDI channels for MIDI messages output from the Zones. These settings can be saved as a Performance.

1. In the Performance mode or Manual mode, press DESTINATIONS [EXT] or [INT], then press PARAMETER SELECT [MIDI CH].



2. If you pressed [INT], use the CURSOR button [▼] to choose the page for MIDI channel settings.



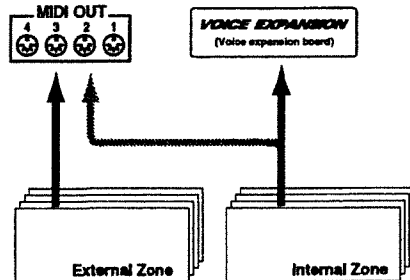
3. Use the DATA ENTRY slider or a PALETTE slider to select the MIDI channels for the Zones.

* If a VE-RD1 is installed, the output channels for the internal Zones become the receiving channels for the VE-RD1's Parts (see p.53 of the Volume 2).

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Setting the Output Destinations for the MIDI Messages from the Zones (EDIT: PERF: COMMON, E42)

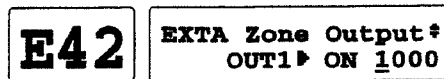
This assigns the performance data from the Zones to the four independent MIDI OUT. These settings can be saved as a Performance.



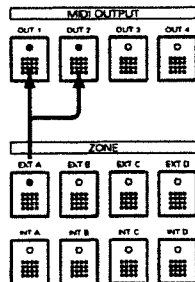
You can make these settings either while in the Edit mode, or directly from the panel.

Making the Settings in the Edit Mode

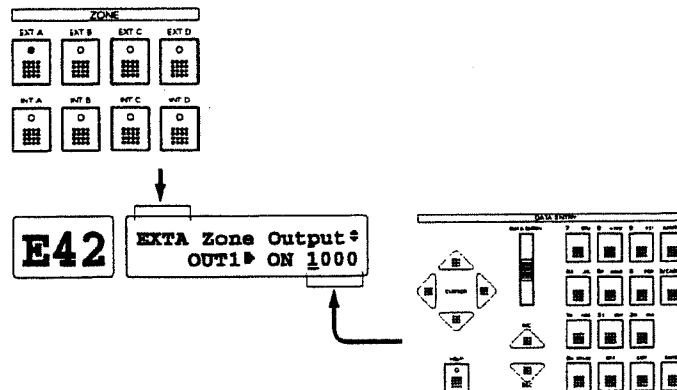
1. Switch from the Performance mode (or Manual mode) to the Edit mode, and use the menu or the shortcut number to choose "Zone Output."



2. Press the ZONE switch for the Zone you want to make the setting for; the button indicator will light and the MIDI OUTPUT switch (corresponding to the MIDI OUT that the Zone currently sends data to) will also light. Press the appropriate MIDI OUTPUT switch to select the desired MIDI OUT.

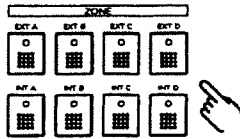


You can also make these settings on screen. Press the ZONE switch for the desired Zone, use the CURSOR buttons to choose the MIDI OUT, and use DATA ENTRY to switch it on or off.

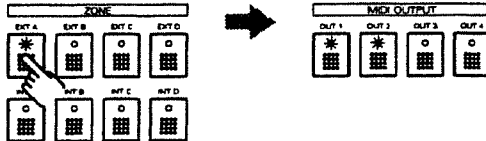


Making Settings Directly from the Panel

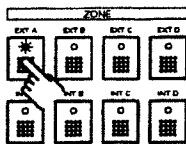
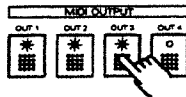
1. In the Performance mode (or Manual mode), hold down the ZONE switch for the Zone you want to make settings for.



After a few seconds the MIDI OUTPUT switch corresponding to the MIDI OUT that the Zone now outputs to begins to flash.



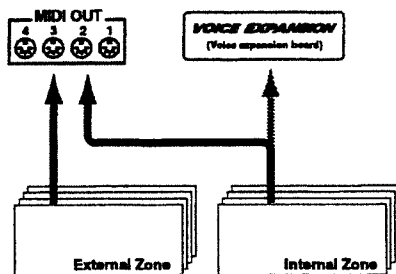
2. Hold down the ZONE switch and press the appropriate MIDI OUTPUT switch to select the desired MIDI OUT.



These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Making External Connections for More Than Four Zones

Performance data from the internal Zones is normally sent to the Voice Expansion Board that is installed. You can, however, also use the settings just described to output the data externally via the MIDI OUTs. This makes it possible to send performance data for up to eight Zones (the four external Zones plus the four internal Zones) to external MIDI instruments.

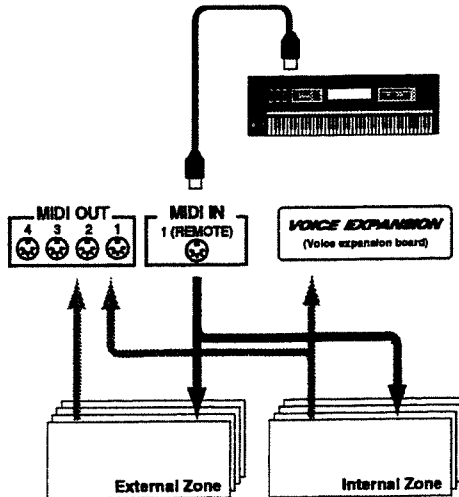


When doing this, the PARAMETER SELECT values that can be handled by the internal Zones vary according to the type of Voice Expansion Board in use (see Volume 2 p.53). The Voice Expansion Board can also be kept separate from the internal Zones (see Volume 2 p.57). When this is done, the PARAMETER SELECT values that can be handled by the internal Zones are the same as for the external Zones.

* If no Voice Expansion Board is installed, the PARAMETER SELECT values that can be handled by the internal Zones are the same as for the external Zones.

Controlling the A-90/EX with an External MIDI Keyboard

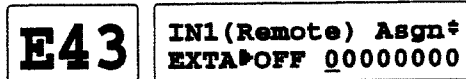
If you connect a MIDI keyboard to the MIDI IN1 connector, you can use the keyboard to control the various Zones. All MIDI channel messages can be controlled. This performance data (received via Omni On, that is, regardless of MIDI channel) is assigned to the Zones in the same way as the A-90/EX's keyboard and Pitch bend lever, and is output on the MIDI channels for the Zones. You can even switch Performances on the A-90/EX from the MIDI keyboard.



Setting the Zones to Control (EDIT: PERF: COMMON, E43)

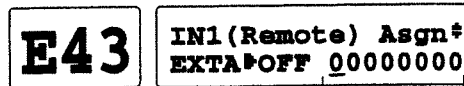
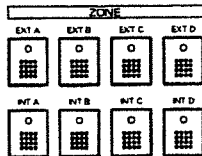
This sets the Zones to be controlled by an external keyboard.

1. Switch from the Performance mode (or Manual mode) to the Edit mode, and use the menu or the shortcut number to choose "IN1 (Remote) Asgn."

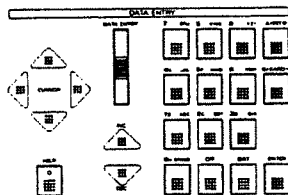


2. Press the ZONE switch for the Zone to be controlled.

Use the CURSOR buttons to choose the Zone, and use DATA ENTRY to switch it on or off.



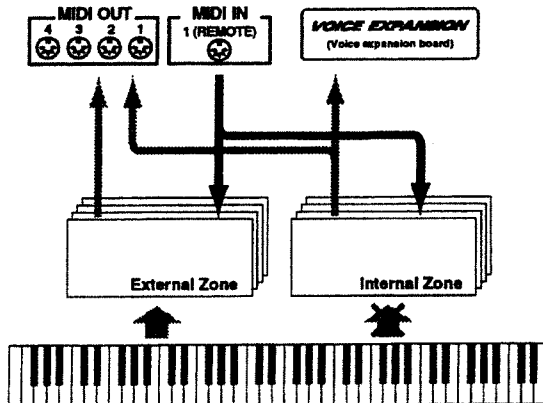
EXTA-D, INTA-D
from the far left of the screen



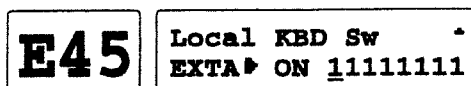
These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Isolating Externally Controlled Zones from the A-90/EX's Keyboard (EDIT: PERF: COMMON, E45)

This setting makes it so that Zones controlled by an external keyboard cannot be controlled from the A-90/EX's keyboard.

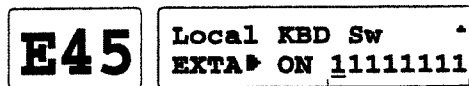
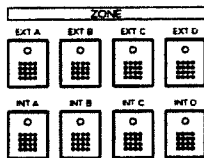


1. Switch from the Performance mode (or Manual mode) to the Edit mode, and use the menu or the shortcut number to choose "Local KBD Sw."

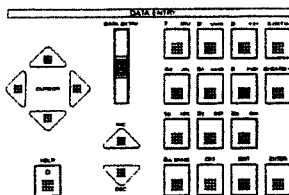


2. Press the ZONE switch for the Zone to be isolated.

Use the CURSOR buttons to choose the Zone, and use DATA ENTRY to switch it on or off.



EXTA-D, INTA-D
from the far left of the screen

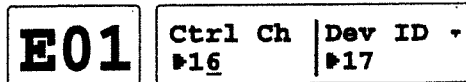


These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Isolating a Performance from an External Device (EDIT: SYS, E01)

You can send Program Change messages from a MIDI instrument connected to MIDI IN1 or IN2 to switch Performances on the A-90/EX. To do this, you need to set the channel for switching Performances on the A-90/EX (the control channel).

1. Switch to the Edit mode, and use the menu or the shortcut number to choose "Control channel."



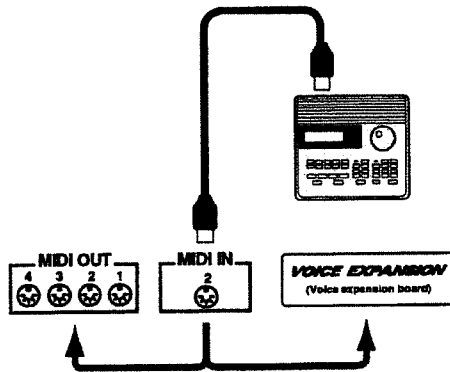
2. Move the cursor use the CURSOR buttons, and use DATA ENTRY to select the control channel. You can also use DATA ENTRY to switch this off.

When a control channel has been set, the Performances on the A-90/EX are switched by Program Change messages sent on the selected channel.

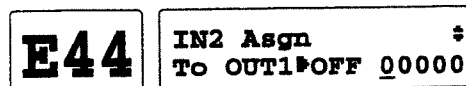
The controller channel is saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

Directly Controlling a MIDI Instrument Connected to the A-90/EX from Another External MIDI Instrument (EDIT: PERF: COMMON, E44)

You can take MIDI messages received at MIDI IN2, mix them with MIDI messages from the A-90/EX itself, and output the mix through a MIDI OUT. This makes it possible to directly control a MIDI instrument connected to the A-90/EX by an external MIDI keyboard or sequencer.

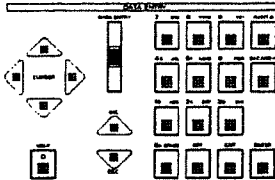
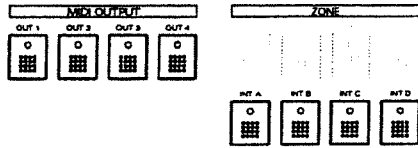


1. Switch from the Performance mode (or Manual mode) to the Edit mode, and use the menu or the shortcut number to choose "IN2 Asgn."



2. Press the MIDI OUTPUT switch for the MIDI OUT you want to use for output. If you want the output to go to the Voice Expansion Board, press an INT ZONE switch (it doesn't matter which switch you press).

Use the CURSOR buttons to choose the Zone, and use DATA ENTRY to switch it on or off.



E44

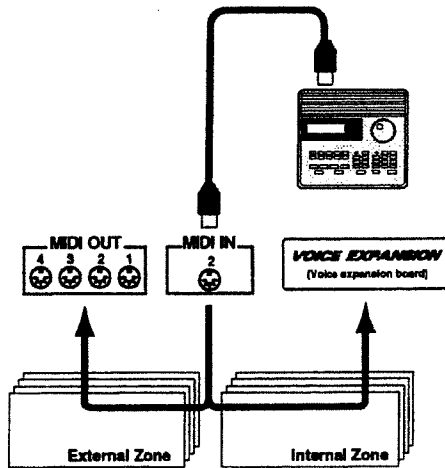
IN2 Asgn
To OUT1▶OFF 0000

OUT1-4, Voice expansion board
from the far left of the screen

These settings can be saved as a Performance setting(see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Applying MIDI Messages from an External MIDI Instrument to the Settings for the Zones (EDIT: SYS, E06)

This lets you have the MIDI messages received from MIDI IN1 or IN2 reflected in the settings for the Zones.



1. Switch to the Edit mode, and use the menu or the shortcut number to choose the page for setting how received MIDI messages are handled.

E06 Rx▶In1▶ExtPaleta[±]
In1▶EPal▶OFF 0000

2. Use the CURSOR buttons to choose a parameter, and set it with DATA ENTRY.

E06 Rx▶In1▶ExtPaleta[±]
In1▶EPal▶OFF 0000

a b c d

- a. Set whether MIDI messages received from IN1 are applied to the external Zone settings.
 OFF/0: Not reflected in the external Zone settings
 ON/1: Values of received messages are reflected in the external Zone settings

- b. Set whether MIDI messages received from IN1 are applied to the internal Zone settings.

OFF/0: Not reflected in the internal Zone settings

ON/1: Values of received messages are reflected in the internal Zone settings

- c. Set whether MIDI messages received from IN2 are applied to the external Zone settings.

OFF/0: Not reflected in the external Zone settings

ON/1: Values of received messages are reflected in the external Zone settings

- d. Set whether MIDI messages received from IN2 are applied to the internal Zone settings.

OFF/0: Not reflected in the internal Zone settings

ON/1: Values of received messages are reflected in the internal Zone settings

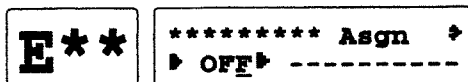
These settings are saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

The reflected settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). In the Manual mode, the settings are saved automatically.

Assigning Functions to Controllers

The A-90/EX comes with a large number of controllers, and you can assign functions to these in any way you want. Read on to learn how to assign functions.

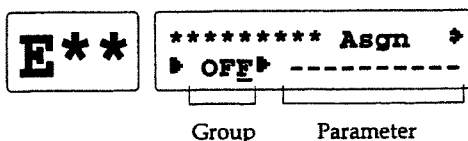
- Go into the Edit mode.
- Activate the controller that you want to assign a function to. This makes the display switch to the page for assigning functions. You can also use the menus or a shortcut number to change to the page for setting functions (EDIT: SYS: CTRL, E10–E25).



* Here are the controllers that can be assigned with functions, along with the shortcut numbers that can be used to make the settings. (An asterisk (*) indicates a switch-type controller.)

• BREATH slider (E10)	• MONO switch (E18)*
• AFTR TCH slider (E11)	• PORTAMENTO switch (E19)*
• EXPRESS slider (E12)	• Aftertouch (E20)
• PORT TM slider (E13)	• WHEEL1 (E21)
• FC1 pedal (E14)	• WHEEL2 (E22)
• FC2 pedal (E15)	• Bend lever (E23)
• FS1 pedal (E16)	• Modulation lever (E24)
• FS2 pedal (E17)	• BREATH controller (E25)

- Use the CURSOR buttons and DATA ENTRY to assign the function. Use the items on the left-hand side to choose the function's Group, and the items on the right-hand side to choose the type. To disable the controller, press [OFF].



Assignable Functions

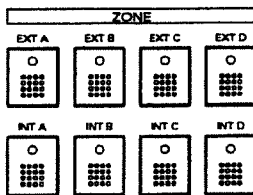
- ◆ **CC (MIDI control change)**
All can be assigned (0 to 119).

- ◆ **Ch.M (MIDI Channel messages)**
 - Ch AFTER (channel aftertouch)
 - P-AFT (polyphonic aftertouch)
Aftertouch is applied to High (highest note played), Low (lowest note), First (first note), or Last (last note).
 - PITCH BEND

- ◆ **MODE (MIDI Mode message) * Only for switch-type controllers.**
 - AllSund OFF (all sound off)
 - RESET CTRL (reset all controllers)
 - LOCAL CTRL (local control)
 - AllNote OFF (all notes off)
 - OMNI ON/OFF (omni mode on or off)
 - MONO/POLY (mono mode or poly mode)

- ◆ **OTHER (Others)**
 - TEMPO
This varies the tempo of the sequencer controller. It can also be used to control the tempo of an external sequencer, or to control a MIDI instrument which can synchronize modulation to a MIDI timing clock (see Volume 2 p.39, 40).
 - PGM UP
When in the Performance mode, this increases the Performance Number. In the Chain mode, it switches to the next Performance in the currently selected Chain.
 - PGM DOWN
When in the Performance mode, this decreases the Performance Number. In the Chain mode, it switches to the previous Performance in the currently selected Chain.
 - FADE OUT
This gradually lowers the value of TOTAL VOLUME (for switch-type controllers only).

4. For each Zone, use the corresponding ZONE switch to select whether this controller is enabled or not.

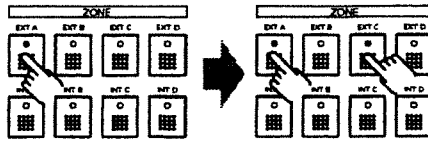


5. If you use the CURSOR buttons to move the cursor even farther to one side, the display changes to the page for setting the controller's maximum and minimum values (values when on or off).



- * The minimum and maximum values for controllers in the MODE Group and the OTHER Group are common for all Zones.
 - * For FADE OUT, this does not set the minimum and maximum values — instead, it sets the time until volume reaches "0" after the switch is pressed.
6. Press the corresponding ZONE switch for the Zone you want to select. (When the A-90/EX is shipped, all Zones have the same setting.) You can make settings independently for each Zone.
- If you want to make the same settings for more than one Zone, press the relevant ZONE switches simultaneously. (You can also press and hold down one switch, and then press another one.) Zones with illuminated ZONE switches are the ones that currently have assigned parameters.

(Making the same settings for more than one Zone)



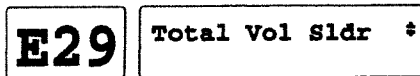
- Use the CURSOR buttons and DATA ENTRY to set the value.
The controller function settings are saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)
The controller on/off settings along with the minimum-value and maximum-value settings (the values when on or off) for the Zones can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). Unless you save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Settings for Other Controllers

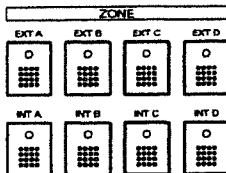
There are some controllers that can't be assigned functions, but which can be switched on or off for each of the Zones.

The TOTAL VOLUME Slider

- Go into the Edit mode.
- Move the TOTAL VOLUME slider. This selects the "Total Vol Slidr" page. You can also select this page by the usual method of operation (EDIT: SYS: CTRL, E29).



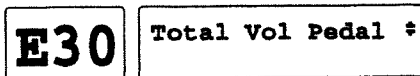
- For each Zone, use the corresponding ZONE switch to determine whether the TOTAL VOLUME slider is enabled or not.



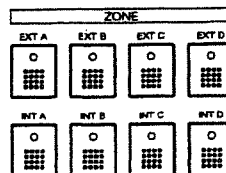
The settings for the TOTAL VOLUME slider can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

The TOTAL VOLUME Pedal.....

- Go into the Edit mode.
- Move the TOTAL VOLUME pedal. This selects the "Total Vol Pedal" page. You can also use the menus or the shortcut number to select this page (EDIT: SYS: CTRL, E30).



- For each Zone, use the corresponding ZONE switch to select whether the TOTAL VOLUME pedal is enabled or not.



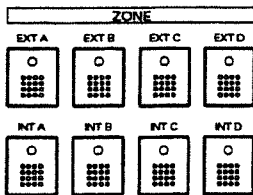
The settings for the TOTAL VOLUME pedal can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

The HOLD Pedal

1. Go into the Edit mode.
2. Move the HOLD pedal. This selects the "Hold Pedal" page. You can also use the menus or the shortcut number to select this page (EDIT: SYS: CTRL, E31).



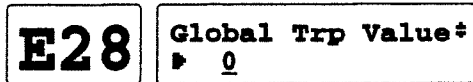
3. For each Zone, use the corresponding ZONE switch to select whether the HOLD pedal is enabled or not.



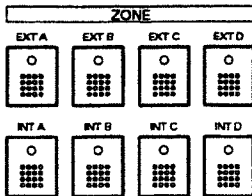
The settings for the HOLD pedal can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Global Transpose

1. Go into the Edit mode.
2. Press the TRANSPOSE switch. This selects the "Global Trp Value" page. You can also use the menus or the shortcut number to select this page (EDIT: SYS: CTRL, E28).



3. For each Zone, use the corresponding ZONE switch to select whether Global Transpose is enabled or not.



4. Use DATA ENTRY to select the range for transposition.

* When using [INC]/[DEC] to change the values rapidly, the display pauses momentarily at "0."

The Global Transpose setting for each of the Zones (enabled or disabled) can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

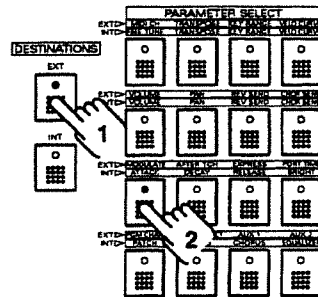
The amount of shift for Global Transpose is saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

Changing the Settings for the Zones (PARAMETER SELECT)

In the Performance mode or the Manual mode, you can use PARAMETER SELECT to make real-time changes in the settings for the Zones. This section describes operations that couldn't be covered in the Volume 1.

Applying Modulation to Zones (External Zones)

1. Press DESTINATIONS [EXT], then press PARAMETER SELECT [MODULATE].



2. Use DATA ENTRY on the PALETTE slider to apply modulation to the external Zones.

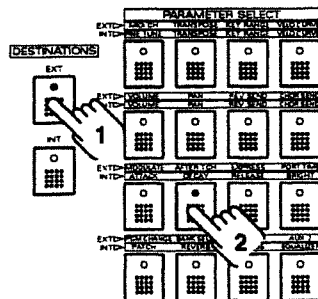
The PALETTE slider is ideal for applying modulation to a particular Zone in real time.

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.) Please be aware that if you've saved the settings, or if you're in the Manual mode, the setting remains with modulation applied (unless you change to another modulation value).

* The PARAMETER SELECT [MODULATE] can also be used to apply modulation to internal Zones (but not to the Voice Expansion Board). For more details, take a look at p.18, 57 of the Volume 2.

Applying Aftertouch to Zones (External Zones)

1. Press DESTINATIONS [EXT], then press PARAMETER SELECT [AFTER TCH].



2. Use DATA ENTRY or the PALETTE slider to apply aftertouch to the external Zones.

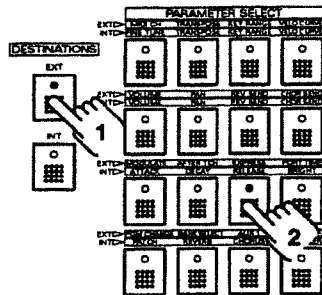
The PALETTE slider is ideal for applying aftertouch to a particular Zone in real time.

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.) Please be aware that if you've saved the settings, or if you're in the Manual mode, the settings remain with aftertouch applied (unless you change to another aftertouch value).

* The PARAMETER SELECT [AFTER TCH] can also be used to apply aftertouch to internal Zones (but not to the Voice Expansion Board). For more details, take a look at p.18, 57 of the Volume 2.

Applying Expression to Zones (External Zones)

1. Press DESTINATIONS [EXT], then press PARAMETER SELECT [EXPRESS].



2. Use DATA ENTRY or the PALETTE slider to apply expression to the external Zones.

The PALETTE slider is ideal for applying expression to a particular Zone in real time.

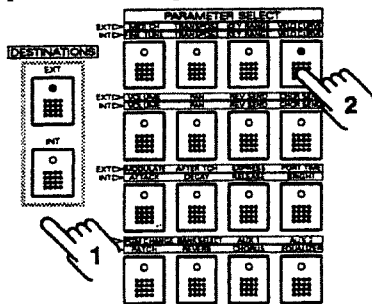
These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.) Please be aware that if you've saved the settings, or if you're in the Manual mode, the settings remain with expression applied (unless you change another expression value).

- * The PARAMETER SELECT [RELEASE] can also be used to apply expression to internal Zones (but not to the Voice Expansion Board). For more details, take a look at p.18, 57 of the Volume 2.

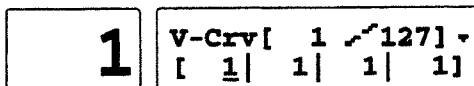
Changing the Touch of the Keyboard

This function sets the velocity curve, which is the relationship between how forcefully the keys are played and how the sound changes. This lets you make a wide variety of settings, ranging from setting the sound to match a heavy-touch piano or a light touch organ, to creating special effects so that playing the keyboard softly results in a loud sound or playing forcefully creates a soft sound.

1. Press the DESTINATIONS button for the Zone you want, then press PARAMETER SELECT [VELO CURVE].

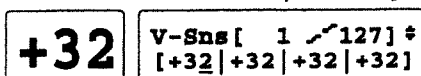


2. Press the CURSOR button [▼] to change to the "V-Crv" (velocity curve) screen. The velocity curve expresses the relationship between the force used to play the keyboard and the change in the actual sound.



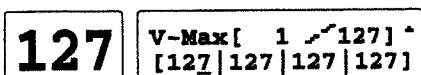
The curve types for the various Zones appear in the lower level of the right-hand screen. The type of the Zone (where the cursor is located) is shown in the left-hand screen, and the form of the curve as well as the minimum and maximum values for actual velocity (the amount of change in the sound produced by playing the keyboard forcefully) are shown in the upper level of the right-hand screen. Once you're there, use DATA ENTRY or the PALETTE slider to select the velocities you want to use for the Zones.

- Press the CURSOR button [▼] to call up the "V-Sns" (velocity sensitivity) screen.



"Velocity sensitivity" represents the keyboard's touch. Larger values give a heavier touch, and values that approach zero result in a progressively lighter touch. (The maximum value is "+32," and "0" gives the lightest touch. In this case, there is no change in velocity due to how forcefully the keyboard is played, and the velocity is always at its maximum value.) Using a negative value causes the velocity curve to be inverted. Once you're there, use DATA ENTRY or the PALETTE slider to select the velocity sensitivity values you want to use for the Zones.

- Press the CURSOR button [▼] to call up the "V-Max" (velocity max) screen.



"Velocity max" indicates the maximum value for velocity. Once you're there, use DATA ENTRY or the PALETTE slider to select the maximum velocity values you want to use for the Zones.

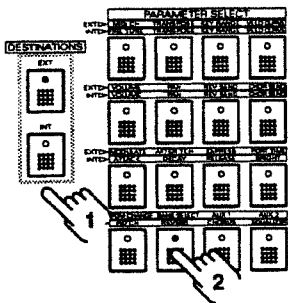
These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Selecting the Tones for the Zones (External Zones — Bank Select)

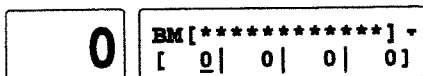
In addition to using Program Change messages to specify Tones, you can also use Bank Select messages. Bank Select messages can be combined with Program Changes to select an even larger number of Tones.

* Some MIDI instruments will not respond to Bank Select messages. Check out the manual for your MIDI instrument for more details.

- Press DESTINATIONS [EXT], then press PARAMETER SELECT [BANK SELECT].

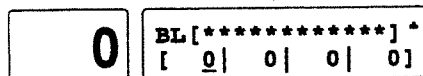


- Use the CURSOR button [▼] to select the "BM" (Bank Select MSB) screen.



Now you can select the MSB values for Bank Select. Use DATA ENTRY or the PALETTE slider to select the Bank Select MSB for the Zones. If you don't want to use Bank Select, press [OFF]. (Pressing [OFF] causes the LSB to be turned off automatically as well.)

- Use the CURSOR button [▼] to select the "BL" (Bank Select LSB) screen.



Now you can select the LSB values for Bank Select. Use DATA ENTRY or the PALETTE slider to select the Bank Select LSB for the Zones.

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

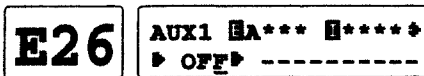
* The PARAMETER SELECT [BANK SELECT] can also be used to set Bank Select for internal Zones (but not for the VE-RD1). For more details, take a look at p.45 of the Volume 1 and p.18, 53 of the Volume 2.

Using the AUX1 and AUX2 Buttons with Parameters Assigned

The PARAMETER SELECT [AUX1] and [AUX2] can be assigned Parameters that you can't select with the PARAMETER SELECT buttons, Exclusive messages, RPN, or NRPN. You can assign these with DATA ENTRY or the PALETTE slider.

Assigning Parameters

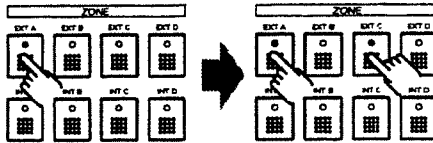
1. Select the Edit mode.
2. Press PARAMETER SELECT [AUX1] or [AUX2]. This selects the parameter allocation page for AUX1 or AUX2. You can also use the menus or the shortcut numbers to select these pages (EDIT: SYS: CTRL, E26 or E27).



3. Press the corresponding ZONE switch for the Zone you want to select. (When the A-90/EX is shipped, all Zones have the same setting.) You can make settings independently for each Zone.

If you want to make the same settings for more than one Zone, press the relevant ZONE switches simultaneously. (You can also press and hold down one switch and then press another.) Zones with illuminated ZONE switches are the ones that currently have assigned parameters.

(Making the same settings for more than one Zone)



4. Use the CURSOR buttons and DATA ENTRY to assign the parameters. Use the items on the left-hand side to choose the parameter's Group, and the items on the right-hand side to choose the type. To disable AUX, press [OFF].



Group Parameter

* Assignable Functions

- ◆ CC (MIDI control change)
All can be assigned (0 to 119).

- ◆ Ch.M (MIDI Channel messages)
- Ch AFTER (channel aftertouch)
- P-AFT (polyphonic aftertouch)
Aftertouch is applied to High (highest note played), Low (lowest note), First (first note), or Last (last note).
- PITCH BEND (pitch bend)

- ◆ RPN
- P.B.SENS (pitch bend sensitivity)

- FINE TUNE
- COURSE TUNE
- Settings made with MSB and LSB
 - * For more information, take a look at the MIDI Implementation Chart for the connected MIDI instrument.

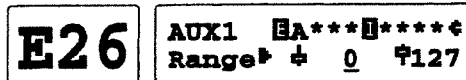
- ◆ **NPRN**
 - GS: VIB RATE (GS vibrato rate)
 - GS: VIB DEP (GS vibrato depth)
 - GS: VIB DLY (GS vibrato delay)
 - GS: CUTOFF (GS cutoff)
 - GS: RESONANC (GS resonance)
 - GS: ATTACK (GS attack)
 - GS: DECAY (GS decay)
 - GS: RELEASE (GS release)
 - Settings made with MSB and LSB
 - * For more information, check out the MIDI Implementation Chart for the connected MIDI instrument.

- ◆ **EXCL (Exclusive messages)**

You can make any settings you like. The method used to input Exclusive (SysEx) messages is described on p.11 of the Volume 2. Checksums are automatically calculated and sent.

 - * For more information, take a look at the MIDI Implementation Chart for the connected MIDI instrument.

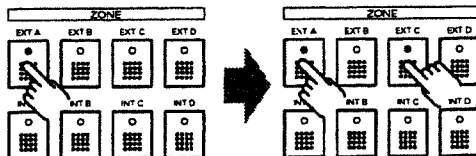
5. If you use the CURSOR buttons to move the cursor even farther to one side, the display changes to the page for setting the parameter's maximum and minimum values.



6. Press the corresponding ZONE switch for the Zone you want to select. (When the A-90/EX is shipped, all Zones have the same setting.) You can make settings independently for each Zone.

If you want to make the same settings for more than one Zone, press the relevant ZONE switches simultaneously. (You can also press and hold down one switch, and then press another one.) Zones with illuminated ZONE switches are the ones that currently have assigned parameters.

(Making the same settings for more than one Zone)



7. Use the CURSOR buttons and DATA ENTRY to set values.

The parameter assigned to an AUX button is saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

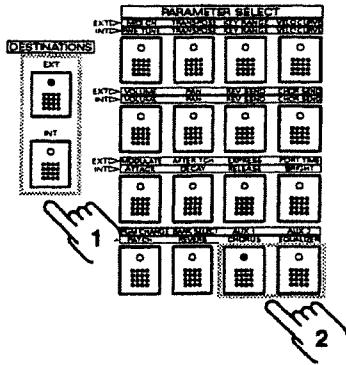
The minimum-value and maximum-value settings for the Zones can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save the settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

- * The PARAMETER SELECT [AUX1]/[AUX2] can also be used for internal Zones, but settings for [AUX1]/[AUX2] cannot be made for the VE-RD1. For more details, take a look at p.45 of the Volume 1 and p.18, 53 of the Volume 2.

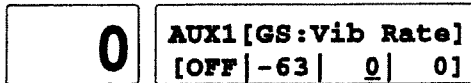
Using the AUX Buttons

Now let's put PARAMETER SELECT to actual use. (Be sure to exit the Edit mode first.)

1. Press DESTINATIONS [EXT] or [INT], then press PARAMETER SELECT [AUX1] or [AUX2].



2. Use DATA ENTRY or the PALETTE slider to set the parameters for the selected Zones. The parameters for the currently selected Zone appear in the upper level of the right-hand screen.



These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

- * The PARAMETER SELECT [AUX1]/[AUX2] cannot be used with the VE-RD1. For more details, take a look at p.45 of the Volume 1 and p.18, 53 of the Volume 2.

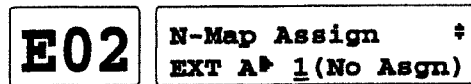
Displaying the Tone Names for a Sound Source

The A-90/EX lets you display the names of sounds of connected instruments with Bank Select and Program Change messages. This is possible because the A-90/EX contains Name Maps for different instruments. You can also create four Name Maps of your own.

Setting Maps for the Zones (EDIT: SYS, E03)

This function specifies a map for each of the Zones. The internal Zones automatically use the map for the Voice Expansion Board. (A map can be specified if no Voice Expansion Board is installed, or by making the appropriate setting (see Volume 2 p.57).)

1. Select the Edit mode, and use the menu or a shortcut number to move to the page for setting the Name Maps for the Zones.



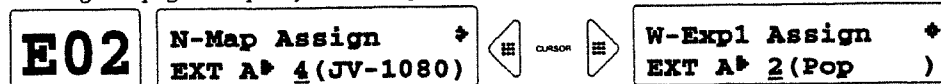
2. Press the corresponding ZONE switch for the Zone you want to select, then choose the map with DATA ENTRY.



The following Name Maps are available.

1	No Asgn	No Name Map is used (The values of the Bank Select and Program Change are shown instead of the sound name)
2	JV-80	Preset for the JV-80
3	JV-90	Preset for the JV-90 (Wave Expansion Board specifiable)
4	JV-1080	Preset for the JV-1080 (Wave Expansion Board specifiable)
5	JD-990	Preset for the JD-990
6	SC-55	For the SC-55
7	SC-88	For the SC-88
8	P-55	For the P-55
9	M-SE1	For the M-SE1
10	M-OC1	For the M-OC1
11	M-VS1	For the M-VS1
12	M-DC1	For the M-DC1
13 to 16	USER1 to 4	You can create your own maps (see Volume 2 p.34)

For maps indicated as "Wave Expansion Board specifiable," you can use the CURSOR buttons [◀]/[▶] to change the page and specify "Wave Expansion Board".



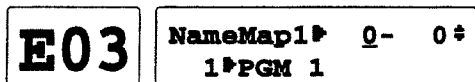
- * When PARAMETER SELECT is used to choose a Tone, the Tone Name is displayed when the Bank Select and Program Change messages match up. For more information on the Bank Select and Program Change messages used with each instrument, check out the manual that came with the equipment.

The map settings for the Zones are saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

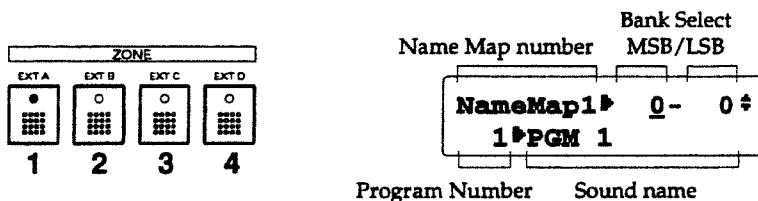
Creating a Name Map (EDIT: SYS, E03)

If you've made your own map for a connected instrument, or if the connected instrument has no map, you can create up four new Name Maps of your own.

1. Select the Edit mode, and use the menu or the shortcut number to move to the page for setting the Name Maps for the Zones.



2. Press the corresponding external ZONE switch to choose a Name Map (press [EXT A] for USER 1, [EXT B] for USER 2, [EXT C] for USER 3, or [EXT D] for USER 4). Then use the CURSOR buttons and input the Bank Select MSB and LSB, Program Change, and Tone Name (see Volume 2 p.10 for an explanation of how to enter the names).



- * You can display the Tone Name with just the Program Change by setting the value of Bank Select to "OFF."

The Name Maps that you create are saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

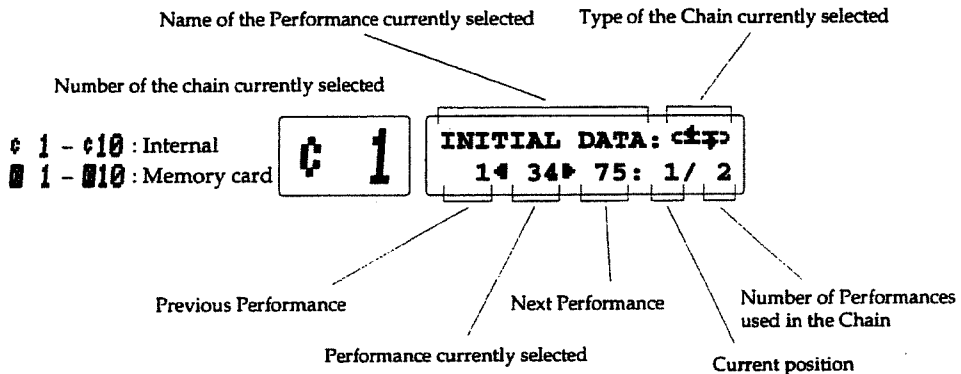
- * When PARAMETER SELECT is used to choose a Tone, the Tone Name is displayed when the Bank Select and Program Change messages match up (but if the value of Bank Select is set to "OFF," they don't have to match). For more information on the Bank Select and Program Change messages used with each instrument, check out the manual that came with the equipment.

Using Performances Arranged in Sequence (Chain Mode)

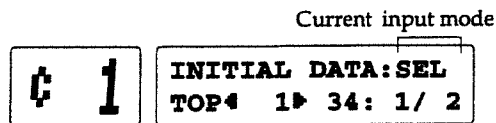
The A-90/EX lets you string together up to 64 Performances in the sequence that you require, and to save up to ten such strings as "Chains." You can use these Chains to call up Performance in sequence within a single song, or over the course of several songs.

Creating a Chain

1. Select the Chain mode, and use DATA ENTRY to choose the Chain Number.



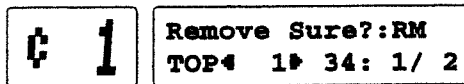
2. Press the CURSOR buttons [▲] or [▼] (either one is OK) to enter the Chain-creation mode.



3. Use the CURSOR buttons [◀]/[▶] to specify the sequence, and use DATA ENTRY to input Performance Numbers.

- If you use the numeric keypad, the Performance is inserted just before the current position (INS mode).
- If you use [INC]/[DEC], the Performance at the current position changes (SEL mode).

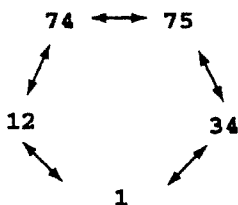
4. Use [OFF] to remove the Performance at the currently selected position from the Chain. When the confirmation message appears, press [ENTER] for "Yes" or [EXIT] for "No."



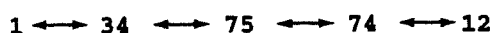
5. Press [EXIT] to leave the Chain-creation mode.

Next, you need to select the type of Chain (EDIT: Chain, E60). Two types are available — Loop and One-way.

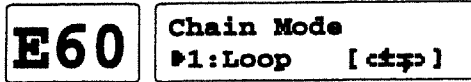
Loop : After cycling through the series of Performances to the last one, the sequence starts again with the first Performance.



One-way : After cycling through the series of Performances to the last one, the Chain ends.



-
6. Change to the Edit mode, and use the menu or the shortcut number to select "Chain Mode."

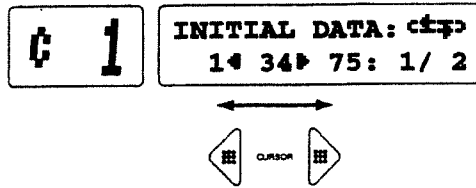


7. Use DATA ENTRY to choose the type of Chain.

These settings can be saved as a Chain setting (see Volume 2 p.45). If you don't save the settings, they become invalid when you switch off the power or change Chains.

Using Chains

1. In the Chain mode, use DATA ENTRY to choose a Chain Number.
2. Use the CURSOR buttons [◀]/[▶] to switch Performances.



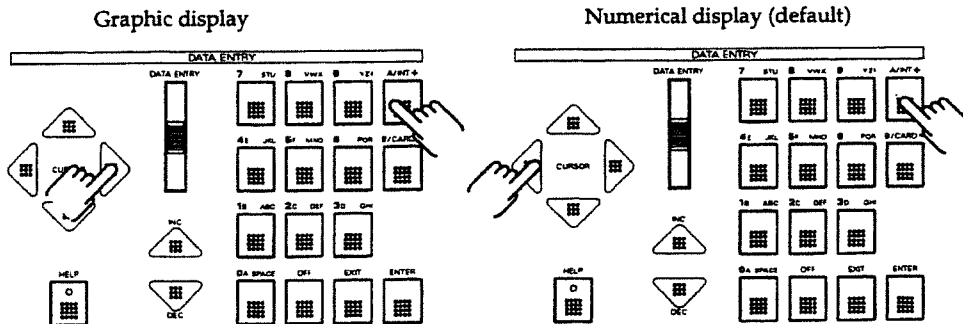
- * If PGM DOWN and PGM UP have been assigned to a controller, these two keys function just like the CURSOR buttons [◀] and [▶].

Other System Settings

The A-90/EX offers a variety of settings that make it easier to use. These are saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the system setting on a memory card — check out the Volume 2 p.46.)

Displaying Values While Using PARAMETER SELECT

When PARAMETER SELECT is in use, you can use the DATA ENTRY [A/INT] + CURSOR buttons [◀]/[▶] to vary the way that the value of parameter is displayed for each individual parameter.

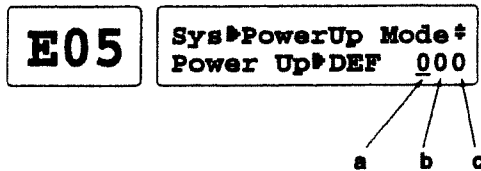


* How parameters are displayed

Parameter	[A/INT] + [▶]	[A/INT] + [◀]
FINE TUNE	Bar graph	Numerical display
KEY RANGE	Tone Name	Numerical display
VOLUME	Bar graph	Numerical display
PAN	Bar graph	Numerical display
REV SEND	Bar graph	Numerical display
CHOR SEND	Bar graph	Numerical display
MODULATE	Bar graph	Numerical display
AFTER TCH	Bar graph	Numerical display
EXPRESS	Bar graph	Numerical display
PORT TIME	Bar graph	Numerical display
ATTACK	Bar graph	Numerical display
DECAL	Bar graph	Numerical display
RELEASE	Bar graph	Numerical display
BRIGHT	Bar graph	Numerical display
PGM CHANGE	Group-Bank-Number	Numerical display
PATCH	Group-Bank-Number	Numerical display
REVERB	Bar graph	Numerical display
CHORUS	Bar graph	Numerical display
EQUALIZER	Bar graph	Numerical display
AUX 1/2	Bar graph	Numerical display

Setting the operating environment for the A-90/EX (EDIT: SYS, E05).....

1. Change to the Edit mode, and use the menu or the shortcut number to select the page for setting the A-90/EX's operating environment.



a. State of the A-90 Series at powerup

DEF/0 : Performance "1" is selected

LST/1 : Last settings used are recalled at powerup

b. How Performance Numbers are displayed

This selects the way that Performance Numbers are displayed.

GBN/0 : Group-Bank-Number format (internal memory: I11 to I88, memory card; C11 to C88)

DEC/1 : Decimal format (internal memory: 1 to 64, memory card; 65 to 128)

c. MIDI indicator settings

OFF/0 : The indicators for the MIDI OUTPUT switches and the ZONE switches show whether the corresponding MIDI OUT are on or off.

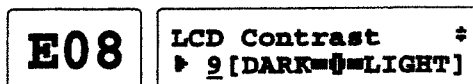
ON/1 : The indicators for the MIDI OUTPUT switches and the ZONE switches show whether the corresponding MIDI OUT are on or off, and flash when MIDI information is being sent.

2. Use the CURSOR buttons to select a parameter, and make the settings with DATA ENTRY.

LCD Contrast (EDIT: SYS, E08).....

This function is used to adjust the contrast (brightness) of the LCD (Liquid Crystal Display).

1. Change to the Edit mode, and use the menu or the shortcut numbers to select "LCD Contrast."

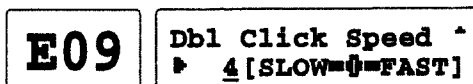


2. Use DATA ENTRY to adjust the contrast.

Double-click Speed (EDIT: SYS, E09).....

This function lets you adjust the speed necessary for double-click operations.

1. Change to the Edit mode, and use the menu or the shortcut number to select the page for adjusting the double-click speed.



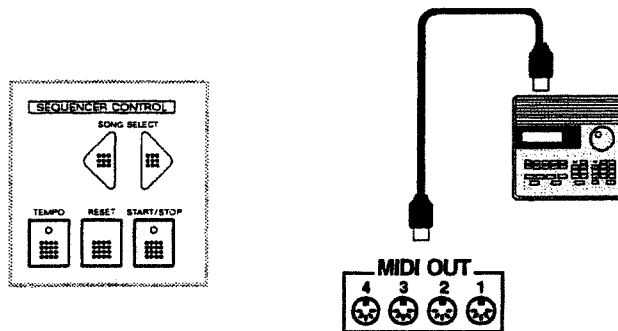
2. Use DATA ENTRY to adjust the speed. While you're doing this, the indicators on the MIDI OUTPUT switches flash to show you the current double-click speed.

* When it is set to OFF, you cannot use the Double-Click operations.

Chapter 3 Controlling External MIDI Instruments Other Than Sound Sources

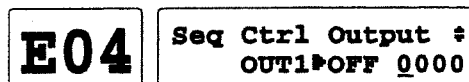
Controlling an External Sequencer

The A-90/EX lets you control an external sequencer.

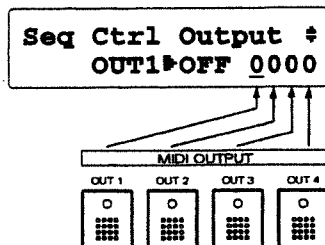


Setting the MIDI OUT for Connecting the Sequencer (EDIT: SYS, E04)

1. Change to the Edit mode, and use the menu or the shortcut number to select "Seq Ctrl Output."



2. Use the corresponding MIDI OUTPUT switch to activate the desired MIDI OUT.



A MIDI timing clock signal is constantly sent to the MIDI OUT that you've selected here. (constantly sent to the Voice Expansion Board installed in the A-90.) This is used to control the tempo of the sequencer. This means that if you want to control the tempo of the sequencer, you need to set the sequencer to respond to an external clock. (For more details, check out the manual that came with the sequencer.)

This can also be used with MIDI instruments that synchronize modulation and other effects to a timing clock. (Take a look at the manual that came with the MIDI instrument for more information.)

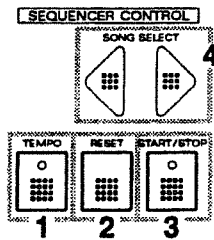
* You can also use this to control the speed of modulation etc. for some Patches on the VE-RD1.

* A MIDI timing clock signal received via MIDI IN2 is NOT mixed with the output to the MIDI OUT that you select here (when the setting has been made to mix the MIDI messages from IN2).

This setting is saved automatically as a system setting. There is only one system setting, so it cannot be switched. (However, you can save the entire settings including the system setting on a memory card — check out the Volume 2 p.46.)

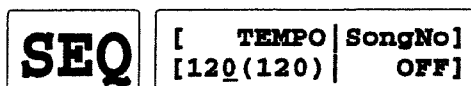
Controlling a Sequencer

You can control a sequencer from any mode.



1. TEMPO

Pressing this button calls up the screen for setting the sequencer's tempo (in other words, the speed of the MIDI timing clock).



In the portion of the screen that shows the tempo (the left-hand half), the number on the left are values that have been set by DATA ENTRY or saved to a Performance (default tempo). The numbers enclosed in parentheses on the right is the current tempo. (When the controller is used to control the tempo, only the value on the right changes.)

This screen also lets you select a Song Number for playback (on the right-hand half of the screen). Either selection is made using DATA ENTRY. A Song Number can also be selected with "4. SONG SELECT."

- * If you haven't specified the MIDI OUT to which the sequencer is connected, no MIDI timing clock or Song Select messages is sent even if you select a tempo or a Song Number. (timing clock is constantly sent to the Voice Expansion Board.)
- * When the [TEMPO] indicator is illuminated, the PALETTE slider functions as the CONTROL slider.

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

- * If you don't want to select a tempo or a Song Number, you can turn it off by pressing [OFF] on the numeric keypad. When switched off, the previously selected Performance values remain unchanged.

2. RESET

Pressing this button returns you to the start of the currently selected song (that is, a Song Position Reset message is sent). When pressed during a performance, playback stops in the sequencer and the song is reset to the beginning.

3. START/STOP

Pressing this button starts or stops (pauses) the sequencer. When a performance is stopped, however, it does not return to the start of the song. After a performance is started, the indicator remains illuminated until stopped (or until ended by pressing RESET).

- * If a performance has finished at the end of a song or has been stopped through operations on the sequencer itself, the indicator remains illuminated until [START/STOP] is pressed.

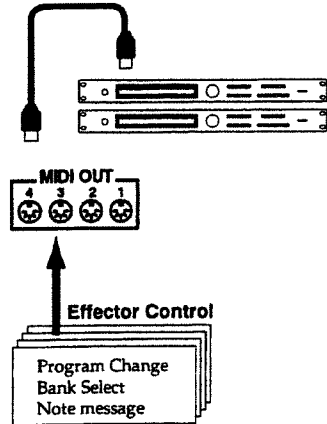
4. SONG SELECT

This button is used to choose a song for playback. The Song Number is displayed while [TEMPO] is depressed. Pressing this button has no effect while playback is in progress (i.e., while the START/STOP indicator is lit).

- * No functions except Sequencer Control will work unless you've specified the MIDI OUT to which the sequencer is connected.

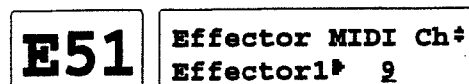
Controlling an External Effects Device

The A-90/EX lets you make four types of settings for controlling externally connected equipment like effectors or rhythm machines.

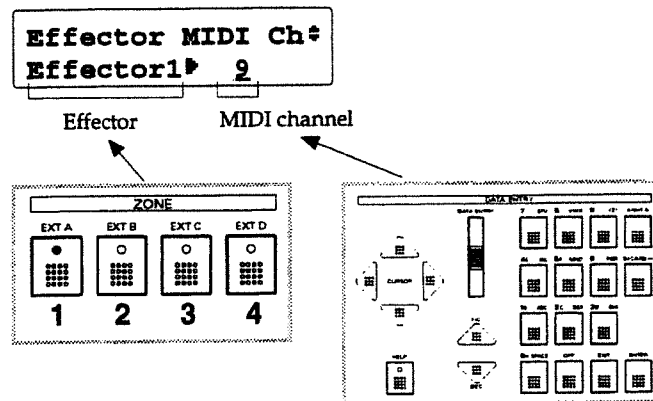


Setting MIDI Channels for Controlling an Effector (EDIT: PERF: EFFECT, E51)

1. Change to the Edit mode, and use the menu or the shortcut number to select "Effector MIDI Ch."



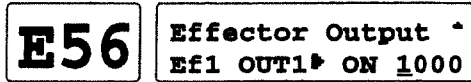
2. Use the corresponding ZONE switch to choose the effector, and use DATA ENTRY to select the MIDI channel.



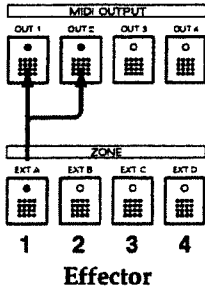
These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Setting the MIDI OUT for Connecting the Effector..... (EDIT: PERF: EFFECT, E56)

1. Change to the Edit mode, and use the menu or the shortcut to select "Effector Output."



2. Use the corresponding ZONE switch to choose the effector, and use the corresponding MIDI OUTPUT switch to activate the desired MIDI OUT. You can set the MIDI OUT with DATA ENTRY as well.

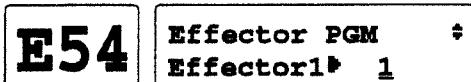
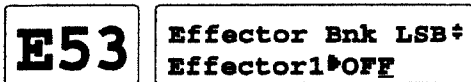
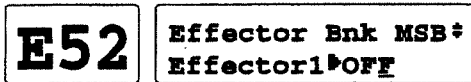


These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

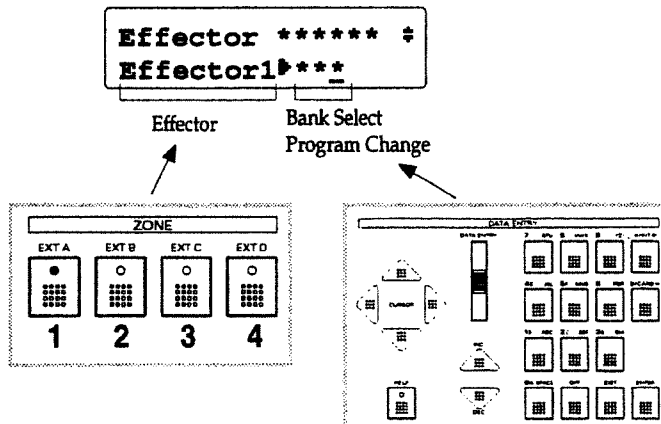
Making the Settings for the Effector (EDIT: PERF: EFFECT, E52, 53, and 54)

This function sets the Bank Select and Program Change messages used to control the effector.

1. Change to the Edit mode, and use the menu or the shortcut to select "Effector Brnk MSB" (Bank Select MSB, E52), "Effector Bnk LSB" (Bank Select LSB, E53), and "Effector PGM" (Program Change, E54).



2. Use the corresponding ZONE switch to choose the effector, and use DATA ENTRY to make the settings.

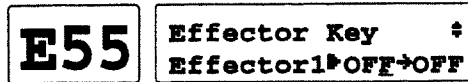


These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

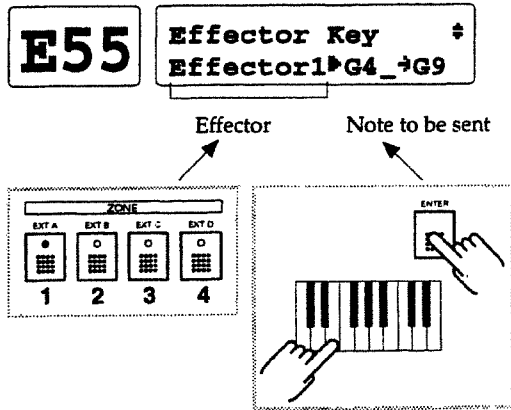
Assigning Note Messages Sent to an Effector or Rhythm Machine to the Keyboard (EDIT: PERF: EFFECT, E55)

When an instrument such as a drum sound module (that uses Note messages to play a wide range of percussion sounds and effects) is connected to the A-90/EX, you can assign the Note messages from that instrument to the keyboard. The keys to which these Note messages are assigned are removed from the range of Zone sounds.

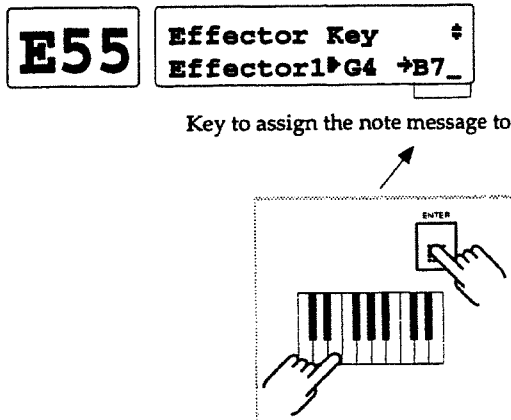
1. Change to the Edit mode, and use the menu or the shortcut to select "Effector Key."



2. Use the corresponding ZONE switch to choose the effector, use the CURSOR buttons to move the cursor to the area shown in the figure below, then hold down [ENTER] and press the key corresponding to the Note message you wish to send.



3. Next, use the CURSOR buttons to move the cursor to the area shown in the figure below, then hold down [ENTER] and press the key to be assigned with the Note message you wish to send.



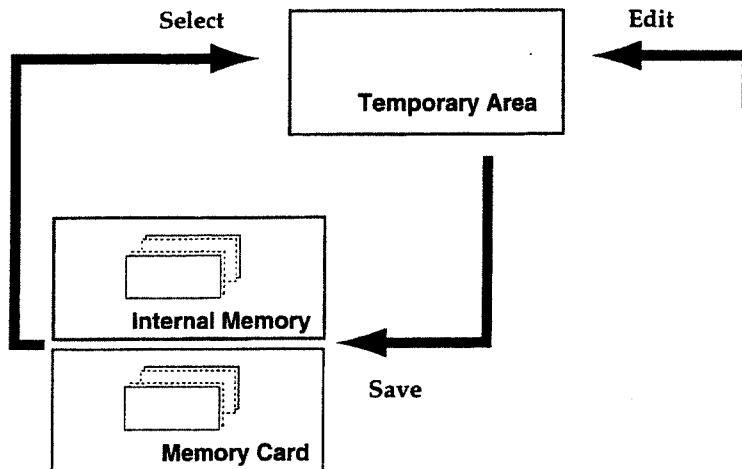
* These steps can be performed with DATA ENTRY.

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

Chapter 4 Organizing Your Settings

Saving to Memory

Settings that you've edited (changed) can be saved in initial memory or on a memory card (available separately). The items described as Performance settings in the manual become invalid when you switch off the power or switch Performances, unless you save them. (In the Manual mode, however, Performance settings are saved automatically.)

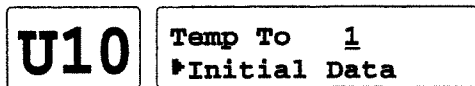


- * If you're using a memory card, be sure to insert the card securely into the DATA CARD slot, with the card's printed side facing up.
- * Before attempting to save settings to a memory card, be sure that the card's PROTECT switch is set to "Off." After you've saved the settings, move the PROTECT switch back to "On" to prevent your data from being accidentally overwritten.

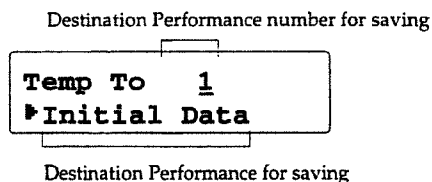
Saving Settings in the Temporary Area As a Performance (UTILITY: WRITE, U10)

This function lets you save settings in the temporary area to memory as a Performance.

1. Change from the Performance mode to the Utility mode, and use the menu or the shortcut to select the page for saving a Performance.

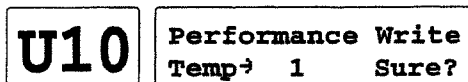


2. Use DATA ENTRY to select the Performance Number to be used as the destination for saving (internal memory: 1-64, or memory card: 65-128). The name of the destination Performance appears in the bottom portion of the screen at this time.



- To select numbers 65-128, press [CARD], then [ENTER] in DATA ENTRY. Press [INT] followed by [ENTER] to select those from 1-64.
- You can use the numeric keypad to input the Performance Number directly.
Ex. Press the [1], [2], [8], and [ENTER] keys to select Performance Number 128.

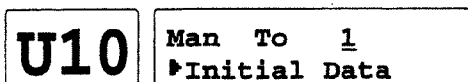
- Press [ENTER]. A confirmation message asking you if you want to save the Performance appears. Press [ENTER] for "Yes" or [EXIT] for "No."



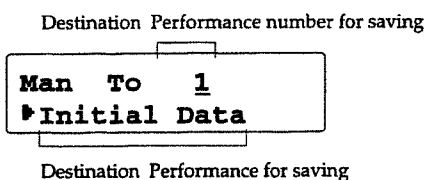
Saving Settings in the Manual Mode As a Performance (UTILITY: WRITE, U10)

This function lets you save settings in the Manual mode to internal memory as a Performance.

- Change from the Performance mode to the Utility mode, and use the menu or the shortcut to select the page for saving a Performance.

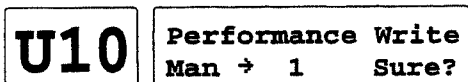


- Use DATA ENTRY to select the Performance Number to be used as the destination for saving (internal memory: 1-64, or memory card: 65-128). The name of the destination Performance appears in the bottom portion of the screen at this time.



- To select numbers 65-128, press [CARD], then [ENTER] in DATA ENTRY. Press [INT] followed by [ENTER] to select those from 1-64.
- You can use the numeric keypad to input the Performance Number directly. Ex: Press the [1], [2], [8], and [ENTER] keys to select Performance Number 128.

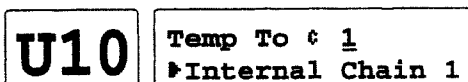
- Press [ENTER]. A confirmation message asking you if you want to save the Performance appears. Press [ENTER] for "Yes" or [EXIT] for "No."



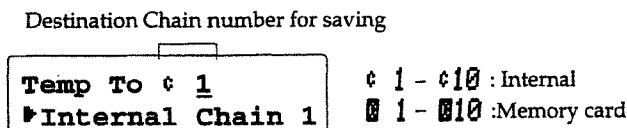
Saving a New or Edited Chain (UTILITY: WRITE, U10).....

This function lets you save Chain settings in the temporary area to internal memory or memory card.

- Change from the Chain mode to the Utility mode, and use the menu or the shortcut to select the page for saving a Performance.

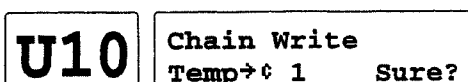


- Use DATA ENTRY to select the Chain Number to be used as the destination for saving.



- To select numbers 1-10, press [CARD], then [ENTER] in DATA ENTRY. Press [INT] followed by [ENTER] to select those from 1-10.

- Press [ENTER]. A confirmation message asking you if you want to save the Chain appears. Press [ENTER] for "Yes" or [EXIT] for "No."



Saving the Entire Contents of Internal Memory to a Memory Card

The A-90/EX lets you save all of the settings in internal memory on a memory card. This operation stores the following settings:

- System settings
- Manual mode settings
- All Performances
- All Chains

* This procedure overwrites any previous settings on the memory card.

Saving from Internal Memory to a Memory Card

(UTILITY: CPY: CARD: I→C, U31).....

1. Be sure a memory card has been properly inserted into the DATA CARD slot.
2. Change to the Utility mode, and use the menu or the shortcut to select "Copy All (Internal to Card)."

U31	Copy All Sure?
	Internal To Card

3. A confirmation message asking you if you want to save the settings appears. Press [ENTER] for "Yes" or [EXIT] for "No."

Copying Settings from a Memory Card to Internal Memory

(UTILITY: CPY: CARD: C→I, U32).....

1. Be sure the correct memory card has been properly inserted into the DATA CARD slot.
2. Change to the Utility mode, and use the menu or the shortcut to select "Copy All (Card to Internal)."

U32	Copy All Sure?
	Card To Internal

3. A confirmation message asking you if you want to copy the contents of the card to internal memory appears. Press [ENTER] for "Yes" or [EXIT] for "No."

* This procedure overwrites all settings in internal memory.

Swapping the Settings in Internal Memory with those on a Memory Card

(UTILITY: CPY: CARD: C↔I, U33).....

1. Be sure a memory card has been properly inserted into the DATA CARD slot.
2. Change to the Utility mode, and use the menu or the shortcut to select "Swap All."

U33	Swap All Sure?
	Card And Internal

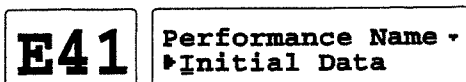
3. A confirmation message asking you if you want to swap the settings appears. Press [ENTER] for "Yes" or [EXIT] for "No."

Giving Names to Settings

Naming a Performance (EDIT: PERF: COMMON, E41).....

This function lets you assign a name to a Performance. This name can be saved as a Performance setting.

1. Change from the Performance mode to the Edit mode, and use the menu or the shortcut to select "Performance Name."

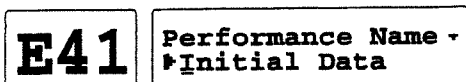


2. Use DATA ENTRY to input the Performance name (see Volume 2 p.10 for an explanation of how to input text).

Naming Settings in the Manual Mode (EDIT: PERF: COMMON, E41)

You can also assign a name to settings in the Manual mode. This name is automatically saved as a Manual mode setting.

1. Change from the Manual mode to the Edit mode, and use the menu or the shortcut to select "Performance Name."



2. Use DATA ENTRY to input the Performance name (see Volume 2 p.10 for an explanation of how to input text).

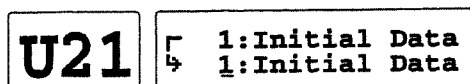
This setting is saved automatically.

Copying Settings

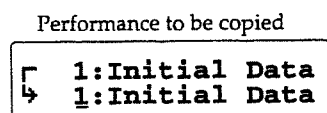
Copying a Performance (UTILITY: CPY: PERF, U21)

This function copies the settings from one Performance to another.

1. Change from the Performance mode to the Utility mode, and use the menu or the shortcut to select the page for copying a Performance.



2. Use the CURSOR buttons [◀]/[▶] and DATA ENTRY to select the Performance to be copied and the Performance Number to be used as the destination for saving (internal memory: 1-64, or memory card: 65-128). The names of the Performance to be copied and the destination Performance appear in the bottom portion of the screen at this time.



Destination Performance
for copying

- To select numbers 65-128, press [CARD], then [ENTER] in DATA ENTRY. Press [INT] followed by [ENTER] to select those from 1-64.
- You can use the numeric keypad to input the Performance Number directly.
Ex: Press the [1], [2], [8], and [ENTER] keys to select Performance Number 128.

- Use the ZONE switches and the MIDI OUTPUT switches to select the settings that you want to copy.

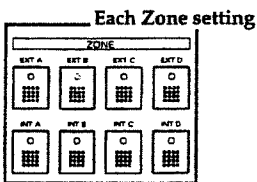
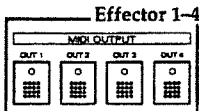
Here's how the switches work:

- ZONE switches**

Each switch is used to choose whether to copy the settings for the corresponding Zone. If a Zone's indicator is flashing, it means that that Zone's settings will be copied.

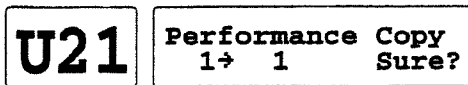
- MIDI OUTPUT switches**

These are used to select whether effector control settings are to be copied. OUT 1 through 4 correspond respectively to Effector 1 through 4. If a switch's indicator is flashing, it means that the settings for the corresponding effector control will be copied.



All settings (other than effector controls that are common to all Zones) are copied.

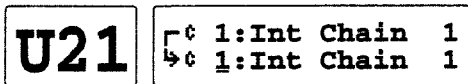
- Press [ENTER]. A confirmation message asking you if you want to go ahead with copying appears. Press [ENTER] for "Yes" or [EXIT] for "No."



Copying a Chain (UTILITY: CPY: CHAIN, U21).....

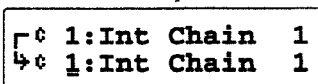
This function copies the settings from one Chain to another.

- Change from the Chain mode to the Utility mode, and use the menu or the shortcut to select the page for copying a Chain.



- Use the CURSOR buttons and DATA ENTRY to select the Chain to be copied and the Chain Number to be used as the destination for saving. The names of the Chain to be copied and the destination Chain appear in the bottom portion of the screen at this time.

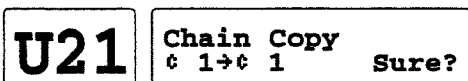
Chain to be copied



Destination Chain for copying

To select numbers 1 - 10, press [CARD], then [ENTER] in DATA ENTRY. Press [INT] followed by [ENTER] to select those from 1 - 10.

- Press [ENTER]. A confirmation message asking you if you want to go ahead with copying appears. Press [ENTER] for "Yes" or [EXIT] for "No."



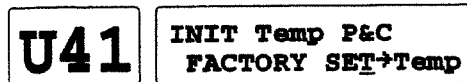
Returning to the Factory Default Settings

It is possible to automatically detect the type of Voice Expansion Board that is installed, and initialize the unit to its optimal settings.

Initializing Performances or Chains in the Temporary Area (UTILITY: INT: TMP, U41)

This function initializes the settings of Performances or Chains in the temporary area to the factory-default values.

1. Change to the Utility mode, and use the menu or the shortcut to select "Init Temp P&C."



2. Use the ZONE switches and the MIDI OUTPUT switches to select the Performances you want to initialize.

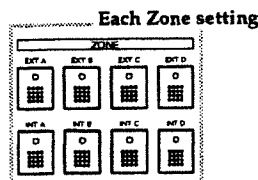
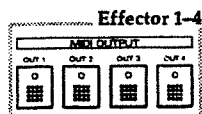
Here's how the switches work:

- **ZONE switches**

Each switch is used to choose whether to initialize the settings for the corresponding Zone. If a Zone's indicator is flashing, it means that that Zone's settings will be initialized.

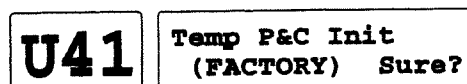
- **MIDI OUTPUT switches**

These are used to select whether effector control settings are to be initialized. OUT 1 through 4 correspond respectively to Effector 1 through 4. If a switch's indicator is flashing, it means that the settings for the corresponding effector control will be initialized.



All settings (other than effector controls that are common to all Zones) are initialized.

3. Use DATA ENTRY to choose whether to initialize to the settings for the Voice Expansion Board ("FACTORY SET") or to the initial settings ("INITIAL DATA").
4. Press [ENTER]. A confirmation message asking you if you want to go ahead with initialization appears. Press [ENTER] for "Yes" or [EXIT] for "No."

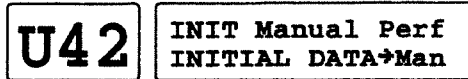


Unless the settings that have been initialized are saved as a new Performance or Chain, they become invalid when you turn off the power or switch to another Performance or Chain.

Initializing Settings in the Manual Mode (UTILITY: INT: MAN, U42).....

This function initializes the settings in the Manual mode to their factory-default values.

1. Change to the Utility mode, and use the menu or the shortcut to select "Init Manual Perf."



2. Use the ZONE switches and the MIDI OUTPUT switches to select the settings you want to initialize.

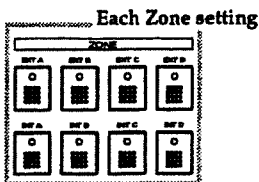
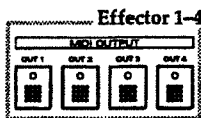
Here's how the switches work:

- **ZONE switches**

Each switch is used to choose whether to initialize the settings for the corresponding Zone. If a Zone's indicator is flashing, it means that that Zone's settings will be initialized.

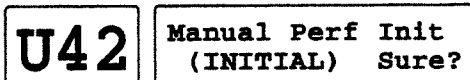
- **MIDI OUTPUT switches**

These are used to select whether effector control settings are to be initialized. OUT 1 through 4 correspond respectively to Effector 1 through 4. If a switch's indicator is flashing, it means that the settings for the corresponding effector control will be initialized.



All settings (other than effector controls that are common to all Zones) are initialized.

3. Press [ENTER]. A confirmation message asking you if you want to go ahead with initialization appears. Press [ENTER] for "Yes" or [EXIT] for "No."

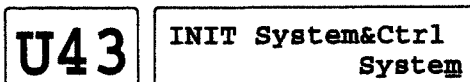


* The Manual Mode settings are initialized only to the "INITIAL DATA."

Initializing the System Settings (UTILITY: INT: SYS, U43).....

This function initializes the system settings (except for User Name Maps) to their factory-default values.

1. Change to the Utility mode, and use the menu or the shortcut to select "INIT System&Ctrl."



2. Use DATA ENTRY to choose the portions of system settings that you want to initialize.

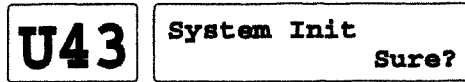
System : All system settings except for User Name Maps and controller assignments

Control Assign : Controller assignments

System+Ctrl : All system settings except for User Name Maps

V-EXP Master Tune : *For detailed explanation about this parameter, refer to page 58.

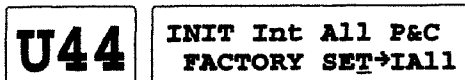
3. Press [ENTER]. A confirmation message asking you if you want to go ahead with initialization appears. Press [ENTER] for "Yes" or [EXIT] for "No."



Initializing the Internal Memory (UTILITY: INT: I-ALL, U44)

This function returns the 64 Performances and 10 Chains stored in the internal memory to their factory-default values.

1. Change to the Utility mode, and use the menu or the shortcut to select "Init Int All P&C."



2. Use the ZONE switches and the MIDI OUTPUT switches to select the Performances you want to initialize.

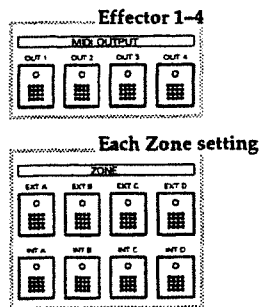
Here's how the switches work:

- **ZONE switches**

Each switch is used to choose whether to initialize the settings for the corresponding Zone. If a Zone's indicator is flashing, it means that that Zone's settings will be initialized.

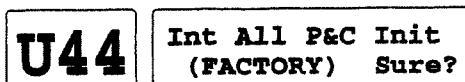
- **MIDI OUTPUT switches**

These are used to select whether effector control settings are to be initialized. OUT 1 through 4 correspond respectively to Effector 1 through 4. If a switch's indicator is flashing, it means that the settings for the corresponding effector control will be initialized.



All settings (other than effector controls that are common to all Zones) are initialized.

3. Use DATA ENTRY to choose whether to initialize to the settings for the Voice Expansion Board ("FACTORY SET") or to the initial settings ("INITIAL DATA").
4. Press [ENTER]. A confirmation message asking you if you want to go ahead with initialization appears. Press [ENTER] for "Yes" or [EXIT] for "No."



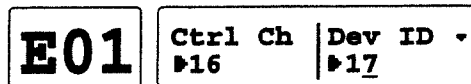
Sending the Contents of Internal Memory As MIDI Messages

You can send the contents of internal memory to a sequencer or another MIDI device that can record bulk data. Data that has been recorded in this way can be received via MIDI IN2 at any time.

* The contents of the internal memory are overwritten by any data that is received.

First of all, you need to set the device ID (EDIT: SYS, E01).

1. Change to the Edit mode, and use the menu or the shortcut to select "Dev ID."



2. Use the CURSOR buttons to move the cursor to the right, and use DATA ENTRY to set the device ID (the initial setting is "17"). If you're exchanging data between two A-90/EX units, they should both be set to the same device ID.

This setting is saved automatically as a system setting.

Next, choose what you want to send and select the MIDI OUT to be used (UTILITY: BLK, U50).

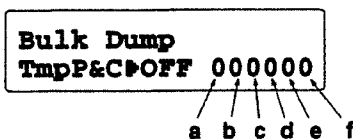
3. Change to the Utility mode, and use the menu or the shortcut to select "Bulk Dump."



4. Use DATA ENTRY to select the items in memory that you want to send.

0: Don't send

1: Send



a: Performance and Chain settings in the temporary area

b: Manual mode settings

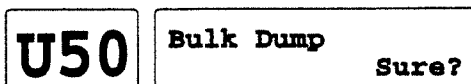
c: System settings (except for controller assignments and User Name Maps)

d: Controller assignments

e: All Performances and Chains in internal memory

f: User Name Maps

5. Use the corresponding MIDI OUTPUT switch to choose the MIDI OUT.
6. Press [ENTER]. A confirmation message asking you if you want to sent the data appears. Press [ENTER] for "Yes" or [EXIT] for "No."



Chapter 5 Controlling the On-board Sound Source

This chapter explains the differences between the various Voice Expansion Boards that can be installed in the A-90.

About Voice Expansion Boards

The performance data in the A-90's internal Zones is normally sent to the Voice Expansion Board installed in the unit. The flow of this performance data varies slightly from one model of Voice Expansion Board to another.

The VE-RD1

The VE-RD1 has four Parts, and a single Patch can be assigned to each of these Parts. The correspondences with the internal Zones are as follows.

- Internal Zone A → Part 1 for the VE-RD1
- Internal Zone B → Part 2 for the VE-RD1
- Internal Zone C → Part 3 for the VE-RD1
- Internal Zone D → Part 4 for the VE-RD1

The MIDI channels set for the internal Zones serve as the MIDI receiving channels for the Parts.

The VE-GS1

The VE-GS1 has 16 Parts, and a single Tone can be assigned to each of these Parts. MIDI receiving channels 1 through 16 are set to the respective Parts.

The MIDI channels set for the respective Zones determine which Part is assigned to what Zone.

- * The internal Zones have four Parts, so only four Parts can be controlled from the A-90.

The VE-JV1

The VE-JV1 has seven Parts and one Rhythm Part, and a single Patch can be assigned to each of these Parts. MIDI receiving channels 1 through 7 and 10 are assigned to the respective Parts.

The MIDI channels set for the respective Zones determine which Part is assigned to what Zone.

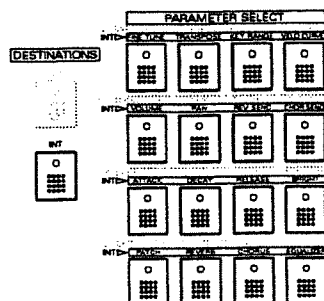
- * The internal Zones have four Parts, so only four Parts can be controlled from the A-90.

Items That PARAMETER SELECT Can Handle

This section describes items that couldn't be covered in the Introductory Volume, with an emphasis on the differences between Voice Expansion Board models.

The VE-RD1

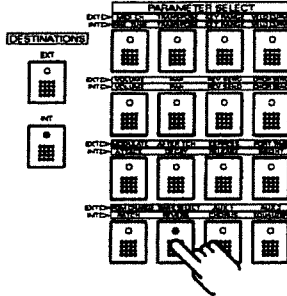
The VE-RD1 is a Voice Expansion Board designed exclusively for the A-90, so all settings can be made with PARAMETER SELECT.



Reverb Settings

Detailed settings can be made for the VE-RD1's built-in Reverb. These settings are common to the entire unit, regardless of the Zone (internal).

1. Press PARAMETER SELECT [REVERB]. (If DESTINATIONS [INT] is dark, you can also press [INT].)



2. Press the CURSOR button [▲] to call up the screen for setting "Type" (the Reverb type), "Levl" (level: the volume level of the Reverb or Delay sound), and "Tim" (time: the Reverb time). Use DATA ENTRY or the PALETTE sliders to make the settings for these parameters.



* From left to right, the PALETTE sliders correspond to these three settings in the sequence given above. The rightmost slider is inactive.

Reverb Parameters (1)

• Type

There are eight types of Reverb.

1. ROOM1: dense reverb with short decay
2. ROOM2: sparse reverb with short decay
3. STGE1: reverb with greater late reverberation
4. STGE2: reverb with strong early reflections
5. HALL1: reverb with clear reverberance
6. HALL2: reverb with rich reverberance
7. DELAY: a conventional delay
8. P_DLY: a delay with echoes that move left and right

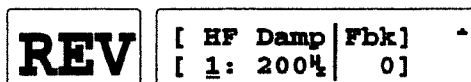
• Lev (level)

This parameter sets the volume of the reverb when any of the four types (from ROOM1 to HALL1) has been selected, or the volume of the delayed sound when DELAY or P_DLY has been selected.

• Tim (time)

This parameter sets the duration of the lingering sounds when any of the four types (from ROOM1 to HALL1) has been selected, or the time interval until the first delayed sound is heard when DELAY or P_DLY has been selected.

3. Press the CURSOR button [▼] to call up the screen for setting "HF Damp" (HF damper: the cutoff frequency for high-frequency components of the Reverb sound) and "Fbk" (feedback: the amount of delayed sound that is returned to Delay). Use DATA ENTRY or the PALETTE sliders to make the settings for these parameters.



- * From left to right, the PALETTE sliders correspond to these two settings in the sequence given above. The rightmost two sliders are inactive.

Reverb Parameters (2)

- **HF Damp (HF damper)**

The lower the frequency, the more high-frequency components are cut, resulting in a softer, lingering sound. If you don't want to cut any high-frequencies, set this to "BYPASS."

- **Fbk (feedback)**

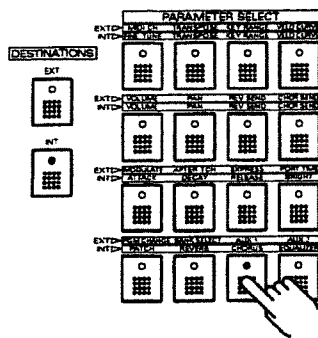
Any setting made for this parameter is ignored when any of the four types of reverb (from ROOM1 to HALL1) have been selected for Type.

These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

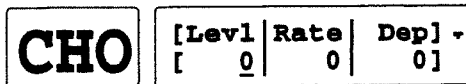
Chorus Settings

Detailed settings can be made for the VE-RD1's on-board Reverb. These settings are common to the entire unit, regardless of the Zone (internal).

1. Press PARAMETER SELECT [CHORUS]. (If DESTINATIONS [INT] is dark, you can also press [INT].)

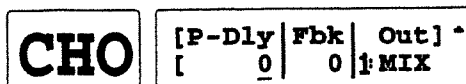


2. Press the CURSOR button [▲] to call up the screen for setting "Levl" (level: the volume level of the Chorus sound), "Rate" (the speed of the undulations for the Chorus sound), and "Dep" (Depth: the depth of the undulations). Use DATA ENTRY or the PALETTE sliders to make the settings for these parameters.



- * From left to right, the PALETTE sliders correspond to these three settings in the sequence given above. The rightmost slider is inactive.

3. Press the CURSOR button [▼] to call up the screen for setting "P-Dly" (predelay: the interval after the original sound until the Chorus sound is heard), "Fbk" (feedback: the amount of sound passing through Chorus that is returned to Chorus), and "Out" (how Chorus and Reverb are combined). Use DATA ENTRY or the PALETTE sliders to make the settings for these parameters.

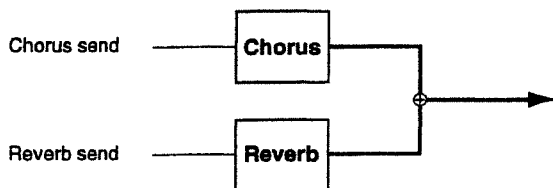


- * From left to right, the PALETTE sliders correspond to these three settings in the sequence given above. The rightmost slider is inactive.

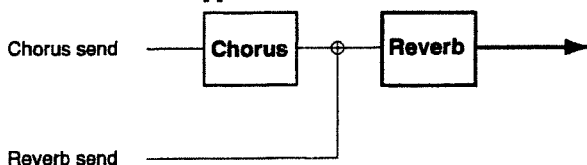
How Chorus and Reverb Are Combined

Chorus and Reverb can be combined in any of three different ways.

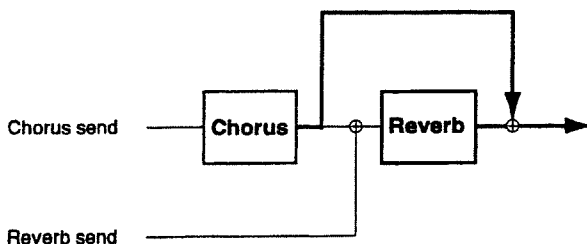
1. **MIX:** The Chorus sound and the Reverb sound are mixed.



2. **REV:** Reverb is applied to the Chorus sound.



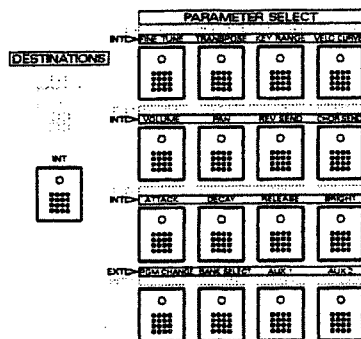
3. **M+R:** Chorus sound with no Reverb, and Chorus sound with Reverb applied are mixed.



These settings can be saved as a Performance setting (see p.26 of the Volume 1 and p.44 of the Volume 2). If you don't save these settings, they become invalid when you switch off the power or switch Performances. (In the Manual mode, however, the settings are saved automatically.)

The VE-GS1 and VE-JV1

The VE-JV1 and the VE-GS1 are not designed specifically for the A-90. This means that PARAMETER SELECT sets some items differently from the VE-RD1.



The bottom row of buttons under PARAMETER SELECT does not make settings for PATCH, REVERB, CHORUS, and EQUALIZER. Instead, they make settings for PGM CHANGE, BANK SELECT, AUX1, and AUX2, just as with the external Zones. You can use AUX1 and AUX2 to control a wide variety of parameters.

- * If a Bank Select other than "0" is selected with the VE-GS1, the sound of the selected Part may fail to play. If this happens, change the Bank Select and Program Change settings to more appropriate values.
- * If the VE-JV1 sets a Program Change on MIDI channel 16, it switches to the VE-JV1's Performance.

Controlling the Built-in Sound Source with an External Sequencer

If you make the settings for sending MIDI messages to the Voice Expansion Board from MIDI IN2 (see Volume 2 p.21), you can control the Voice Expansion Board with a sequencer connected to MIDI IN2.

The VE-RD1

The VE-RD1 can be controlled as a four-part, multi-timbral sound source. The MIDI channels set for the internal Zones become the MIDI receiving channels for the Parts.

The VE-GS1

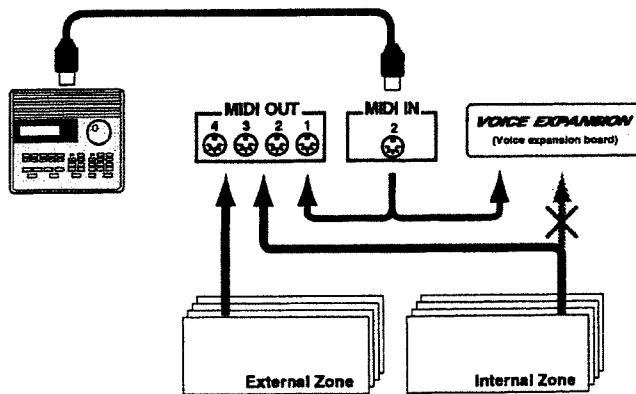
The VE-GS1 can be controlled as a 16-part, multi-timbral sound source.

The VE-JV1

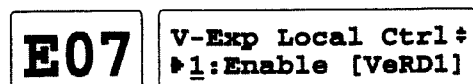
The VE-JV1 can be controlled as a multi-timbral sound source with seven Parts and one Rhythm Part.

Using the Voice Expansion Board As an Independent Sound Source (EDIT: SYS, E07)

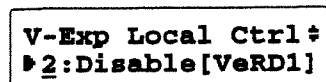
When external connections are made for more than four Zones (up to a maximum of eight — see Volume 2 p.18), the Voice Expansion Board can be isolated from the internal Zones.



1. Change to the Edit mode, and use the menu or the shortcut to select "V-Exp Local Ctrl."



2. Use DATA ENTRY to select "2: Disable" (the model name of the installed Voice Expansion Board appears at the bottom right of the right-hand screen at this time).



This setting is saved automatically as a system setting.

When this setting has been made, performance data from internal Zones is no longer sent to the Voice Expansion Board (although performance data from MIDI IN2 is sent). At this time, the PARAMETER SELECT functions that can be used with the internal Zones are the same as for the external Zones. And you can set the Name Map to the internal zones.

* When "V-Exp Local Ctrl" has been set to "Disable," the MIDI receiving channels for the VE-RD1's Parts are set to channels 1, 2, 3, and 4, respectively.

Setting the Master Tune in the Voice Expansion Board (UTILITY: INIT: SYS, U43)

You can set the Master Tune in the Voice Expansion Board installed into the A-90.

1. Change to the Utility mode, and use the menu or the shortcut to select "INIT System&Ctrl."

U43	INIT System&Ctrl System
------------	--

2. Use DATA ENTRY to select "V-EXP Master Tune", then press [ENTER].

U43	INIT System&Ctrl V-EXP Master Tune
------------	---

3. Use DATA ENTRY to set the Master Tune. If you are satisfied with the value you have specified, press [ENTER]. To retrieve the previous value, press [EXIT].

U43	V-EXP Master Tune ▶440.0 Sure?
------------	---

This setting is saved automatically as a system setting.

Chapter 6 Supplementary Materials

If You Think There Might Be a Problem...

If no sound is produced, or if you suspect there is a problem, check the points described here first. If you can't resolve the problem, contact the store where you purchased the A-90/EX, or your nearest Roland Service Station.

There's No Sound When the Keys Are Played

Is the volume turned down too low?

→ Check the levels of INT VOLUME and TOTAL VOLUME on the A-90/EX, the volume levels of any connected MIDI instruments, and the volume levels of any connected amps or mixers.

Is Expression turned down too low?

→ Check the setting of the EXPRESS slider on the A-90/EX.

Is the Voice Expansion Board installed correctly?

→ If you're sending data from the A-90/EX's OUTPUT, the Voice Expansion Board must be installed correctly. See Chapter 3 "About the Voice Expansion Board" of the Volume 1.

Are all the connections correct?

→ If you can hear sounds through headphones, it may mean that a cable is damaged, or the amp or mixer is malfunctioning. Check your cable connections and equipment again.

Are the volume settings for the various Zones too low?

→ Check the PARAMETER SELECT [VOLUME] settings.

Are the MIDI send and receive channels set correctly?

→ Make sure that the send channels for the A-90/EX's Zones match the receive channels for the Parts of the MIDI instruments and the Voice Expansion Board.

Are the Zones or the MIDI OUT turned off?

→ No performance data is output if the ZONE switches or MIDI OUTPUT switches are dark. Make sure the correct ZONE switches and MIDI OUTPUT switches for MIDI OUT are on.

Are the keys you're playing outside the Zone range?

→ Check the PARAMETER SELECT [KEY RANGE] settings.

Is Local Control turned off?

→ If "Local KBD Sw" (EDIT: PERF: COMMON, E43) is set to "OFF," the A-90/EX's keyboard becomes inactive. Check the Zone settings.

→ If "V-Exp Local Ctrl" (EDIT: SYS, E07) is set to "Disable," the Voice Expansion Board cannot be controlled from the A-90/EX. To allow control from the A-90/EX's keyboard, set this parameter to "Enable."

The Pitch Is Wrong

Is the FINE TUNE setting for the internal Zones correct?

→ Check the PARAMETER SELECT [FINE TUNE] setting (for the internal Zones).

Are Pitch Bend messages set to the central value?

→ This can easily happen if Pitch Bend is assigned to some controller other than WHEEL1 or the BEND lever. Double-click on [PANIC], set the Pitch Bend messages to the center value, and check the minimum and maximum values of the controller to which Pitch Bend is assigned (the central value is 64).

Is TRANSPOSE in effect?

→ Check the PARAMETER SELECT [TRANSPOSE] setting and the position of the TRANSPOSE switch.

A Memory Card Is Unusable

Are you attempting to use a memory card that's not suitable for the A-90/EX?

→ The A-90/EX cannot read memory cards for other instruments. It also cannot use memory cards other than the M-512E.

Sound Doesn't Stop

Has a MIDI cable become disconnected?

→ Check the MIDI cable connections, and double-click on [PANIC].

If an Error Message Appears...

Message Appearing at Powerup

Internal Battery LOW!

The A-90/EX's backup battery is almost exhausted.
→Contact your nearest Roland Service Center.

Messages About Memory Cards

Data Card Not Ready

A memory card is not inserted into the card slot, or is inserted incorrectly.
→Make sure that the memory card is inserted properly.

Data Card Battery Low!

The memory card's backup battery is almost exhausted.
→Check the manual for the memory card and replace the battery.

Data Card Protected

The memory card's protect switch is on.
→Move the memory card's protect switch to the "OFF" position.

Improper Data Card

A memory card which cannot be used with the A-90/EX has been inserted.
→Use a proper memory card.

Data Card Read/Write Error

The memory card may have become dislodged during data transmission.
→Reinsert the memory card and execute the operation again.

Messages About MIDI.....

MIDI Buffer Full

An excessive amount of MIDI data has been received by the A-90/EX.
→Reduce the amount of MIDI data from the transmitting device.

MIDI Communication Error

A MIDI cable may have been disconnected or damaged.
→Be sure that the cables are in good working order and that all the connections are secure.

Excl:Check Sum Error

A checksum error has occurred for an Exclusive (SysEx) message that has been received.
→Check the checksums for the data being sent and carry out the operation again. If this doesn't stop the message from reappearing, check the MIDI cable connections.

Other Messages

Now Chain Mode Can't Edit Perf

An attempt was made to edit a Performance while in the Chain mode.
→Performances cannot be edited while in the Chain mode. Select the Performance mode, then change to the Edit mode.

Shortcut Numbers (Edit Mode)

Edit

E00 Edit mode top menu

EDIT: SYS

E01 Control channel/device ID

E02 Program Name Map assignments

E03 User Name Map creation

E04 Sequencer control output

E05 System environment settings

E06 Application of received MIDI messages to Zone settings

E08 Voice expansion local control

E09 LCD contrast

E09 Double-click speed

EDIT: CTRL (not accessible from the Chain mode)

E10 Function setting for the BREATH slider

E11 Function setting for the AFTER TCH slider

E12 Function setting for the EXPRESS slider

E13 Function setting for the PORT TIME slider

E14 Function setting for the FC1 pedal

E15 Function setting for the FC2 pedal

E16 Function setting for the FS1 pedal

E17 Function setting for the FS2 pedal

E18 Function setting for [MONO]

E19 Function setting for [PORTAMENTO]

E20 Function setting for Aftertouch

E21 Function setting for WHEEL1

E22 Function setting for WHEEL2

E23 Function setting for the BEND lever

E24 Function setting for the MODULATION lever

E25 Function setting for the BREATH controller

E26 Function setting for [AUX1]

E27 Function setting for [AUX2]

E28 Setting for Global Transpose

E29 Setting for the TOTAL VOLUME slider

E30 Setting for the TOTAL VOLUME pedal

E31 Setting for the HOLD pedal

E32 Switching ON and OFF whether to transmit "Reset All Controller"

EDIT: PERF/MANUAL (not accessible from the Chain mode)

E40 COMMON Group for the Performance and Manual modes

E50 Group for effector control

EDIT: PERF/MANUAL: COMMON

E41 Performance Name

E42 MIDI output settings for the Zones

E43 Zone assignment setting for MIDI IN1

E44 Zone assignment setting for MIDI IN2

E45 Local keyboard switch

E46 Set comments to each Zone

EDIT: PERF/MANUAL: EFFECT

E51 MIDI channel setting for effector control

E52 Bank Select MSB setting for effector control

E53 Bank Select LSB setting for effector control

E54 Program Change setting for effector control

E55 Note message assignment setting for effector control

E56 MIDI output setting for effector control

Shortcut Numbers (Utility Mode)

UTILITY

U00 Utility mode top menu

UTILITY:WRITE

U10 Save temporary area data/save Manual mode settings as a Performance

UTILITY: CPY

UTILITY: CPY: PERF/CHAIN

U20 Copy a Performance or Chain

UTILITY: CPY: CARD

U30 Menu for backup to a card

UTILITY: CPY: CARD: I→C

U31 Save contents of internal memory to a card

UTILITY: CPY: CARD: C→I

U32 Save contents of a card to internal memory

UTILITY: CPY: CARD: I↔C

U33 Swap contents of internal memory with contents of a card

UTILITY: BLK

U50 Output contents of internal memory to MIDI

UTILITY: INT

U40 Menu for initializing settings

UTILITY: INT: TMP

U41 Initialize the temporary area

UTILITY: INT: MAN

U42 Initialize Manual mode settings

UTILITY: INT: SYS

U43 Initialize system settings and Master Tune in the Voice Expansion Board

UTILITY: INT: I-ALL

U44 Initialize Performances and Chains in internal memory

1. Receive data

- The A-90/A-90EX has two MIDI IN connectors, MIDI IN 1 (REMOTE) and MIDI IN 2. MIDI messages fed into the device through MIDI IN 1 (REMOTE) are sent to each Zone according to the IN 1 (REMOTE) Assign's setting, then are treated as performance messages on the A-90. That is, MIDI messages sent to the external Zones will be assigned to MIDI OUT 1, 2, 3 and 4 according to the settings of the external Zones, then sent out again on the MIDI channels set in the relevant Zones. The MIDI messages sent to an internal Zone will respond to the Part on the Voice Expansion Board specified in each internal Zone, when the Voice Expansion Board is installed. MIDI message fed through IN 2 will be assigned to the MIDI OUT 1, 2, 3, 4 or INT (Voice Expansion Board) according to the IN 2 Assign's setting, then sent out again. The explanation here (receive data), however, applies only to the A-90/A-90EX with the Voice Expansion Board VE-RD1 installed.

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH
9nH	kkH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=note off velocity : 00H - 7FH (0 - 127)

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=note on velocity : 01H - 7FH (1 - 127)

- The Note On/Off message sent to each Zone through the IN 1 (REMOTE), if it is within the Key Range of each Zone, will be transposed, then re-sent on the MIDI channel of the relevant Zone, after calculating the velocity value using the velocity curve, velocity sensitivity and velocity max.
- Each Zone allows the transposition to ± 36 semi tones.
- Note message transposed exceeding 0-127 range will be converted to the Note message of the closest octave that is out of the range.

● Polyphonic Key Pressure

Status	2nd byte	3rd byte
AnH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=key pressure : 00H - 7FH (0 - 127)

● Control Change

○ Modulation (Controller number 1)		
Status	2nd byte	3rd byte
BnH	01H	vvH

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

○ Breath type (Controller number 2)		
Status	2nd byte	3rd byte
BnH	02H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127)

○ Foot type (Controller number 4)		
Status	2nd byte	3rd byte
BnH	04H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127)

○ Portamento Time (Controller number 5)		
Status	2nd byte	3rd byte
BnH	05H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Portamento Time : 00H - 7FH (0 - 127) Initial value = 00H (0)

○ Data Entry (Controller number 6,38)		
Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	llH

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

○ Volume (Controller number 7)		
Status	2nd byte	3rd byte
BnH	07H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Volume : 00H - 7FH (0 - 127) Initial value = 64H (100)

○ Balance (Controller number 8)		
Status	2nd byte	3rd byte
BnH	08H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=balance : 00H - 7FH

○ Pan (Controller number 10)		
Status	2nd byte	3rd byte
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=pan : 00H - 40H - 7FH (Left - Center - Right)
Initial value = 40H (Center)

○ Expression (Controller number 11)		
Status	2nd byte	3rd byte
BnH	0BH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Expression : 00H - 7FH (0 - 127) Initial value = 7FH (127)

○ Hold 1 (Controller number 64)		
Status	2nd byte	3rd byte
BnH	40H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Portamento (Controller number 65)		
Status	2nd byte	3rd byte
BnH	41H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Sostenuto (Controller number 66)		
Status	2nd byte	3rd byte
BnH	42H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Soft (Controller number 67)		
Status	2nd byte	3rd byte
BnH	43H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Hold 2 (Controller number 69)

Status 2nd byte 3rd byte
BnH 45H vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Portamento control (Controller number 84)

Status 2nd byte 3rd byte
BnH 54H kkH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=Source note number : 00H - 7FH (0 - 127)

* This applies to the Zone on the receiving ch. The on-note glides to the pitch of the note turned on next.

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

Status 2nd byte 3rd byte
BnH 5BH vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Reverb send level : 00H - 7FH (0 - 127) Initial value = 28H (40)

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

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

Status 2nd byte 3rd byte
BnH 5DH vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Chorus send level : 00H - 7FH (0 - 127) Initial value = 00H (0)

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

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

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

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

NRPN

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used.

To use these messages, you must first use NRPN MSB and NRPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter.

On the A-90 / A-90 EX, NRPN can be used to modify the following parameters.

NRPN MSB LSB	Data entry MSB	Description
01H 20H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Bright (relative change)
01H 63H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Attack time (relative change)
01H 64H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Decay time (relative change)
01H 66H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Release time (relative change)

* Parameters marked "relative change" will change relative to the preset value(40H).

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

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

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

RPN

The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.

To use these messages, you must first use RPN MSB and RPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter.

RPN MSB LSB	Data entry MSB LSB	Description
00H 00H	mmH —	Pitch Bend Sensitivity mm: 00H - 1CH (0 - 12 semitones) Initial value = 02H (2 semitones) ll: ignored (processed as 00H) specify up to 1 octaves in semitone steps
00H 01H	mmH llH	Master Fine Tuning mm,ll: 20 00H - 40 00H - 60 00H (-8192*50/8192 - 0 - +8192*50/8192 cents)
00H 02H	mmH —	Master Coarse Tuning mm: 10H - 40H - 70H (-48 - 0 - +48 semitones) ll: ignored (processed as 00H)
7FH 7FH	— —	RPN null Set condition where RPN and NRPN are unspecified. The data entry messages after set RPN null will be ignored. (No Data entry messages are required after RPN null). Settings already made will not change. mm,ll: ignored

● Program Change

Status 2nd byte
CnH ppH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
pp=Program number : 00H - 7FH (prog.1 - prog.128)

- The A-90 performance changes, when the A-90 received on the control channel specified the A-90.

● Channel Pressure

Status 2nd byte
DnH vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Channel Pressure : 00H - 7FH (0 - 127)

● Pitch Bend Change

Status 2nd byte 3rd byte
EnH llH numH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll=Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

■ Channel Mode Messages

● All Sounds Off (Controller number 120)

Status 2nd byte 3rd byte
BnH 78H 00H

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

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

● Reset All Controllers (Controller number 121)

Status 2nd byte 3rd byte
BnH 79H 00H

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

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

Controller	Reset value
Pitch Bend Change	+/-0 (center)
Polyphonic Key Pressure	0 (off)
Channel Pressure	0 (off)
Modulation	0 (off)
Expression	0 (min) However, the volume becomes maximum.
Hold 1	0 (off)
Portamento	0 (off)
Sostenuto	0 (off)
Soft	0 (off)
Hold 2	0 (off)
RPN	unset; previously set data will not change
NRPN	unset; previously set data will not change

● All Notes Off (Controller number 123)

Status 2nd byte 3rd byte
BnH 7BH 00H

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

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

● OMNI OFF (Controller number 124)

Status 2nd byte 3rd byte
BnH 7CH 00H

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

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

● OMNI ON (Controller number 125)

Status 2nd byte 3rd byte
BnH 7DH 00H

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

- The same processing will be carried out as when All Notes Off is received. The Mode doesn't change OMNI ON.

● MONO (Controller number 126)

Status 2nd byte 3rd byte
BnH 7EH mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=mono number : 00H - 10H (0 - 16)

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

● POLY (Controller number 127)

Status 2nd byte 3rd byte
BnH 7FH 00H

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

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

■ System Realtime Message

● Active Sensing

Status
FEH

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

■ System Exclusive Message

Status Data byte Status
FOH iiH, ddH, ...,eeH F7H

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

The System Exclusive Messages received by the A-90/A-90EX are Universal Realtime System Exclusive messages, Data Requests (RQ1), and Data Set (DT1).

■ Universal Non-realtime System Exclusive Messages

● Inquiry Request

Status	Data byte	Status
F0H	7EH, dev, 06H, 01H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
dev	Device ID (dev: UNIT#-1)
06H, 01H	Inquiry request
F7H	EOX (End Of Exclusive)

- Even if the Device ID is 7FH (Broadcast), Inquiry Reply message will be transmitted.
- When Inquiry Request is received, Inquiry Reply message will be transmitted.

● Data transmission

A-90 / A-90EX can transmit and receive the various parameters using System Exclusive messages.

The exclusive message for using the data transmission has a model ID of 7DH and a device ID of 10H. (A-90 / A-90EX can change the setting of the device ID.)

○ Request data 1 RQ1

This message requests the other device to send data. The Address and Size determine the type and amount of data to be sent.

Status	Data byte	Status
F0H	41H, dev, 7DH, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H)
7DH	Model ID (A-90)
11H	Command ID (RQ1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
ssH	Size MSB
ttH	Size
uuH	Size
vvH	Size LSB
sum	Checksum
F7H	EOX (End Of Exclusive)

○ Data set 1 DT1

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

Status	Data byte	Status
F0H	41H, dev, 7DH, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H)
7DH	Model ID (A-90)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	Data: the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	:
ffH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

2. Transmit data

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
 kk=note number : 00H - 7FH (0 - 127)
 vv=velocity : 00H - 7FH (0 - 127)

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
 kk=note number : 00H - 7FH (0 - 127)
 vv=velocity : 01H - 7FH (1 - 127)

- If you play the key within the range of a Zone, the Note On/Off message will be sent with the MIDI channel set to the Zone.
- The value figured out with the strength of playing keyboard, velocity curve of the Zone, velocity sensitivity and velocity max. is transmitted as "Velocity".
- Each Zone allows the transposition to ± 36 semi tones.
- Note message transposed exceeding 0-127 range will be converted to the Note message of the closest octave that is out of the range.

● Polyphonic After Touch

Status	2nd byte	3rd byte
AnH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
 kk=note number : 00H - 7FH (0 - 127)
 vv=polyphonic after touch : 00H - 7FH (0 - 127)

- You can transmit this message by assigning to the Controller.

● Control Change

Status	2nd byte	3rd byte
BnH	ccH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
 cc=note number : 0H - C7H (0 - 199)
 vv=control value : 00H - 7FH (0 - 127)

- You can transmit this message by assigning to the Controller.

● Program Change

Status	2nd byte
CnH	ppH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
 pp=Program number : 00H - 7FH (prog.1 - prog.128)

● Channel After Touch

Status	2nd byte
DnH	vvH

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

- You can transmit this message by assigning to the Controller.

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

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

- You can transmit this message by assigning to the Controller.

■ Channel Mode Messages

● All Sounds Off (Controller number 120)

Status	2nd byte	3rd byte
BnH	78H	00H

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

- You can transmit this message by assigning to the Controller.

● Reset All Controllers (Controller number 121)

Status	2nd byte	3rd byte
BnH	79H	00H

n=MIDI channel number :0H - FH (ch.1 - ch.16)
vv=value :00H, 7F (0, 127) 0=OFF 127=ON

- You can transmit this message by assigning to the Controller.

● All Notes Off (Controller number 123)

Status	2nd byte	3rd byte
BnH	7BH	00H

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

- You can transmit this message by assigning to the Controller.

● OMNI OFF (Controller number 124)

Status	2nd byte	3rd byte	
BnH	7CH		00H

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

- You can transmit this message by assigning to the Controller.

● OMNI ON (Controller number 125)

Status	2nd byte	3rd byte
BnH	7DH	00H

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

- You can transmit this message by assigning to the Controller.

● MONO (Controller number 126)

Status	2nd byte	3rd byte
BnH	7EH	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=mono number : 00H - 10H (0 - 16)

- You can transmit this message by assigning to the Controller.

● POLY (Controller number 127)

Status	2nd byte	3rd byte
BnH	7FH	00H

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

- You can transmit this message by assigning to the Controller.

■ System Common Message

● Song select

Status	2nd byte
F3H	ssH

ss=Song Number

:0H-7F (0 - 127)

■ System Realtime Message

● Active sensing

Status
FEH

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

● Timing clock

Status
F8H

● Start

Status
FAH

● Continue

Status
FBH

● Stop

Status
FCH

■ System exclusive messages

When an appropriate "Data Request 1 (RQ1)" message is received, the requested internal data will be transmitted.

○ Data set 1 DT1

Status	Data byte	Status
F0H	41H, dev, 7DH, 12H, aaH, bbH, ccH, ddH, eeH, ... fFH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H)
7DH	Model ID (A-90)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	Data: the actual data to be sent. Multiple bytes of data are transmitted in order starting from the address.
:	:
ffH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

■ Universal Non-realtime System Exclusive Messages

○ Inquiry Reply

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,1AH,00H, 00H,02H,ssH,01H,00H,00H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
dev	Device ID (dev:UNIT#-1)
06H,02H	Inquiry reply
41H	Manufacture's ID(Roland)
7DH,00H	Device family code
00H,ssH	Device family number code ss : 00(A-90) 01: (A-90 EX: A-90 equipped with a VE-RD 1)
00H,01H,00H,00H	Software revision level
F7H	EOX (End Of Exclusive)

* When Inquiry Request is received, Inquiry Reply message will be transmitted.

* When the VE-CS1 is installed to the A-90, it will transmit the following Inquiry Reply message when receiving the Inquiry Request.

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,42H,00H, 02H,01H,03H,01H,01H,00H	F7H

* When the VE-JV1 is installed to the A-90, it will transmit the following Inquiry Reply message when receiving the Inquiry Request.

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,46H,00H, 00H,00H,00H,01H,01H,00H	F7H

3. Parameter address map

Address and size are configured in 7 bits, and expressed in hexadecimal.

Address	MSB	LSB		
Binary	0aaa aaaa	0bbb bbbb	0ccc cccc	0ddd dddd
7-bit hex	AA	BB	CC	DD

Size	MSB	LSB		
Binary	0sss ssss	0ttt tttt	0uuu uuuu	0vvv vvvv
7-bit hex	SS	TT	UU	VV

■ Parameter base address

All data sent in exclusive message are given particular addresses to identify parameters. These addresses are the sum of the base address and offset address. Some parameters are defined using multiple offsets.

The address included in the message of a data set or a data request must be within the value shown in the table below.

Note: A pair of two addresses preceded by the symbol # represents a divided-by-two data. e.g. the data ABH (hex) is divided into 0AH and 0BH and sent in that order.

Example of exclusive data

To set the External Zone A MIDI Channel of the temporary performance to "Ch.=4", send the following data to the A-90.

F0H	41H	10H	7DH	12H	00H	00H	22H	06H	03H	55H	F7H
1	2	3	4	5	6		7	8	9		

1. Exclusive status
2. Manufacturer ID: Roland=41H.
3. Device ID: the unit number of the system common parameter minus 1. In this example, the unit number is 17: 17 - 1=16 which is expressed as 10H in hexadecimal notation.
4. Model ID of the A-90 is &DH.
5. Command ID: data set 1=12H.
6. Addresses: by referring to Table 1, the start address of the temporary performance=00H 00H 20H 00H; from Table 1-3, offset address of External Zone A=02H 00H; from Table 1-3-2, offset address of MIDI Channel=06H. These addresses are added together:

```

00H 00H 20H 00H
      02H 00H
+)      06H
-----
00H 00H 22H 06H = target address
    
```

7. The number of MIDI Channel = 4 is 3 : 03H in hexadecimal.

8. Check sum

The error checking process use a checksum and provides a bit pattern where the last significant 7 bits are zero, when values for an address, data (or size) and the checksum are summed.

<Example>

$$80H - ((00H + 00H + 22H + 06H + 03H) \& 7FH) = 55H$$

Addresses Data

9. End of exclusive

4. Parameter address map

1 A-90 (Model ID=7DH)

Start address	Description	
00 00 00 00	System Common	*1-1
00 00 10 00	Controller Assign	*1-2
00 00 20 00	Temporary Performance	*1-3
00 00 30 00	Temporary Chain	*1-4
00 01 20 00	Manual Performance	*1-3
01 00 20 00	Internal Performance I11	*1-3
01 01 20 00	Internal Performance I12	
01 3F 20 00	Internal Performance I88	
01 40 30 00	Internal Chain 01	*1-4
01 41 30 00	Internal Chain 02	
01 49 30 00	Internal Chain 10	
01 4A 40 00	Internal User PGM Name map 1	*1-5
01 4B 40 00	Internal User PGM Name map 2	
01 4C 40 00	Internal User PGM Name map 3	
01 4D 40 00	Internal User PGM Name map 4	

*1-1 System Common

Offset address	Description	
00 00	0000 000a Panel mode (Performance, Manual, Chain)	0 - 2
00 01	0aaa aaaa Performance number (Internal 1 - 64, CARD 1 - 64)	0 - 127
00 02	0aaa aaaa Chain number (Internal 1 - 10, CARD 1 - 10)	0 - 9, 64-73
00 03	0000 000a Control channel switch (OFF, ON)	0 - 1
00 04	0000 aaaa Control channel (1 - 16 Ch.)	0 - 15
00 05	0000 000a MIDI out 1 switch (OFF, ON)	0 - 1
00 06	0000 000a MIDI out 2 (OFF, ON)	0 - 1
00 07	0000 000a MIDI out 3 (OFF, ON)	0 - 1
00 08	0000 000a MIDI out 4 (OFF, ON)	0 - 1
00 09	0000 000a MIDI out 1 Sequencer control output sw (OFF, ON)	0 - 1
00 0A	0000 000a MIDI out 2 Sequencer control output sw (OFF, ON)	0 - 1
00 0B	0000 000a MIDI out 3 Sequencer control output sw (OFF, ON)	0 - 1
00 0C	0000 000a MIDI out 4 Sequencer control output sw (OFF, ON)	0 - 1
00 0D	0aaa aaaa Global key transpose Value (28 - 64 - 100 (-36 - 0 - +36))	28 - 64 - 100 (-36 - 0 - +36)
00 0E	0000 000a V-EXP enable switch (Enable, Disable)	0 - 1
00 0F	0000 aaaa Ext zone A PGM Name map assign 0 - 15 (OFF, JV-80, JV-90, JV-1080, JD-990, SC-55, P-88, P-55, M-SEL, M-OCL, M-VSI, M-DCL, USR 1, USR 2, USR 3, USR 4)	0 - 15
00 10	0000 aaaa : B	
00 11	0000 aaaa : C	
00 12	0000 aaaa : D	
00 13	0000 aaaa Int zone A	
00 14	0000 aaaa : B	
00 15	0000 aaaa : C	
00 16	0000 aaaa : D	
00 17	0000 aaaa Ext zone A PGM Name map assign for W-EXP 1 0 - 8 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys)	0 - 8
00 18	0000 aaaa : B	
00 19	0000 aaaa : C	
00 1A	0000 aaaa : D	
00 1B	0000 aaaa Int zone A	
00 1C	0000 aaaa : B	
00 1D	0000 aaaa : C	
00 1E	0000 aaaa : D	
00 1F	0000 aaaa Ext zone A PGM Name map assign for W-EXP 2 0 - 8 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys)	0 - 8
00 20	0000 aaaa : B	
00 21	0000 aaaa : C	
00 22	0000 aaaa : D	
00 23	0000 aaaa Int zone A	
00 24	0000 aaaa : B	
00 25	0000 aaaa : C	
00 26	0000 aaaa : D	
00 27	0000 aaaa Ext zone A PGM Name map assign for W-EXP 3 0 - 8 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys)	0 - 8
00 28	0000 aaaa : B	
00 29	0000 aaaa : C	
00 2A	0000 aaaa : D	
00 2B	0000 aaaa Int zone A	
00 2C	0000 aaaa : B	
00 2D	0000 aaaa : C	
00 2E	0000 aaaa : D	

00 2F	0000 aaaa	Ext zone A PGM Name map assign for W-EXP 4 0 - 8 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys)	
00 30	0000 aaaa	: B	
00 31	0000 aaaa	: C	
00 32	0000 aaaa	: D	
00 33	0000 aaaa	Int zone A	
00 34	0000 aaaa	: B	
00 35	0000 aaaa	: C	
00 36	0000 aaaa	: D	
00 37	0000 aaaa	Voice Expansion Board Master Tune	1 -127 (427.4 - 452.6)
Total Size	00 00 00 38		

* The settings of Int zone A PGM Name map assign, Int zone B PGM name map assign, Int zone C PGM name map assign, Int zone D PGM Name map assign will be made invalid when the Voice Expansion Board is installed.

*1-2 Controller Assign

Offset address	Description	
00 00	0000 00aa Breath slider assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 01	0aaa aaaa : CC number	0 - 119
00 02	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 03	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 04	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 05	0000 00aa A.T slider assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 06	0aaa aaaa : CC number	0 - 119
00 07	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 08	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 09	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 0A	0000 00aa Expr slider assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 0B	0aaa aaaa : CC number	0 - 119
00 0C	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 0D	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 0E	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 0F	0000 00aa P.T slider assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 10	0aaa aaaa : CC number	0 - 119
00 11	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 12	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 13	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 14	0000 00aa FC 1 assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 15	0aaa aaaa : CC number	0 - 119
00 16	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 17	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 18	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 19	0000 00aa FC 2 assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 1A	0aaa aaaa : CC number	0 - 119
00 1B	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 1C	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 1D	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 1E	0000 00aa FS 1 assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 1F	0aaa aaaa : CC number	0 - 119
00 20	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 21	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 22	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 23	0000 00aa FS 2 assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 24	0aaa aaaa : CC number	0 - 119
00 25	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 26	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 27	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 28	0000 00aa Aftertouch assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 29	0aaa aaaa : CC number	0 - 119
00 2A	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend up/down)	0 - 3
00 2B	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3
00 2C	0000 00aa : Others (Tempo, Program Up, Program Down)	0 - 2
00 2D	0000 00aa Wheel 1 assign type (OFF, CC, Ch-Mess, Others)	0 - 3
00 2E	0aaa aaaa : CC number	0 - 119
00 2F	0000 00aa : Ch-Mess number (Ch-Aft, Poly-Aft, Pitch bend)	0 - 2
00 30	0000 00aa : Poly-Aft trigger (High, Low, First, Last)	0 - 3

00 31	0000 00aa	:	Others	0 - 2		01 07	0aaa aaaa	:	SysExcl Header 15 0 - 127
00 32	0000 00aa	Wheel 2	(Tempo, Program Up, Program Down) assign type	0 - 3		01 08	0000 0aaa	AUX 1 ext zone C slider asgn type	0 - 5
00 33	0aaa aaaa	:	(OFF, CC, Ch-Mess, Others)			01 09	0aaa aaaa	:	CC number 0 - 119
00 34	0000 00aa	:	Ch-Mess number	0 - 2		01 0A	0000 00aa	:	Ch-Mess number 0 - 2
00 35	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 0B	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)
00 36	0000 00aa	:	Poly-Aft trigger	0 - 3		01 0C	0000 00aa	:	Poly-Aft trigger 0 - 3
00 37	0000 00aa	Bend lever	(High, Low, First, Last) assign type	0 - 3		01 0D	0aaa aaaa	:	(High, Low, First, Last)
00 38	0aaa aaaa	:	Others	0 - 2		01 0E	0aaa aaaa	:	RPN 0 - 3
00 39	0000 00aa	:	(Tempo, Program Up, Program Down)			01 0F	0000 0aaa	:	(Pitch Bend sense, Fine Tune, Course Tune, Free)
00 3A	0000 00aa	:	(OFF, CC, Ch-Mess, Others)			01 00	0aaa aaaa	:	Free RPN MSB 0 - 127
00 3B	0000 00aa	:	CC number	0 - 119		01 01	0aaa aaaa	:	Free RPN LSB 0 - 127
00 3C	0000 00aa	:	Ch-Mess number	0 - 2		01 10	0aaa aaaa	:	NRPN 0 - 8
00 3D	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 11	0aaa aaaa	:	(GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
00 3E	0000 00aa	:	Poly-Aft trigger	0 - 3		01 12	0aaa aaaa	:	Free NRPN MSB 0 - 127
00 3F	0000 00aa	:	(High, Low, First, Last)			01 13	0aaa aaaa	:	Free NRPN LSB 0 - 127
00 40	0000 00aa	:	Others	0 - 2		01 14	0aaa aaaa	:	SysExcl Header length 0 - 15
00 41	0000 00aa	Breath	(Tempo, Program Up, Program Down) assign type	0 - 3		01 15	0aaa aaaa	:	SysExcl Header 1 0 - 127
00 42	0aaa aaaa	:	(OFF, CC, Ch-Mess, Others)			01 16	0aaa aaaa	:	SysExcl Header 2 0 - 127
00 43	0000 00aa	:	CC number	0 - 119		01 17	0aaa aaaa	:	SysExcl Header 15 0 - 127
00 44	0000 00aa	:	Ch-Mess number	0 - 2		01 18	0aaa aaaa	:	
00 45	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 19	0000 0aaa	:	
00 46	0000 00aa	:	Poly-Aft trigger	0 - 3		01 20	0aaa aaaa	:	
00 47	0000 00aa	:	(High, Low, First, Last)			01 21	0aaa aaaa	:	
00 48	0000 00aa	Mono switch	(Tempo, Program Up, Program Down) assign type	0 - 4		01 22	0000 0aaa	AUX 1 ext zone D slider asgn type	0 - 5
00 49	0000 00aa	:	(OFF, CC, Ch-Mess, Mood-Mess, Others)			01 23	0aaa aaaa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
00 4A	0000 00aa	:	CC number	0 - 119		01 24	0000 00aa	:	CC number 0 - 119
00 4B	0000 00aa	:	Ch-Mess number	0 - 2		01 25	0000 00aa	:	Ch-Mess number 0 - 2
00 4C	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 26	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)
00 4D	0000 00aa	:	Mode-Mess number	0 - 5		01 27	0aaa aaaa	:	Poly-Aft trigger 0 - 3
00 4E	0000 00aa	:	(All Sound Off, Reset All Controllers, Local Control, All Note Off, Omni on/off, Mono/Polyl)			01 28	0aaa aaaa	:	(High, Low, First, Last)
00 4F	0000 00aa	:	Poly-Aft trigger	0 - 3		01 29	0000 0aaa	:	(Pitch Bend sense, Fine Tune, Course Tune, Free)
00 50	0000 00aa	:	Others	0 - 1		01 2A	0aaa aaaa	:	Free RPN MSB 0 - 127
00 51	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 2B	0aaa aaaa	:	Free RPN LSB 0 - 127
00 52	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 2C	0aaa aaaa	:	SysExcl Header length 0 - 15
00 53	0000 00aa	Portamento switch	assign type	0 - 4		01 2D	0aaa aaaa	:	SysExcl Header 1 0 - 127
00 54	0000 00aa	:	(OFF, CC, Ch-Mess, Mood-Mess, Others)			01 2E	0aaa aaaa	:	SysExcl Header 2 0 - 127
00 55	0aaa aaaa	:	CC number	0 - 119		01 2F	0aaa aaaa	:	SysExcl Header 15 0 - 127
00 56	0000 00aa	:	Ch-Mess number	0 - 2		01 30	0000 0aaa	AUX 1 int zone A slider asgn type	0 - 5
00 57	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 31	0aaa aaaa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
00 58	0000 00aa	:	Poly-Aft trigger	0 - 3		01 32	0000 00aa	:	CC number 0 - 119
00 59	0000 00aa	:	(High, Low, First, Last)			01 33	0000 00aa	:	Ch-Mess number 0 - 2
00 5A	0aaa aaaa	:	Others	0 - 1		01 34	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)
00 5B	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 35	0000 00aa	:	Poly-Aft trigger 0 - 3
00 5C	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 36	0000 00aa	:	(High, Low, First, Last)
00 5D	0000 00aa	:	Others	0 - 3		01 37	0000 00aa	:	RPN 0 - 3
00 5E	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 38	0aaa aaaa	:	(Pitch Bend sense, Fine Tune, Course Tune, Free)
00 5F	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 39	0aaa aaaa	:	Free RPN MSB 0 - 127
00 60	0000 00aa	AUX 1 ext zone A slider	asgn type	0 - 5		01 40	0000 00aa	:	Free RPN LSB 0 - 127
00 61	0aaa aaaa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)			01 41	0aaa aaaa	:	NRPN 0 - 8
00 62	0000 00aa	:	CC number	0 - 119		01 42	0aaa aaaa	:	(GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
00 63	0000 00aa	:	Ch-Mess number	0 - 2		01 43	0000 0aaa	:	Free NRPN MSB 0 - 127
00 64	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 44	0aaa aaaa	:	Free NRPN LSB 0 - 127
00 65	0000 00aa	:	Poly-Aft trigger	0 - 3		01 45	0aaa aaaa	:	SysExcl Header length 0 - 15
00 66	0000 00aa	:	(High, Low, First, Last)			01 46	0aaa aaaa	:	SysExcl Header 1 0 - 127
00 67	0000 00aa	:	Others	0 - 1		01 47	0aaa aaaa	:	SysExcl Header 2 0 - 127
00 68	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 48	0aaa aaaa	:	SysExcl Header 15 0 - 127
00 69	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 49	0aaa aaaa	:	
00 70	0000 00aa	:	Others	0 - 3		01 50	0000 0aaa	AUX 1 int zone B slider asgn type	0 - 5
00 71	0000 00aa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)			01 51	0aaa aaaa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
00 72	0000 00aa	:	CC number	0 - 119		01 52	0aaa aaaa	:	CC number 0 - 119
00 73	0000 00aa	:	Ch-Mess number	0 - 2		01 53	0000 00aa	:	Ch-Mess number 0 - 2
00 74	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 54	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)
00 75	0000 00aa	:	Poly-Aft trigger	0 - 3		01 55	0000 00aa	:	Poly-Aft trigger 0 - 3
00 76	0000 00aa	:	(High, Low, First, Last)			01 56	0000 00aa	:	(High, Low, First, Last)
00 77	0000 00aa	:	Others	0 - 1		01 57	0aaa aaaa	:	RPN 0 - 3
00 78	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 58	0aaa aaaa	:	(Pitch Bend sense, Fine Tune, Course Tune, Free)
00 79	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 59	0aaa aaaa	:	Free RPN MSB 0 - 127
00 80	0000 00aa	:	Others	0 - 3		01 60	0aaa aaaa	:	Free RPN LSB 0 - 127
00 81	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 61	0aaa aaaa	:	NRPN 0 - 8
00 82	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 62	0aaa aaaa	:	(GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
00 83	0000 00aa	:	Others	0 - 3		01 63	0aaa aaaa	:	Free NRPN MSB 0 - 127
00 84	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 64	0aaa aaaa	:	Free NRPN LSB 0 - 127
00 85	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 65	0aaa aaaa	:	SysExcl Header length 0 - 15
00 86	0000 00aa	:	Others	0 - 1		01 66	0aaa aaaa	:	SysExcl Header 1 0 - 127
00 87	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)			01 67	0aaa aaaa	:	SysExcl Header 2 0 - 127
00 88	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)	01 68	0aaa aaaa	:	SysExcl Header 15 0 - 127
00 89	0000 00aa	:	Others	0 - 3		01 69	0000 0aaa	AUX 1 int zone C slider asgn type	0 - 5
00 90	0000 00aa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)			01 70	0aaa aaaa	:	(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
00 91	0000 00aa	:	CC number	0 - 119		01 71	0aaa aaaa	:	CC number 0 - 119
00 92	0000 00aa	:	Ch-Mess number	0 - 2		01 72	0000 00aa	:	Ch-Mess number 0 - 2
00 93	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)			01 73	0000 00aa	:	(Ch-Aft, Poly-Aft, Pitch bend)
00 94	0000 00aa	:	Poly-Aft trigger	0 - 3		01 74	0000 00aa	:	Poly-Aft trigger 0 - 3
00 95	0000 00aa	:	(High, Low, First, Last)			01 75	0aaa aaaa	:	(High, Low, First, Last)
00 96	0000 00aa	:	Others	0 - 1				:	RPN 0 - 3
00 97	0000 00aa	:	(Tempo, Program Up, Program Down, Auto Fadeout)					:	(Pitch Bend sense, Fine Tune, Course Tune, Free)
00 98	0000 00aa	:	Auto Fade Out Time	5 - 30	(5 - 30 sec)			:	Free RPN MSB 0 - 127
00 99	0000 00aa	:	Others	0 - 3				:	

01 76	0000 0000	Free RPN LSB 0 - 127 NRPN 0 - 8	02 71	0000 0000	SysExcl Header 15 0 - 127
01 77	0000 0000	(GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)	02 72	0000 0000	AUX 2 ext zone D slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
01 78	0000 0000	Free RPN MSB 0 - 127	02 73	0000 0000	CC number 0 - 119
01 79	0000 0000	Free RPN LSB 0 - 127	02 74	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
01 7A	0000 0000	SysExcl Header length 0 - 15	02 75	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
01 7B	0000 0000	SysExcl Header 1 0 - 127	02 76	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
01 7C	0000 0000	SysExcl Header 2 0 - 127	02 77	0000 0000	Free RPN MSB 0 - 127
02 09	0000 0000	SysExcl Header 15 0 - 127	02 78	0000 0000	Free RPN LSB 0 - 127
02 0A	0000 0000	AUX 1 int zone D slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)	02 79	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
02 0B	0000 0000	CC number 0 - 119	02 7A	0000 0000	Free RPN MSB 0 - 127
02 0C	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)	02 7B	0000 0000	Free RPN LSB 0 - 127
02 0D	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)	02 7C	0000 0000	SysExcl Header length 0 - 15
02 0E	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)	02 7D	0000 0000	SysExcl Header 1 0 - 127
02 0F	0000 0000	Free RPN MSB 0 - 127	02 7E	0000 0000	SysExcl Header 2 0 - 127
02 10	0000 0000	Free RPN LSB 0 - 127	02 0B	0000 0000	SysExcl Header 15 0 - 127
02 11	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)	03 0C	0000 0000	AUX 2 int zone A slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 12	0000 0000	Free RPN MSB 0 - 127	03 0D	0000 0000	CC number 0 - 119
02 13	0000 0000	Free RPN LSB 0 - 127	03 0E	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
02 14	0000 0000	SysExcl Header length 0 - 15	03 0F	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
02 15	0000 0000	SysExcl Header 1 0 - 127	03 10	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
02 16	0000 0000	SysExcl Header 2 0 - 127	03 11	0000 0000	Free RPN MSB 0 - 127
02 23	0000 0000	SysExcl Header 15 0 - 127	03 12	0000 0000	Free RPN LSB 0 - 127
02 24	0000 0000	AUX 2 ext zone A slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)	03 13	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
02 25	0000 0000	CC number 0 - 119	03 14	0000 0000	Free RPN MSB 0 - 127
02 26	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)	03 15	0000 0000	Free RPN LSB 0 - 127
02 27	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)	03 16	0000 0000	SysExcl Header length 0 - 15
02 28	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)	03 17	0000 0000	SysExcl Header 1 0 - 127
02 29	0000 0000	Free RPN MSB 0 - 127	03 18	0000 0000	SysExcl Header 2 0 - 127
02 2A	0000 0000	Free RPN LSB 0 - 127	03 25	0000 0000	SysExcl Header 15 0 - 127
02 2B	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)	03 26	0000 0000	AUX 2 int zone B slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 2C	0000 0000	Free RPN MSB 0 - 127	03 27	0000 0000	CC number 0 - 119
02 2D	0000 0000	Free RPN LSB 0 - 127	03 28	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
02 2E	0000 0000	SysExcl Header length 0 - 15	03 29	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
02 2F	0000 0000	SysExcl Header 1 0 - 127	03 2A	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
02 30	0000 0000	SysExcl Header 2 0 - 127	03 2B	0000 0000	Free RPN MSB 0 - 127
02 3D	0000 0000	SysExcl Header 15 0 - 127	03 2C	0000 0000	Free RPN LSB 0 - 127
02 3E	0000 0000	AUX 2 ext zone B slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)	03 2D	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
02 3F	0000 0000	CC number 0 - 119	03 2E	0000 0000	Free RPN MSB 0 - 127
02 40	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)	03 2F	0000 0000	Free RPN LSB 0 - 127
02 41	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)	03 30	0000 0000	SysExcl Header length 0 - 15
02 42	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)	03 31	0000 0000	SysExcl Header 1 0 - 127
02 43	0000 0000	Free RPN MSB 0 - 127	03 32	0000 0000	SysExcl Header 2 0 - 127
02 44	0000 0000	Free RPN LSB 0 - 127	03 3F	0000 0000	SysExcl Header 15 0 - 127
02 45	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)	03 40	0000 0000	AUX 2 int zone C slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 46	0000 0000	Free RPN MSB 0 - 127	03 41	0000 0000	CC number 0 - 119
02 47	0000 0000	Free RPN LSB 0 - 127	03 42	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
02 48	0000 0000	SysExcl Header length 0 - 15	03 43	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
02 49	0000 0000	SysExcl Header 1 0 - 127	03 44	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
02 4A	0000 0000	SysExcl Header 2 0 - 127	03 45	0000 0000	Free RPN MSB 0 - 127
02 57	0000 0000	SysExcl Header 15 0 - 127	03 46	0000 0000	Free RPN LSB 0 - 127
02 58	0000 0000	AUX 2 ext zone C slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)	03 47	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
02 59	0000 0000	CC number 0 - 119	03 48	0000 0000	Free RPN MSB 0 - 127
02 5A	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)	03 49	0000 0000	Free RPN LSB 0 - 127
02 5B	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)	03 4A	0000 0000	SysExcl Header length 0 - 15
02 5C	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)	03 4B	0000 0000	SysExcl Header 1 0 - 127
02 5D	0000 0000	Free RPN MSB 0 - 127	03 4C	0000 0000	SysExcl Header 2 0 - 127
02 5E	0000 0000	Free RPN LSB 0 - 127	03 59	0000 0000	SysExcl Header 15 0 - 127
02 5F	0000 0000	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)	03 5A	0000 0000	AUX 2 int zone D slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 60	0000 0000	Free RPN MSB 0 - 127	03 5B	0000 0000	CC number 0 - 119
02 61	0000 0000	Free RPN LSB 0 - 127	03 5C	0000 0000	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
02 62	0000 0000	SysExcl Header length 0 - 15	03 5D	0000 0000	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
02 63	0000 0000	SysExcl Header 1 0 - 127	03 5E	0000 0000	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
02 64	0000 0000	SysExcl Header 2 0 - 127			

03 5F	0aaa aaaa	:	Free RPN MSB	0 - 127
03 60	0aaa aaaa	:	Free RPN LSB	0 - 127
03 61	0000 aaaa	:	NRPN	0 - 8
(GS Vibrato rate, GS Vibrato depth, GS Vibrato delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)				
03 62	0aaa aaaa	:	Free NRPN MSB	0 - 127
03 63	0aaa aaaa	:	Free NRPN LSB	0 - 127
03 64	0aaa aaaa	:	SysExcl Header length	0 - 15
03 65	0aaa aaaa	:	SysExcl Header 1	0 - 127
03 66	0aaa aaaa	:	SysExcl Header 2	0 - 127
03 73	0aaa aaaa	:	SysExcl Header 15	0 - 127
03 74	0000 000a	:	Ext Zone A CC Reset w/Perf	0 - 1 (OFF, ON)
03 75	0000 000a	:	Ext Zone B CC Reset w/Perf	0 - 1 (OFF, ON)
03 76	0000 000a	:	Ext Zone C CC Reset w/Perf	0 - 1 (OFF, ON)
03 77	0000 000a	:	Ext Zone D CC Reset w/Perf	0 - 1 (OFF, ON)
03 78	0000 000a	:	Int Zone A CC Reset w/Perf	0 - 1 (OFF, ON)
03 79	0000 000a	:	Int Zone B CC Reset w/Perf	0 - 1 (OFF, ON)
03 7A	0000 000a	:	Int Zone C CC Reset w/Perf	0 - 1 (OFF, ON)
03 7B	0000 000a	:	Int Zone D CC Reset w/Perf	0 - 1 (OFF, ON)
Total Size		00 00 03 7c		

***1-3 Performance**

Offset address	Description	
00 00	Performance common	*1-3-1
02 00	Performance ext zone A	*1-3-2
03 00	Performance ext zone B	
04 00	Performance ext zone C	
05 00	Performance ext zone D	
06 00	Performance int zone A	*1-3-3
07 00	Performance int zone B	
08 00	Performance int zone C	
09 00	Performance int zone D	
0A 00	Performance zone comments	*1-3-4

***1-3-1 Performance Common**

Offset address	Description	
00	0aaa aaaa	Performance name 1 32 - 127
01	0aaa aaaa	Performance name 2 32 - 127
0B	0aaa aaaa	Performance name 12 32 - 127
0C	0000 000a	Tempo change switch 0 - 1 (OFF, ON)
0D	0000 aaaa	Default Tempo 20 - 250
0E	0000 bbbb	
0F	0000 000a	Song change switch 0 - 1 (OFF, ON)
10	0aaa aaaa	Song Number 0 - 127 (1 - 128)
11	0000 000a	Ext zone A remote sw 0 - 1 (OFF, ON)
12	0000 000a	Ext zone B remote sw 0 - 1 (OFF, ON)
13	0000 000a	Ext zone C remote sw 0 - 1 (OFF, ON)
14	0000 000a	Ext zone D remote sw 0 - 1 (OFF, ON)
15	0000 000a	Int zone A remote sw 0 - 1 (OFF, ON)
16	0000 000a	Int zone B remote sw 0 - 1 (OFF, ON)
17	0000 000a	Int zone C remote sw 0 - 1 (OFF, ON)
18	0000 000a	Int zone D remote sw 0 - 1 (OFF, ON)
19	0000 000a	IN 2 to int assign sw 0 - 1 (OFF, ON)
1A	0000 000a	IN 2 to out 1 assign sw 0 - 1 (OFF, ON)
1B	0000 000a	IN 2 to out 2 assign sw 0 - 1 (OFF, ON)
1C	0000 000a	IN 2 to out 3 assign sw 0 - 1 (OFF, ON)
1D	0000 000a	IN 2 to out 4 assign sw 0 - 1 (OFF, ON)
1E	0000 0aaa	VE-RD 1 reverb type 0 - 7 (ROOM 1, ROOM 2, STAGE 1, STAGE 2, HALL 1, HALL 2, DELAY, PAN-DLY)
1F	0aaa aaaa	reverb level 0 - 127
20	0aaa aaaa	reverb time 0 - 127
21	000a aaaa	reverb HF damp 0 - 17 (200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS)
22	0aaa aaaa	reverb feed back 0 - 127
23	0aaa aaaa	VE-RD 1 chorus level 0 - 127
24	0aaa aaaa	chorus rate 0 - 127
25	0aaa aaaa	chorus depth 0 - 127
26	0aaa aaaa	chorus pre delay 0 - 127
27	0aaa aaaa	chorus feedback 0 - 127
28	0000 000a	chorus output 0 - 3 (MIX, REV, MIX-REV)
29	0aaa aaaa	VE-RD 1 eq low gain 49 - 79 (-15 - 15)
3A	0aaa aaaa	eq mid gain 49 - 79 (-15 - 15)
3B	0aaa aaaa	eq high gain 49 - 79 (-15 - 15)
3C	0aaa aaaa	eq mid freq. 0 - 16

		(200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS)	
2D	000a aaaa	Effector 1 MIDI channel	0 - 16 (1 - 16)
2E	0000 000a	Bank select send sw	0 - 1 (OFF, ON)
2F	0aaa aaaa	Bank select MSB	0 - 127
30	0aaa aaaa	Bank select LSB	0 - 127
31	0000 000a	Program change send sw	0 - 1 (OFF, ON)
32	0aaa aaaa	Program change	0 - 127
33	0000 000a	Key send sw	0 - 1 (OFF, ON)
34	0aaa aaaa	Local key number	0 - 127
35	0aaa aaaa	Send key number	0 - 127
36	0000 000a	MIDI out 1 output	0 - 1 (OFF, ON)
37	0000 000a	MIDI out 2 output	0 - 1 (OFF, ON)
38	0000 000a	MIDI out 3 output	0 - 1 (OFF, ON)
39	0000 000a	MIDI out 4 output	0 - 1 (OFF, ON)
3A	000a aaaa	Effector 2 MIDI channel	0 - 16 (1 - 16)
3B	0000 000a	Bank select send sw	0 - 1 (OFF, ON)
3C	0aaa aaaa	Bank select MSB	0 - 127
3D	0aaa aaaa	Bank select LSB	0 - 127
3E	0000 000a	Program change send sw	0 - 1 (OFF, ON)
3F	0aaa aaaa	Program change	0 - 127
40	0000 000a	Key send sw	0 - 1 (OFF, ON)
41	0aaa aaaa	Local key number	0 - 127
42	0aaa aaaa	Send key number	0 - 127
43	0000 000a	MIDI out 1 output	0 - 1 (OFF, ON)
44	0000 000a	MIDI out 2 output	0 - 1 (OFF, ON)
45	0000 000a	MIDI out 3 output	0 - 1 (OFF, ON)
46	0000 000a	MIDI out 4 output	0 - 1 (OFF, ON)
47	000a aaaa	Effector 3 MIDI channel	0 - 16 (1 - 16)
48	0000 000a	Bank select send sw	0 - 1 (OFF, ON)
49	0aaa aaaa	Bank select MSB	0 - 127
4A	0aaa aaaa	Bank select LSB	0 - 127
4B	0000 000a	Program change send sw	0 - 1 (OFF, ON)
4C	0aaa aaaa	Program change	0 - 127
4D	0000 000a	Key send sw	0 - 1 (OFF, ON)
4E	0aaa aaaa	Local key number	0 - 127
4F	0aaa aaaa	Send key number	0 - 127
50	0000 000a	MIDI out 1 output	0 - 1 (OFF, ON)
51	0000 000a	MIDI out 2 output	0 - 1 (OFF, ON)
52	0000 000a	MIDI out 3 output	0 - 1 (OFF, ON)
53	0000 000a	MIDI out 4 output	0 - 1 (OFF, ON)
54	000a aaaa	Effector 4 MIDI channel	0 - 15 (1 - 16)
55	0000 000a	Bank select send sw	0 - 1 (OFF, ON)
56	0aaa aaaa	Bank select MSB	0 - 127
57	0aaa aaaa	Bank select LSB	0 - 127
58	0000 000a	Program change send sw	0 - 1 (OFF, ON)
59	0aaa aaaa	Program change	0 - 127
5A	0000 000a	Key send sw	0 - 1 (OFF, ON)
5B	0aaa aaaa	Local key number	0 - 127
5C	0aaa aaaa	Send key number	0 - 127
5D	0000 000a	MIDI out 1 output	0 - 1 (OFF, ON)
5E	0000 000a	MIDI out 2 output	0 - 1 (OFF, ON)
5F	0000 000a	MIDI out 3 output	0 - 1 (OFF, ON)
60	0000 000a	MIDI out 4 output	0 - 1 (OFF, ON)
61	0000 aaaa	Breath slider Tempo Min	20 - 250
62	0000 bbbb		
63	0000 aaaa	Tempo Max	20 - 250
64	0000 bbbb		
65	0000 aaaa	A.T slider Tempo Min	20 - 250
66	0000 bbbb		
67	0000 aaaa	Tempo Max	20 - 250
68	0000 bbbb		
69	0000 aaaa	Expr slider Tempo Min	20 - 250
6A	0000 bbbb		
6B	0000 aaaa	Tempo Max	20 - 250
6C	0000 bbbb		
6D	0000 aaaa	F.T slider Tempo Min	20 - 250
6E	0000 bbbb		
6F	0000 aaaa	Tempo Max	20 - 250
70	0000 bbbb		
71	0000 aaaa	FC 1 Tempo Min	20 - 250
72	0000 bbbb		
73	0000 aaaa	Tempo Max	20 - 250
74	0000 bbbb		
75	0000 aaaa	FC 2 Tempo Min	20 - 250
76	0000 bbbb		
77	0000 aaaa	Tempo Max	20 - 250
78	0000 bbbb		
79	0000 aaaa	FS 1 Tempo Min	20 - 250
7A	0000 bbbb		
7B	0000 aaaa	Tempo Max	20 - 250
7C	0000 bbbb		

7D	0000	aaaa	FS 2	Tempo Min	20 - 250
7E	0000	bbbb	:	Tempo Max	20 - 250
7F	0000	aaaa	:	Tempo Max	20 - 250
01 00	0000	bbbb	:	Tempo Max	20 - 250
01 01	0000	aaaa	Mono switch	Tempo Min	20 - 250
01 02	0000	bbbb	:	Tempo Max	20 - 250
01 03	0000	aaaa	:	Tempo Max	20 - 250
01 04	0000	bbbb	:	Tempo Max	20 - 250
01 05	0000	aaaa	P.T switch	Tempo Min	20 - 250
01 06	0000	bbbb	:	Tempo Max	20 - 250
01 07	0000	aaaa	:	Tempo Max	20 - 250
01 08	0000	bbbb	:	Tempo Max	20 - 250
01 09	0000	aaaa	Aftertouch	Tempo Min	20 - 250
01 0A	0000	bbbb	:	Tempo Max	20 - 250
01 0B	0000	aaaa	:	Tempo Max	20 - 250
01 0C	0000	bbbb	:	Tempo Max	20 - 250
01 0D	0000	aaaa	Wheel 1	Tempo Min	20 - 250
01 0E	0000	bbbb	:	Tempo Max	20 - 250
01 0F	0000	aaaa	:	Tempo Max	20 - 250
01 10	0000	bbbb	:	Tempo Max	20 - 250
01 11	0000	aaaa	Wheel 2	Tempo Min	20 - 250
01 12	0000	bbbb	:	Tempo Max	20 - 250
01 13	0000	aaaa	:	Tempo Max	20 - 250
01 14	0000	bbbb	:	Tempo Max	20 - 250
01 15	0000	aaaa	Bend lever	Tempo Min	20 - 250
01 16	0000	bbbb	:	Tempo Max	20 - 250
01 17	0000	aaaa	:	Tempo Max	20 - 250
01 18	0000	bbbb	:	Tempo Max	20 - 250
01 19	0000	aaaa	Mod lever	Tempo Min	20 - 250
01 1A	0000	bbbb	:	Tempo Max	20 - 250
01 1B	0000	aaaa	:	Tempo Max	20 - 250
01 1C	0000	bbbb	:	Tempo Max	20 - 250
01 1D	0000	aaaa	Breath controller	Tempo Min	20 - 250
01 1E	0000	bbbb	:	Tempo Max	20 - 250
01 1F	0000	aaaa	:	Tempo Max	20 - 250
01 20	0000	bbbb	:	Tempo Max	20 - 250

Total Size | 00 00 01 21

* The Parameters of the VE-RD1 is valid only when the Voice Expansion Board is installed.

*1-3-2 Performance external zone

Offset address	Description	
00	0000 000a	Zone switch (OFF, ON) 0 - 1
01	0000 000a	Local keyboard switch (OFF, ON) 0 - 1
02	0000 000a	MIDI out 1 output assign (OFF, ON) 0 - 1
03	0000 000a	MIDI out 2 output assign (OFF, ON) 0 - 1
04	0000 000a	MIDI out 3 output assign (OFF, ON) 0 - 1
05	0000 000a	MIDI out 4 output assign (OFF, ON) 0 - 1
06	000a aaaa	MIDI channel 0 - 15 (1 - 16)
07	0aaa aaaa	Key range lower 0 - 127
08	0aaa aaaa	Key range upper 0 - 127
09	0aaa aaaa	Key transpose 2B - 64 - 100 (-32 - 0 - -32)
0A	0000 0aaa	Velocity curve 0 - 6
0B	0aaa aaaa	Velocity sense 1 - 127
0C	0aaa aaaa	Velocity max 1 - 127
0D	0aaa aaaa	Volume value 0 - 127
0E	0000 000a	: send switch 0 - 1 (OFF, ON)
0F	0aaa aaaa	Pan value 0 - 127
10	0000 000a	: send switch 0 - 1 (OFF, ON)
11	0aaa aaaa	Reverb send level 0 - 127
12	0000 000a	: send switch 0 - 1 (OFF, ON)
13	0aaa aaaa	Chorus send level 0 - 127
14	0000 000a	: send switch 0 - 1 (OFF, ON)
15	0aaa aaaa	Program change number 0 - 127
16	0000 000a	: send switch 0 - 1 (OFF, ON)
17	0aaa aaaa	Bank select MSB number 0 - 127
18	0aaa aaaa	Bank select LSB number 0 - 127
19	0000 000a	Bank select send switch 0 - 1 (OFF, ON)
1A	0aaa aaaa	AUX 1 value 0 - 127
1B	0000 000a	: send switch 0 - 1 (OFF, ON)
1C	0aaa aaaa	AUX 2 value 0 - 127
1D	0000 000a	: send switch 0 - 1 (OFF, ON)
1E	0000 000a	Breath slider switch 0 - 1 (OFF, ON)
1F	0aaa aaaa	: low value 0 - 127
20	0aaa aaaa	: high value 0 - 127
21	0000 000a	A.T slider switch 0 - 1 (OFF, ON)
22	0aaa aaaa	: low value 0 - 127
23	0aaa aaaa	: high value 0 - 127
24	0000 000a	Expr slider switch 0 - 1 (OFF, ON)
25	0aaa aaaa	: low value 0 - 127
26	0aaa aaaa	: high value 0 - 127
27	0000 000a	P.T slider switch 0 - 1 (OFF, ON)
28	0aaa aaaa	: low value 0 - 127
29	0aaa aaaa	: high value 0 - 127
2A	0000 000a	FC 1 switch 0 - 1 (OFF, ON)
2B	0aaa aaaa	: low value 0 - 127
2C	0aaa aaaa	: high value 0 - 127
2D	0000 000a	FC 2 switch 0 - 1 (OFF, ON)

2E	0aaa aaaa	: low value	0 - 127
2F	0aaa aaaa	: high value	0 - 127
30	0000 000a	FS 1 switch	0 - 1 (OFF, ON)
31	0aaa aaaa	: off value	0 - 127
32	0aaa aaaa	: on value	0 - 127
33	0000 000a	FS 2 switch	0 - 1 (OFF, ON)
34	0aaa aaaa	: off value	0 - 127
35	0aaa aaaa	: on value	0 - 127
36	0000 000a	Mono switch switch	0 - 1 (OFF, ON)
37	0aaa aaaa	: off value	0 - 127
38	0aaa aaaa	: on value	0 - 127
39	0000 000a	P.T switch switch	0 - 1 (OFF, ON)
3A	0aaa aaaa	: off value	0 - 127
3B	0aaa aaaa	: on value	0 - 127
3C	0000 000a	Aftertouch	0 - 1 (OFF, ON)
3D	0aaa aaaa	: low value	0 - 127
3E	0aaa aaaa	: high value	0 - 127
3F	0000 000a	Wheel 1 switch	0 - 1 (OFF, ON)
40	0aaa aaaa	: low value	0 - 127
41	0aaa aaaa	: high value	0 - 127
42	0000 000a	Wheel 2 switch	0 - 1 (OFF, ON)
43	0aaa aaaa	: low value	0 - 127
44	0aaa aaaa	: high value	0 - 127
45	0000 000a	Bend lever switch	0 - 1 (OFF, ON)
46	0aaa aaaa	: low value	0 - 127
47	0aaa aaaa	: high value	0 - 127
48	0000 000a	Mod lever switch	0 - 1 (OFF, ON)
49	0aaa aaaa	: low value	0 - 127
4A	0aaa aaaa	: high value	0 - 127
4B	0000 000a	Breath controller switch	0 - 1 (OFF, ON)
4C	0aaa aaaa	: low value	0 - 127
4D	0aaa aaaa	: high value	0 - 127
4E	0000 000a	Global Transpose switch	0 - 1 (OFF, ON)
4F	0000 000a	Total volume slider switch	0 - 1 (OFF, ON)
50	0000 000a	Total volume pedal switch	0 - 1 (OFF, ON)
51	0000 000a	Hold pedal switch	0 - 1 (OFF, ON)

52	0aaa aaaa	Modulation value	0 - 127
53	0000 000a	: send switch	0 - 1 (OFF, ON)
54	0aaa aaaa	Aftertouch value	0 - 127
55	0000 000a	: send switch	0 - 1 (OFF, ON)
56	0aaa aaaa	Expression value	0 - 127
57	0000 000a	: send switch	0 - 1 (OFF, ON)
58	0aaa aaaa	Portamento time	0 - 127
59	0000 000a	: send switch	0 - 1 (OFF, ON)

Total Size | 00 00 00 5A

* The values of key range upper must be greater than or equal to values of the key range lower.

*1-3-3 Performance internal zone

Offset address	Description	
00	0000 000a	Zone switch (OFF, ON) 0 - 1
01	0000 000a	Local keyboard switch (OFF, ON) 0 - 1
02	0000 000a	MIDI out 1 output assign (OFF, ON) 0 - 1
03	0000 000a	MIDI out 2 output assign (OFF, ON) 0 - 1
04	0000 000a	MIDI out 3 output assign (OFF, ON) 0 - 1
05	0000 000a	MIDI out 4 output assign (OFF, ON) 0 - 1
06	000a aaaa	MIDI channel 0 - 15 (1 - 16)
07	0aaa aaaa	Key range lower 0 - 127
08	0aaa aaaa	Key range upper 0 - 127
09	0aaa aaaa	Key transpose 2B - 64 - 100 (-32 - 0 - -32)
0A	0000 0aaa	Velocity curve 0 - 6
0B	0aaa aaaa	Velocity sense 1 - 127
0C	0aaa aaaa	Velocity max 1 - 127
0D	0aaa aaaa	Volume value 0 - 127
0E	0000 000a	: send switch 0 - 1 (OFF, ON)
0F	0aaa aaaa	Pan value 0 - 127
10	0000 000a	: send switch 0 - 1 (OFF, ON)
11	0aaa aaaa	Reverb send level 0 - 127
12	0000 000a	: send switch 0 - 1 (OFF, ON)
13	0aaa aaaa	Chorus send level 0 - 127
14	0000 000a	: send switch 0 - 1 (OFF, ON)
15	0aaa aaaa	Program change number 0 - 127
16	0000 000a	: send switch 0 - 1 (OFF, ON)
17	0aaa aaaa	Bank select MSB number 0 - 127
18	0aaa aaaa	Bank select LSB number 0 - 127
19	0000 000a	Bank select send switch 0 - 1 (OFF, ON)
1A	0aaa aaaa	AUX 1 value 0 - 127
1B	0000 000a	: send switch 0 - 1 (OFF, ON)
1C	0aaa aaaa	AUX 2 value 0 - 127
1D	0000 000a	: send switch 0 - 1 (OFF, ON)
1E	0000 000a	Breath slider switch 0 - 1 (OFF, ON)
1F	0aaa aaaa	: low value 0 - 127
20	0aaa aaaa	: high value 0 - 127
21	0000 000a	A.T slider switch 0 - 1 (OFF, ON)

22	0aaa aaaa	: low value	(OFF, ON)
23	0aaa aaaa	: high value	0 - 127
24	0000 000a	Expr slider switch	0 - 1
25	0aaa aaaa	: low value	(OFF, ON)
26	0aaa aaaa	: high value	0 - 127
27	0000 000a	P.T slider switch	0 - 1
28	0aaa aaaa	: low value	(OFF, ON)
29	0aaa aaaa	: high value	0 - 127
2A	0000 000a	Fc 1 switch	0 - 1
2B	0aaa aaaa	: low value	(OFF, ON)
2C	0aaa aaaa	: high value	0 - 127
2D	0000 000a	Fc 2 switch	0 - 1
2E	0aaa aaaa	: low value	(OFF, ON)
2F	0aaa aaaa	: high value	0 - 127
30	0000 000a	FS 1 switch	0 - 1
31	0aaa aaaa	: off value	(OFF, ON)
32	0aaa aaaa	: on value	0 - 127
33	0000 000a	FS 2 switch	0 - 1
34	0aaa aaaa	: off value	(OFF, ON)
35	0aaa aaaa	: on value	0 - 127
36	0000 000a	Mono switch switch	0 - 1
37	0aaa aaaa	: off value	(OFF, ON)
38	0aaa aaaa	: on value	0 - 127
39	0000 000a	P.T switch switch	0 - 1
3A	0aaa aaaa	: off value	(OFF, ON)
3B	0aaa aaaa	: on value	0 - 127
3C	0000 000a	Aftertouch	0 - 1
3D	0aaa aaaa	: low value	(OFF, ON)
3E	0aaa aaaa	: high value	0 - 127
3F	0000 000a	Wheel 1 switch	0 - 1
40	0aaa aaaa	: low value	(OFF, ON)
41	0aaa aaaa	: high value	0 - 127
42	0000 000a	Wheel 2 switch	0 - 1
43	0aaa aaaa	: low value	(OFF, ON)
44	0aaa aaaa	: high value	0 - 127
45	0000 000a	Bend lever switch	0 - 1
46	0aaa aaaa	: low value	(OFF, ON)
47	0aaa aaaa	: high value	0 - 127
48	0000 000a	Mod lever switch	0 - 1
49	0aaa aaaa	: low value	(OFF, ON)
4A	0aaa aaaa	: high value	0 - 127
4B	0000 000a	Breath controller switch	0 - 1
4C	0aaa aaaa	: low value	(OFF, ON)
4D	0aaa aaaa	: high value	0 - 127
4E	0000 000a	Global Transpose switch	0 - 1
4F	0000 000a	Total volume slider switch	(OFF, ON)
50	0000 000a	Total volume pedal switch	0 - 1
51	0000 000a	Hold pedal switch	(OFF, ON)
52	0aaa aaaa	Attack time	14 - 114
53	0aaa aaaa	Decay time	14 - 114
54	0aaa aaaa	Release time	14 - 114
55	0aaa aaaa	Bright value	14 - 114
56	0aaa aaaa	Fine Tune	14 - 64 - 114 (-50 - 0 - -50)
57	0aaa aaaa	Modulation value	0 - 127
58	0000 000a	: send switch	0 - 1
59	0aaa aaaa	Aftertouch value	(OFF, ON)
5A	0000 000a	: send switch	0 - 1
5B	0aaa aaaa	Expression value	(OFF, ON)
5C	0000 000a	: send switch	0 - 1
5D	0aaa aaaa	Portamento time	(OFF, ON)
5E	0000 000a	: send switch	0 - 1
Total Size	00 00 00 5F		

- * The values of key range upper must be greater than or equal to values of the key range lower.
- * Attack time, Decay time, Release time and Bright are valid only to the Internal zones with the Voice Expansion Board installed.

***1-3-4 Performance zone comments**

Offset address	Description	
00 00	0aaa aaaa	Ext zone A comment 1 32 - 127
00 21	0aaa aaaa	Ext zone A comment 34 32 - 127
00 22	0aaa aaaa	Ext zone B comment 1 32 - 127
00 43	0aaa aaaa	Ext zone B comment 34 32 - 127
00 44	0aaa aaaa	Ext zone C comment 1 32 - 127
00 65	0aaa aaaa	Ext zone C comment 34 32 - 127
00 66	0aaa aaaa	Ext zone D comment 1 32 - 127
01 07	0aaa aaaa	Ext zone D comment 34 32 - 127
01 08	0aaa aaaa	Int zone A comment 1 32 - 127
01 29	0aaa aaaa	Int zone A comment 34 32 - 127
01 2A	0aaa aaaa	Int zone B comment 1 32 - 127
01 4B	0aaa aaaa	Int zone B comment 34 32 - 127
01 4C	0aaa aaaa	Int zone C comment 1 32 - 127
01 6D	0aaa aaaa	Int zone C comment 34 32 - 127
01 6E	0aaa aaaa	Int zone D comment 1 32 - 127
02 0F	0aaa aaaa	Int zone D comment 34 32 - 127
Total Size	00 00 02 10	

***1-4 Chain**

Offset address	Description	
00	0000 000a	Chain mode 0 - 1 (One-way, Loop)
01	00aa aaaa	Chain length 0 - 63 (1 - 64)
02	0aaa aaaa	Chain link 1 patch's number 0 - 127
41	0aaa aaaa	Chain link 64 patch's number 0 - 127
Total Size	00 00 00 41	

***1-5 PGM Name map**

Offset address	Description	
00 00	0aaa aaaa	Program change number 1 name 1 32 - 127
00 01	0aaa aaaa	Program change number 1 name 2 32 - 127
00 0B	0aaa aaaa	Program change number 1 name 12 32 - 127
01 34	0aaa aaaa	Program change number 16 name 1 32 - 127
01 35	0aaa aaaa	Program change number 16 name 2 32 - 127
01 3F	0aaa aaaa	Program change number 16 name 12 32 - 127
01 40	0aaa aaaa	Program change number 17 name 1 32 - 127
01 41	0aaa aaaa	Program change number 17 name 2 32 - 127
01 4B	0aaa aaaa	Program change number 17 name 12 32 - 127
02 74	0aaa aaaa	Program change number 32 name 1 32 - 127
02 75	0aaa aaaa	Program change number 32 name 2 32 - 127
02 7F	0aaa aaaa	Program change number 32 name 12 32 - 127
03 00	0aaa aaaa	Program change number 33 name 1 32 - 127
03 01	0aaa aaaa	Program change number 33 name 2 32 - 127
03 0B	0aaa aaaa	Program change number 33 name 12 32 - 127
04 34	0aaa aaaa	Program change number 48 name 1 32 - 127
04 35	0aaa aaaa	Program change number 48 name 2 32 - 127
04 3F	0aaa aaaa	Program change number 48 name 12 32 - 127
04 40	0aaa aaaa	Program change number 49 name 1 32 - 127
04 41	0aaa aaaa	Program change number 49 name 2 32 - 127
04 4B	0aaa aaaa	Program change number 49 name 12 32 - 127
05 74	0aaa aaaa	Program change number 64 name 1 32 - 127
05 75	0aaa aaaa	Program change number 64 name 2 32 - 127
05 7F	0aaa aaaa	Program change number 64 name 12 32 - 127
06 00	0aaa aaaa	Program change number 65 name 1 32 - 127
06 01	0aaa aaaa	Program change number 65 name 2 32 - 127
06 0B	0aaa aaaa	Program change number 65 name 12 32 - 127
07 34	0aaa aaaa	Program change number 80 name 1 32 - 127
07 35	0aaa aaaa	Program change number 80 name 2 32 - 127
07 3F	0aaa aaaa	Program change number 80 name 12 32 - 127
07 40	0aaa aaaa	Program change number 81 name 1 32 - 127
07 41	0aaa aaaa	Program change number 81 name 2 32 - 127
07 4B	0aaa aaaa	Program change number 81 name 12 32 - 127
08 74	0aaa aaaa	Program change number 96 name 1 32 - 127
08 75	0aaa aaaa	Program change number 96 name 2 32 - 127
08 7F	0aaa aaaa	Program change number 96 name 12 32 - 127
09 00	0aaa aaaa	Program change number 97 name 1 32 - 127
09 01	0aaa aaaa	Program change number 97 name 2 32 - 127
09 0B	0aaa aaaa	Program change number 97 name 12 32 - 127
0A 34	0aaa aaaa	Program change number 112 name 1 32 - 127
0A 35	0aaa aaaa	Program change number 112 name 2 32 - 127
0A 3F	0aaa aaaa	Program change number 112 name 12 32 - 127
0A 40	0aaa aaaa	Program change number 113 name 1 32 - 127
0A 41	0aaa aaaa	Program change number 113 name 2 32 - 127
0A 4B	0aaa aaaa	Program change number 113 name 12 32 - 127
0B 74	0aaa aaaa	Program change number 128 name 1 32 - 127
0B 75	0aaa aaaa	Program change number 128 name 2 32 - 127
0B 7F	0aaa aaaa	Program change number 128 name 12 32 - 127
0C 00	0000 000a	PGM name map bank select MSB switch 0 - 1 (OFF, ON)
0C 01	0aaa aaaa	PGM name map bank select MSB 0 - 127
0C 02	0000 000a	PGM name map bank select LSB switch 0 - 1 (OFF, ON)
0C 03	0aaa aaaa	PGM name map bank select LSB 0 - 127
Total Size	00 00 0C 04	

Address Map			
Address	Block	Sub Block	Reference
00 00 00 00	System Common		1-1
00 00 10 00		Controller Assign	1-2
00 00 20 00	Temporary Performance	Common	1-3-1
		Ext zone A	1-3-2
		:	
		Ext zone D	
		:	
		Int zone A	1-3-3
		:	
		Int zone D	
		:	
		Comments	1-3-4
00 00 30 00	Temporary Chain		1-4
00 01 20 00	Manual Performance	Common	1-3-1
		Ext zone A	1-3-2
		:	
		Ext zone D	
		:	
		Int zone A	1-3-3
		:	
		Int zone D	
		:	
		Comments	1-3-4
01 00 20 00	Internal Memory Performance	Ill	Common 1-3-1
		:	
		IB8	Ext Zone A 1-3-2
		:	
		Ext Zone D	
		Int Zone A	1-3-3
		:	
		Int Zone D	
01 40 30 00	Internal Memory Chain	01	1-4
		10	
01 4A 40 00	Internal Memory PGM Name map	Map1	1-5
		Map4	

4. Reference materials

● Table A-1: Decimal to Hexadecimal

The MIDI messages are expressed in hexadecimal configured in 7 bits. This table is useful when you read or write MIDI messages.

(D)=decimal
(H)=hexadecimal

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

- * The decimal value of MIDI channel, bank select, program change, etc is the decimal number in the table plus 1.
- * In the hexadecimal notation in configured 7 bits, the maximum data of 1 byte is 128. If the data is more than 128, used plural bytes.
- * The signed value is 00H=-64, 40H=±0, 7FH=+63. In decimal notation, the value is the decimal number in the table minus 64.
The signed value of dual bytes is 00 00H=-8192, 40 40H=±0, 7F 7FH=8191. For example, converted aaH bbH (hex) to decimal to the following: aa bbH-40H 00H=aa x 128 + bb - 64 x 128.

● Table A-2: ASCII code

Patch Name and Performance Name of MIDI data are described the ASCII code in the table below.
(H)=hexadecimal

Character	(H)	Character	(H)	Character	(H)
SP	20H	a	61H	1	31H
A	41H	b	62H	2	32H
B	42H	c	63H	3	33H
C	43H	d	64H	4	34H
D	44H	e	65H	5	35H
E	45H	f	66H	6	36H
F	46H	g	67H	7	37H
G	47H	h	68H	8	38H
H	48H	i	69H	9	39H
I	49H	j	6AH	0	30H
J	4AH	k	6BH	.	2BH
K	4BH	l	6CH	-	2DH
L	4CH	m	6DH	*	2AH
M	4DH	n	6EH	/	2FH
N	4EH	o	6FH	#	23H
O	4FH	p	70H	!	21H
P	50H	q	71H	.	2CH
Q	51H	r	72H	.	2EH
R	52H	s	73H		
S	53H	t	74H		
T	54H	u	75H		
U	55H	v	76H		
V	56H	w	77H		
W	57H	x	78H		
X	58H	y	79H		
Y	59H	z	7AH		
Z	5AH				

Note: "SP" is space.

Specifications

A-90/A-90EX: Expandable Controller

A-90EX Sound Section (VE-RD1)

- **Sound Generator**

PCM synthesis

- **Parts**

4 parts

- **Maximum Polyphony**

64 voices

- **Effects**

Reverb, Chorus, Equalizer

- **Preset Memory**

Patches:128

A-90/A-90EX Common

- **Keyboard**

88 keys (Hammer-action mechanism with Velocity and Channel Aftertouch)

- **Zones**

Internal:4

External:4

- **Internal Memory**

System Setup: 1

User Name Maps: 4

Preset Name Maps: 9

Performances: 64

Chains: 10

Manual: 1

- **Memory Card (Option)**

System Setup: 1

User Name Maps: 4

Performances: 64

Chains: 10

- **Display**

3 characters (backlit LCD)

17 characters, 2 lines (backlit LCD)

- **Nominal Output Level**

Output (balanced):-10 dBm

Output (unbalanced):-10 dBm

- **Output Impedance**

Output (balanced): 600 Ω

Output (unbalanced): 300 Ω

- **Recommended Load Impedance**

Output (balanced): 10 k Ω or greater

Output (unbalanced): 10 k Ω or greater

- **Connectors**

MIDI Connectors (in: 2, thru: 1, out: 4)

Foot Controller Jacks: 2

Foot Switch Jacks: 2

Total Volume Pedal Jack

Hold Pedal Jack

Output Jacks (L(Mono), R)

Headphone Jack

Breath Controller Jack

Memory Card Slot

AC Inlet (AC 230 V, AC 240 V)

- **Power Supply**

AC 117 V, AC 230 V or AC 240 V

- **Power Consumption**

15 W (AC 117 V), 20 W (AC 230 V), 20 W (AC 240 V)

- **Dimensions**

1456(W) x 405(D) x 143(H) mm

57-1/3(W) x 16(D) x 5-3/5(H) inches

- **Weight**

27.3 kg / 60 lb 4 oz

- **Accessories**

Pedal Switch: DP-6

Owner's Manuals (Volume 1/2)

Power Cord (AC 230 V, AC 240 V)

- **Options**

Memory card :M-512E

Stereo headphone :RH-20/80/120

Pedal switch :DP-2/6, BOSS FS-5U

Expression pedal :EV-5

Connecting cable :PJ-1M, PCS-100PW

MIDI/SYNC cable :MSC-15/25/50

Voice expansion board :VE series

0 dBm = 0.775 Vrms

* In the interest of product improvement, the specifications and/or contents of this package are subject to change without prior notice.

Index

I: Volume 1 manual

II: Volume 2 manual

A

Aftertouch(I) 15, 33 (II) 27
AFTR TCH
 Control slider.....(I) 14, 15, 32, 33 (II) 23
 Aftertouch of the each zone(II) 27
ATTACK.....(I) 22
Attack time.....(I) 22
AUX 1/2.....(II) 30

B

Balanced output(II)15
Balancing out the zones
 Setting Volume.....(I) 6, 10, 20, 29, 39
 Setting Placement(Pan)(I) 21, 39
Bank select(II) 29, 33, 34, 42
BREATH
 Control slider.....(I) 14, 32 (II) 23
 Controller.....(I) 8 (II) 23
BRIGHT(I) 24

C

Chain
 Chain(II) 8, 35
 Chain mode(II) 8, 35
 Editing chain(II) 35
CHOR SEND.....(I) 25, 41
CHORUS.....(II) 55
Contrast of the LCD.....(II) 38
Control slider
 AFTR TCH.....(I) 15, 33 (II) 23
 BREATH.....(I) 14, 32 (II) 23
 EXPRESS.....(I) 15, 33 (II) 23
 PORT TIME(I) 14, 32 (II) 23
Copy
 Performance copy(II) 47
 Chain copy(II) 48

D

DATA ENTRY
 Numeric keypad(II) 9, 10
 Cursor button(II) 9, 10
 DATA ENTRY slider(II) 9
 INC/DEC button(I) 11, 17 (II) 9
DECAY(I) 22
Decay time.....(I) 22
Decimal format.....(II) 38
Default tempo.....(II) 40
DESTINATIONS(I) 6

E

Edit
 Edit mode.....(II) 8
 Chain edit mode.....(II) 8, 35
Effector
 Effector control.....(II) 41
 Chorus send(I) 25, 41
 Reverb send.....(I) 24, 40
 Equalizer on VE-RD1.....(I) 25
 Chorus on VE-RD1.....(II) 55
 Reverb on VE-RD1.....(II) 54
EQUALIZER(I) 25
EXPRESS
 Control slider.....(I) 15, 33 (II) 23
 Setting expression of the each zone(II) 28

Expression.....(I) 15, 33 (II) 28
External zone.....(I) 29 (II) 5

F

FC 1/2.....(I) 8 (II) 23
FINE TUNE.....(I) 22
FUNCTION(I) 7 (II) 7
FS 1/2(I) 8 (II) 23

G

GBN(II) 38
Grobal transpose(I) 13, 31 (II) 26
Group-Bank-Number format.....(II) 38

H

HELP button.....(II) 15
Help function.....(II) 15
HOLD pedal(I) 8, 9, 12, 27, 30 (II) 26

I

Initialize
 Initializing the internal memory.....(I) 44 (II) 51
 Initializing the system memory(II) 50
 Initializing the temporary area(II) 49
 Initializing settings in the manual mode.....(I) 28 (II) 50
Internal
 Internal memory(II) 6, 44, 46, 51, 52
 Internal zone.....(I) 11 (II) 5

K

KEY RANGE.....(I) 17, 36

L

LSB(II) 29, 34, 42

M

Master tune(II) 58
Memory
 Internal memory(II) 6, 44, 46, 51, 52
 System memory(II) 6, 46, 50
 Temporary area(II) 6, 44, 45, 49
 Manual memory.....(II) 6
 Memory card(II) 2, 6, 44, 46
Menu(II) 12
MIDI
 MIDI timing clock.....(II) 40
 Inputs/Outputs of MIDI messages.....(II) 16
 MIDI OUTPUT switch(II) 14
MODULATE.....(II) 27
Modulation lever(I) 12, 30 (II) 23
MONO switch.....(I) 14, 32 (II) 23
MSB.....(II) 29, 34, 42

N

Name map
 Name map(II) 33
 Setting maps for the zones(II) 33
 Creating user's name map.....(II) 34
Note message.....(II) 43
NRPN(II) 31

O

Output
 Output(I) 8, 9, 27 (II) 15
 MIDI output.....(II) 5, 14, 16
 Zone output.....(II) 14, 16

P

PALETTE	(II) 11
Palette slider	(II) 11
PAN	(I) 21, 39
PANIC button	(II) 15
Panic function	(II) 15
PARAMETER SELECT	(I) 6, 45 (II) 27, 53
Patch	(I) 10, 16, 21 (II) 5
Pedal	
FC 1/2	(I) 8 (II) 23
FS 1/2	(I) 8 (II) 23
HOLD	(I) 8, 9, 12, 27, 30 (II) 26
TOTAL VOL	(I) 8 (II) 25
Performance	
Performance	(I) 10, 26, 42 (II) 5, 6, 7, 8
Performance mode	(I) 11, 26, 42 (II) 7, 9, 11
Pitch bend lever	(I) 7, 12, 30 (II) 23
Portamento	(I) 14, 32, 40
PORTAMENTO switch	(I) 14, 32, 40 (II) 23
PORT TIME	
Control slider	(I) 14, 32 (II) 23
Portamento	(I) 14, 32, 40
Program change	(I) 34 (II) 33, 34, 42
Program name map	(II) 33
Protect switch	(II) 2, 44

R

RELEASE	(I) 22
Release time	(I) 22
REV SEND	(I) 24, 40
Reverb	(II) 54
RPN	(II) 30

S

Save	
Saving a performance	(I) 26 (II) 44
Saving the settings in the manual mode	(I) 41 (II) 45
Saving a chain	(II) 45
Saving the internal memory to a memory card	(II) 46
Settings of controllers	(II) 23
SEQUENCER CONTROL	(I) 7 (II) 40
Shortcut	
Edit shortcut	(II) 12, 13
List of shortcut numbers	(II) 61, 62
Utility shortcut	(II) 12, 13
SONG SELECT	(II) 40
Sound brightness	(I) 24
System	
System settings	(II) 6, 46
System parameter	(II) 6
System memory	(II) 6

T

TEMPO	
Sequencer control	(II) 40
Settings of controllers	(II) 23
Temporary	
Temporary area	(II) 6, 44
Temporary chain	(II) 6, 45
Temporary performance	(II) 6, 44
Timing clock	(II) 40
TOTAL VOLUME	
Pedal	(I) 8 (II) 25
Slider	(I) 6, 10, 20, 29, 39 (II) 25
Tone	
Program change	(I) 34, (II) 33, 34, 42
Bank select	(II) 29, 33, 34, 42

Tone name	(II) 34
Transpose	
Global transpose	(I) 13, 31 (II) 26
Transposition of the each zone	(I) 21, 35
TRANSCOPE switch	(I) 13, 31 (II) 26

U

UTILITY	(II) 8
Utility mode	(II) 8

V

VE-GS1	(I) 45 (II) 53, 56
VE-JV1	(I) 45 (II) 53, 56
VE-RD1	(I) 45 (II) 53
VELO CURV	(II) 28
Velocity	
Velocity	(II) 28
Velocity curve	(II) 28
Velocity sensitivity	(I) 19, 38 (II) 29
Velocity max	(II) 29
Voice expansion board	
Voice expansion board	(I) 43 (II) 53
VE-GS1	(I) 45 (II) 53, 56
VE-JV1	(I) 45 (II) 53, 56
VE-RD1	(I) 45 (II) 53

Volume

Volume of the each zone	(I) 20, 39
INT VOLUME	(I) 6, 10, 20
TOTAL VOLUME	(I) 6, 29, 39 (II) 25

W

WHEEL 1/2	(I) 6, 12, 30 (II) 23
-----------------	-----------------------

Z

Zone	
Zone	(I) 11, 29 (II) 5
Zone switch	(I) 6, 11, 29 (II) 14
Output destinations of zones	(II) 17
MIDI IN 1/2 to zones	(II) 19, 22

Information

When you need repair service, call your nearest Roland Service Center or authorized Roland distributor in your country as shown below.

AFRICA

EGYPT

Al Fanny Trading Office
P.O. Box 2904,
El Horrieh Heliopolis, Cairo,
EGYPT
TEL: (02) 4185531

REUNION

Maison FO - YAM Marcel
25 Rue Jules Merman, ZL
Chaudron - BP79 97491
Ste Clotilde REUNION
TEL: 28 29 16

SOUTH AFRICA

That Other Music Shop
(PTY) Ltd.
11 Melle Street (Cnr Melle and
Juta Street)
Braamfontein, 2001,
Republic of SOUTH AFRICA
TEL: (011) 403 4105

Paul Bothner (PTY) Ltd.
17 Werdmuller Centre Claremont
7700
Republic of SOUTH AFRICA

P.O. Box 23032
Claremont, Cape Town
SOUTH AFRICA, 7735
TEL: (021) 64 4030

ASIA

CHINA

Beijing Xinghai Musical
Instruments Co., Ltd.
6 Huangmuchiung Chao Yang
District, Beijing, CHINA
TEL: (010) 6774 7491

HONG KONG

Tom Lee Music Co., Ltd.
Service Division
22-32 Pun Shan Street, Tseun
Wan, New Territories,
HONG KONG
TEL: 2415 0911

INDIA

Rivera Digitec (India) Pvt. Ltd.
409, Nirman Kendra Mahalaxmi
Flats Compound Off. Dr. Edwin
Moses Road, Mumbai-400011,
INDIA
TEL: (022) 498 3079

INDONESIA

PT Citra IntiRama
Jl. Cideng Timur No. 15/1-150
Jakarta Pusat
INDONESIA
TEL: (021) 6324170

KOREA

Cosmos Corporation
1461-9, Seocho-Dong,
Seocho Ku, Seoul, KOREA
TEL: (02) 3486-8555

MALAYSIA

Bentley Music SDN BHD
140 & 142, Jalan Bukit Bintang
55100 Kuala Lumpur, MALAYSIA
TEL: (03) 2443333

PHILIPPINES

G.A. Yupangco & Co. Inc.
339 Gil I, Fuyat Avenue
Makati, Metro Manila 1200,
PHILIPPINES
TEL: (02) 899 9801

SINGAPORE

Swee Lee Company
150 Sims Drive,
SINGAPORE 387381
TEL: 748-1669

CRISTOFORI MUSIC PTE LTD

Blk 3014, Bedok Industrial Park E.
#02-2148, SINGAPORE 489980
TEL: 243 9555

TAIWAN

ROLAND TAIWAN
ENTERPRISE CO., LTD.
Room 5, 9fl. No. 112 Chung Shan
N.Road Sec.2, Taipei, TAIWAN,
R.O.C.
TEL: (02) 2561 3339

THAILAND

Theera Music Co., Ltd.
330 Verg NakornKasem, Soi 2,
Bangkok 10100, THAILAND
TEL: (02) 2248821

VIETNAM

Saigon Music
138 Tran Quang Khai St.,
District 1
Ho Chi Minh City
VIETNAM
TEL: (08) 844-4068

AUSTRALIA/ NEW ZEALAND

AUSTRALIA

Roland Corporation
Australia Pty, Ltd.
38 Campbell Avenue
Dee Why West, NSW 2099
AUSTRALIA
TEL: (02) 9982 8266

NEW ZEALAND

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

CENTRAL/LATIN AMERICA

ARGENTINA

Instrumentos Musicales S.A.
Florida 656 2nd Floor
Office Number: 206A
Buenos Aires
ARGENTINA, CP1005
TEL: (54-11) 4-393-6057

BRAZIL

Roland Brasil Ltda.
R. Coronel Octaviano da Silveira
203 05522-010
Sao Paulo BRAZIL
TEL: (011) 3743 9377

COSTA RICA

JUAN Bansbach
Instrumentos Musicales
Ave.1, Calle 11, Apartado 10237,
San Jose, COSTA RICA
TEL: (506)258-0211

CHILE

Comercial Fancy S.A.
Avenida Rancagua #0330
Providencia Santiago, CHILE
TEL: 56-2-373-9100

EL SALVADOR OMNI MUSIC

75 Avenida Notre YY Alameda,
Juan Pablo 2, No. 4010
San Salvador, EL SALVADOR
TEL: (503) 262-0788

MEXICO

Casa Veerkamp, s.a. de c.v.
Av. Toluca No. 323, Col. Olivar
de los Padres 01780 Mexico D.F.
MEXICO
TEL: (525) 668 04 80

La Casa Wagner de

Guadalajara s.a. de c.v.
Av. Corona No. 202 S.I
Guadalajara, Jalisco Mexico
C.P.44100 MEXICO
TEL: (3) 613 1414

PANAMA

SUPRO MUNDIAL, S.A.
Boulevard Andrews, Albrook,
Panama City,
REP. DE PANAMA
TEL: (507) 315-0101

PARAGUAY

Distribuidora De
Instrumentos Musicales
J.E. Olear y ESQ. Manduvira
Edificio, El Dorado Planta Baja
Asuncion PARAGUAY
TEL: 595-21-492147

PERU

VIDEO Broadcast S.A.
Portinari 199 (ESQ. HALS),
San Borja, Lima 41,
REP. OF PERU
TEL: 51-14-758226

URUGUAY

Todo Musica S.A.
Cuareim 1844, Montevideo,
URUGUAY
TEL: 5962-924-2335

VENEZUELA

Musiland Digital C.A.
Av. Francisco de Miranda,
Centro Parque de Cristal, Nivel
C2 Local 20 Caracas
VENEZUELA
TEL: (02) 285 9218

EUROPE

AUSTRIA

Roland Austria GES.M.B.H.
Siemensstrasse 4, P.O. Box 74,
A-6063 RUM, AUSTRIA
TEL: (0512) 26 44 260

BELGIUM/HOLLAND/ LUXEMBOURG

Roland Benelux N. V.
Houtstraat 3, B-2260, Oevel
(Westerlo) BELGIUM
TEL: (01 600) 73 500

DENMARK

Roland Scandinavia A/S
Nordhavnsvej 7, Postbox 880,
DK-2100 Copenhagen
DENMARK
TEL: (039)16 6200

FRANCE

Roland France SA
4, Rue Paul Henri SPAAK,
Parc de l'Esplanade, F 77 462 St.
Thibault, Lagny Cedex FRANCE
TEL: 01 600 73 500

FINLAND

Roland Scandinavia As,
Filial Finland
Lautasaarentie 54 B
Fin-00201 Helsinki, FINLAND
TEL: (9) 682 4020

GERMANY

Roland Elektronische
Musikinstrumente HmbH.
Oststrasse 96, 22844 Norderstedt,
GERMANY
TEL: (040) 52 60090

GREECE

STOLLAS S.A.
Music Sound Light
155, New National Road
26422 Patras, GREECE
TEL: 061-435400

HUNGARY

Intermusica Ltd.
Warehouse Area DEPO Pf.83
H-2046 Torokbalint, HUNGARY
TEL: (23) 511011

IRELAND

Roland Ireland
Audio House, Belmont Court,
Donnybrook, Dublin 4,
Republic of IRELAND
TEL: (01) 2603501

ITALY

Roland Italy S. p. a.
Viale delle Industrie 8,
20020 Arese, Milano, ITALY
TEL: (02) 937-78300

NORWAY

Roland Scandinavia Avd.
Kontor Norge
Lilleakerveien 2 Postboks 95
Lilleaker N-0216 Oslo
NORWAY
TEL: 273 0074

POLAND

P. P. H. Brzostowicz
UL. Gibraltarska 4,
PL-03664 Warszawa POLAND
TEL: (022) 679 44 19

PORTUGAL

Tecnologias Musica e Audio,
Roland Portugal, S.A.
RUA DE SANTA CARARINA
131/133, 4000-450 PORTO
PORTUGAL
TEL: (022) 208 4456

ROMANIA

FBS LINES
Plata Libertatii 1,
RO-4200 Cheorgheni
TEL: (066) 164-609

RUSSIA

Slami Music Company
Sadojava-Triumfalnaja st., 16
103006 Moscow, RUSSIA
TEL: 095 209 2193

SPAIN

Roland Electronics
de España, S. A.
Calle Bolivia 239, 08020
Barcelona, SPAIN
TEL: (93) 308 1000

SWEDEN

Roland Scandinavia A/S
SWEDISH SALES OFFICE
Danvik Center 28, 2 tr.
S-131 30 Nacka SWEDEN
TEL: (08) 702 0020

SWITZERLAND

Roland (Switzerland) AG
Musitronic AG
Gerberstrasse 5, CH-4410 Liestal,
SWITZERLAND
TEL: (061) 921 1615

UKRAINE

TIC-TAC
Mira Str. 19/108
P.O. Box 180
295400 Munkachevo, UKRAINE
TEL: (03131) 414-40

UNITED KINGDOM

Roland (U.K.) Ltd.
Atlantic Close, Swansea
Enterprise Park, SWANSEA
SA7 9FJ,
UNITED KINGDOM
TEL: (01792) 700139

MIDDLE EAST

BAHRAIN

Moon Stores
Bab Al Bahrain Road,
P.O. Box 20077
State of BAHRAIN
TEL: 211 005

CYPRUS

Radex Sound Equipment Ltd.
17 Diagorou St., P.O. Box 2046,
Nicosia CYPRUS
TEL: (02) 453 426

ISRAEL

Halilit P. Greenspoon &
Sons Ltd.
8 Retzif Fa aliya Hashnva St.
Tel-Aviv-Yahv ISRAEL
TEL: (03) 6823666

JORDAN

AMMAN Trading Agency
Prince Mohammed St. P.O. Box
825 Amman 11118 JORDAN
TEL: (06) 4641200

KUWAIT

Easa Husain Al-Yousifi
Abdullah Salem Street,
Safat KUWAIT
TEL: 5719499

LEBANON

A. Chahine & Fils
P.O. Box 16-5857 Gergi Zeidan St.
Chahine Building, Achrafieh
Beirut, LEBANON
TEL: (01) 335799

QATAR

Badie Studio & Stores
P.O. Box 62,
DOHA QATAR
TEL: 423554

SAUDI ARABIA

aDawlah Universal
Electronics APL
P.O. Box 2154 ALKHOBAR 31952,
SAUDI ARABIA
TEL: (03) 898 2081

SYRIA

Technical Light & Sound
Center
Khaled Ibn Al Walid St.
P.O. Box 13520
Damascus - SYRIA
TEL: (011) 2235 384

TURKEY

Barkat muzik aletleri ithalat
ve ihracat Ltd Sti
Siraselviler cad.Guney is hari 84-
86/6, Taksim, Istanbul, TURKEY
TEL: (0212) 2499324

U.A.E.

Zak Electronics & Musical
Instruments Co. L.L.C.
Zabeel Road, Al Sherooq Bldg.,
No. 14, Grand Floor DUBAJ
U.A.E.
TEL: (04) 3360715

NORTH AMERICA

CANADA

Roland Canada Music Ltd.
(Head Office)
5480 Parkwood Way Richmond
B. C., V6V 2M4 CANADA
TEL: (0604) 270 6626

Roland Canada Music Ltd.

(Toronto Office)
Unit 2, 109 Woodbine Downs
Blvd, Etobicoke, ON
M9W 6Y1 CANADA
TEL: (0416) 213 9707

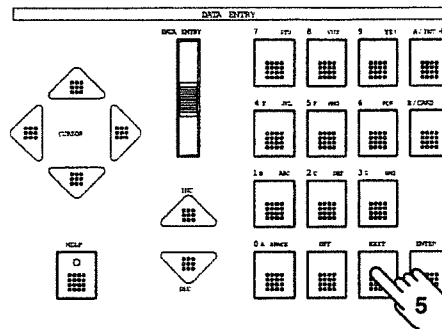
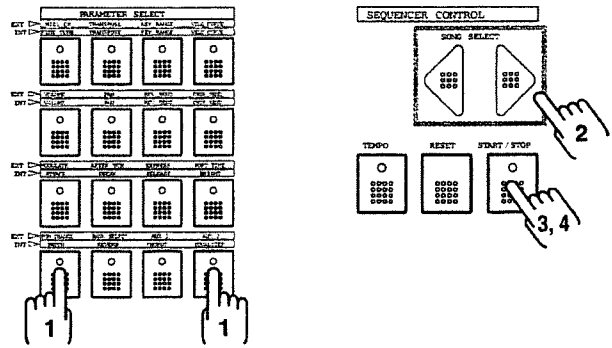
U. S. A.

Roland Corporation U.S.
5100 S. Eastern Avenue
Los Angeles, CA 90040-2938,
U. S. A.
TEL: (323) 890 3700

To Listen to the Demo Songs in the VE-RD1

To play Demo Songs stored in the VE-RD1, do as follows.

1. Press <PARAMETER SELECT>[PGM CAHNGE] and [AUX2] in simultaneously.
2. Select a demo song you wish to hear using <SEQUENCER CONTROL> [SONG SELECT].
3. Press <SEQUENCER CONTROL> [START/STOP] to start playing the song.
4. To stop playing, press [START/STOP] again.
5. Press <DATA ENTRY> [EXIT] to return to the previous mode before playing the demo song.



SONG 1, 2 Scott Wilkie Copyright © 1995, Scott Wilkie Media (ASCAP)
SONG 3 Scott Tibbs Copyright © 1995, Roland Corporation US

● Composer Profiles

Scott Wilkie

Scott Wilkie is a contemporary jazz recording artist, based in southern California. He tours frequently with his own band, and also appears as an artist for Roland in the U.S., Japan, Europe and South America. His debut solo album, Chasing The Dream, will be released worldwide in 1999 on Narada/Virgin Records. You can find him on-line at www.scottwilkie.com.

Scott Tibbs

Scott Tibbs has performed and conducted for several orchestral groups, including the Atlanta Symphony Orchestra, throughout the United States, Canada, Latin America, and Japan. His diverse compositional output ranges from numerous film, theater and television projects to the symphonic concert stage. For the past four years, he has been teaching music composition and theory at UCLA where he has received a Ph.D. degree in composition. He has performed with well-known artists Dizzy Gillespie, Bill Cosby, Jerry Sienfeld, and Bobby Shew, amongst numerous others.

* All rights reserved. Unauthorized use of this material for purposes other than private, personal enjoyment is a violation of applicable laws.

Copyright © 1998 ROLAND CORPORATION

All rights reserved. No part of this publication may be reproduced in any form without the written permission of ROLAND CORPORATION.

Information About Added Functions of A-90/EX

Switching ON and OFF Whether to Transmit “Reset All Controller” (EDIT: SYS: CTRL E32)

Set Comments to Each Zone (EDIT: PERF: COMMON E46)

When the VE-GSPro is Installed in the A-90/EX

Loading a Performance appropriate for the Voice Expansion Board

Listening to the Demo Songs

Selecting sounds

Applying Multi-Effects (MFX)

Caution

MIDI Implimentation

Switching ON and OFF Whether to Transmit “Reset All Controller” (EDIT: SYS: CTRL E32)

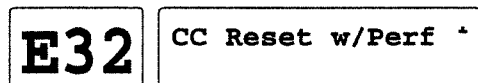
Normally, when you change Performances, the A-90/EX transmits a Reset All Controllers message, and then transmits the settings of the Performance you choose to each Zone. You can select whether to transmit this “Reset All Controller” for each Zone when you change the Performance.

CC Reset w / Perf = OFF: When switching to a new Performance, the last value sent by the slider will still be active on that Zone. For example, if the Expression slider is brought to 0 to fade out a string sound, the strings will still have Expression 0 when the new Performance is selected, and they will not sound.

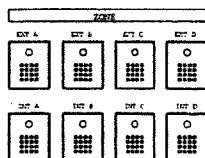
CC Reset w / Perf = ON: When switching to a new Performance, each Zone enabled will transmit a Reset All Controller message. If the Expression slider is brought to 0 to fade out a string sound now, Expression will be reset to 127 when the new Performance is selected, and strings will return to their normal level.

Reset All Controllers is a single standard message, not a set of controller messages, that typically will reset volume, expression, panning, modulation, pitch bend, and/or aftertouch. Refer to the MIDI implementation chart for each instrument to determine how it will respond to a Reset All Controllers message.

1. Change to the Edit mode, use the menu or the shortcut number to choose “CC Reset w / Perf”.



2. Set whether to transmit “Reset All Controller” to each Zone using the corresponding ZONE switch.



These settings are saved automatically as a system setting.

Set Comments to Each Zone (EDIT: PERF: COMMON E46)

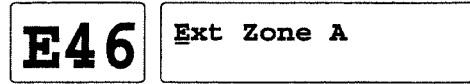
You can set simple comments to each Zone, such as the settings of the Zone, or the name of connected sound source, and so on.

Press the corresponding ZONE switch, then the MIDI OUT switch that the Zone are to output flashes and the comments you set are shown on the screen.

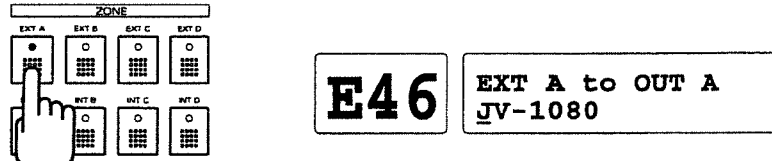
<How to set comments>

1. Change to the Edit mode, use the menu or the shortcut to choose Comment Setting Screen.

* If you have not set the comments, the factory preset comments are shown on the screen.



2. Press the Zone switch for the Zone you wish to set a comment for.



3. Enter comments using DATA ENTRY. (For entering text, take a look at p.10 of Volume 2.)

You can set the comment of 17 letters x 2 lines to each zone.

You can save these settings as a Performance. (p. 26 of Volume 1, p. 44 of Volume 2)

Settings are lost when the Performance is switched or the power is turned off unless you save them. (They are saved automatically and are available at the Manual mode.)

When the VE-GSPro is Installed in the A-90/EX

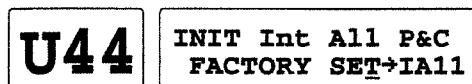
Loading a Performance appropriate for the Voice Expansion Board

When you use the VE-GSPro for the first time, please perform the following procedure.

This will write settings appropriate for the Voice Expansion Board into the A-90/EX (refer to p.44 of Volume 1 manual).

* Internal settings will be overwritten and lost. If necessary, please backup the settings on a memory card, etc.

1. Press the <FUNCTION> [UTILITY] twice in succession. (double-click)
2. Press the numeric keys in the order of [4] [4] [ENTER].



3. Finally press [ENTER], and a message will ask whether you wish to initialize the performance data. Press [ENTER] once again to initialize the data.

Listening to the Demo Songs

1. Press <PARAMETER SELECT> [PGM CAHNGE] and [AUX2] simultaneously.
2. Press the <SEQUENCER CONTROL> [START/STOP] to start playing the song.
3. To stop playing, press [START/STOP] again.
4. Press the <DATA ENTRY> [EXIT] to return to the previous mode before playing the demo song.

Selecting sounds

When the VE-GSPro is installed, there are two ways to select sounds.

You can either load a **Patch**, or directly select individual **Tones**.

A **Patch** is a combination of four **Tones**, and also contains **multi-effect (MFX)** settings.

* *Data that corresponds to a **Patch** on the VE-RD1 is referred to on the VE-GSPro as a **Tone**. → Volume 1 p.16*

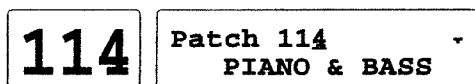
● Loading a patch

* *When you switch **patches**, the **multi-effect (MFX)** settings will change along with the combination of **tones**.*

1. Use <DATA ENTRY> [INC]/[DEC] to select the performance that will change these settings.
2. Press <DESTINATIONS> [INT] to select the internal zone, and then press <PARAMETER SELECT> [PATCH].

The display will indicate the number and name of the current patch.

* *If the display is different than the Patch Selecting Screen as shown below, press <CURSOR> [▲] several times.*



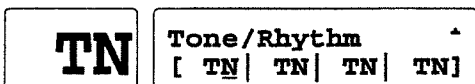
3. Use <DATA ENTRY> [INC]/[DEC] to select a patch (1–128). At this time, **the multi-effect (MFX) settings will change along with the combination of tones.**

* *It is not possible to change the combination of tones in a **patch**. Similarly, **the multi-effect (MFX) settings are also fixed for each patch.***

● Directly selecting individual tones

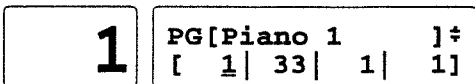
The procedure is the same up through **step 2** described above.

3. Press <CURSOR> [▼] twice. Now you can specify whether each zone will play a **rhythm set** or a **conventional instrumental sound** (a sound from the tone list).



4. Use <DATA ENTRY> [INC]/[DEC] to select either RHY or TN. If you select **RHY**, a rhythm set will sound. If you select **TN**, a conventional instrument will sound.
5. Press <CURSOR> [▲] once. Now you can specify a tone number for each zone.

* *For a list of **tones**, refer to the VE-GSPro owner's manual.*



The tone will also depend on the **bank select (CC00, CC32)** setting. **Bank select MSB (CC00)** corresponds to the Variation, and **bank select LSB (CC32)** corresponds to the **Tone Set**. If the **bank select LSB (CC32)** is 0, 2, or 1, **Tone Sets 3, 2 or 1** will be selected respectively.

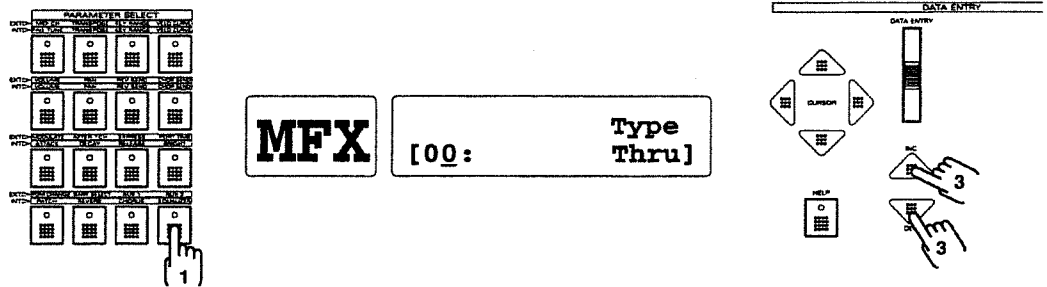
* *For details on **Bank Select** settings, refer to p.29 of Volume 2.*

6. Use <CURSOR> [◀]/[▶] to select the zone, and use <DATA ENTRY> [INC]/[DEC] to select the tone.
 - * In actuality, **only one rhythm set part** can be handled by the A-90/EX. Even if two or more parts are assigned to a rhythm set on the A-90/EX, the data will be sent to the same part on the Voice Expansion Board. The last-transmitted tone number (PC) will apply to all zones that are assigned to a **rhythm set**.
 - * Even if the bank select LSB has been set to select Tone Set 1 or 2, **the sound names of Tone Set 3 will be displayed**.
 - * If you set the MIDI channel to channel 10, **the rhythm set will sound, but the tone settings will not have changed from the settings for the instrumental tone**. This means that if you save that performance and then recall it, **the instrumental tone will be recalled, and the rhythm set will not sound**.

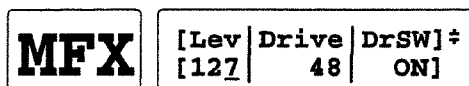
Applying Multi-Effects (MFX)

Multi-Effects (MFX) can apply a **single effect** to all zones. It is not possible to apply a different effect to each zone. For each zone, you can specify whether the selected multi-effect (MFX) will be applied or not (ON/OFF).

1. Press <DESTINATIONS> [INT], and then press <PARAMETER SELECT> [AUX2 (EQUALIZER)].
2. Press <CURSOR> [▲] to access the screen where you can select the multi-effect (MFX) type.



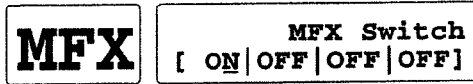
3. Use <DATA ENTRY> [INC]/[DEC] to select the desired effect type.
4. Press <CURSOR> [▼] to access the screen where you can set the multi-effect parameters.



* The screen above shows the parameters for when MFX type 4: Humanizer has been selected.

5. Use <CURSOR> [◀]/[▶] to move between items, use [▲]/[▼] to move between screens, and use [INC]/[DEC] to set values.
 - * For details on **the parameters**, refer to the Multi-Effect Parameter Chart of the VE-GSPro.
 - * Parameters which cannot be set from the A-90/EX will be set to their most suitable value.
 - * Some of **the multi-effect parameters** are not simple numerical values, and cannot be easily set using the numeric keys. For such parameters, press <DATA ENTRY> [A/INT] + [◀] so that all **multi-effect parameters** will be displayed as numerical values. →Volume 2 p.37

6. Press <PARAMETER SELECT> [AUX1 (CHORUS)].



7. For each zone, you specify whether or not the selected multi-effect will be applied. Use [◀]/[▶] to select zones, and use [INC]/[DEC] to turn the setting ON (effect will be applied) or OFF (effect will not be applied).

Caution

- After changing the Voice Expansion Board (for instance, from the VE-GSPro to the VE-RD1, or the reverse), you must be sure to load **performance settings appropriate for that Voice Expansion Board** (Volume 1 p.44). If this is not done, the correct sounds will not play.
- Even though the VE-GS Pro is a 32-Part multitimbral sound generator, when installed in the A-90/EX, only sixteen of its Parts will be available for use.
- **Exclusive messages** can be transmitted from an external device to the **MIDI IN** of the A-90/EX to modify the settings of the A-90/EX. When this is done, there are some parameters which do not reach the **Voice Expansion Board**; i.e., the sound may not change even though the settings have changed. If this occurs, press [PANIC] so that the values that were set on the A-90/EX will be reflected by the Voice Expansion Board.
- When inputting music data such as SMF to the **MIDI IN 2** of the A-90/EX, please turn the **Control Channel OFF** (Volume 2 p.21). Program changes received on the MIDI channel that has been specified as the **Control Channel** will cause the A-90/EX to switch to a different Performance (instead of selecting a different sound for that channel). If the Performance is changed, the song may no longer be played with the correct sounds.
- Depending on the effect settings, the Pan setting may not be reflected in the sound.

MIDI Implimentation

Into the table "1-3-1 Performance Common" in the section "Parameter Address Map" of Owner's Manual Volume 2 P.72-73, the following matters are inserted.

1-3-1 Performance Common

	:	:	:	:
	:	:	:	:
	:	:	:	:
#	01 1D	0000 aaaa	Breath controller Tempo Min	20 - 250
	01 1E	0000 bbbb		
#	01 1F	0000 aaaa	:	
	01 20	0000 bbbb	Tempo Max	20 - 250

(The following part is added)

	01 21	0aaa aaaa	VE-GSPro MFX Type	0 - 64
	01 22	0aaa aaaa	VE-GSPro MFX Parameter 1	0 - 127
	01 23	0aaa aaaa	VE-GSPro MFX Parameter 2	0 - 127
	01 24	0aaa aaaa	VE-GSPro MFX Parameter 3	0 - 127
	01 25	0aaa aaaa	VE-GSPro MFX Parameter 4	0 - 127
	01 26	0aaa aaaa	VE-GSPro MFX Parameter 5	0 - 127
	01 27	0aaa aaaa	VE-GSPro MFX Parameter 6	0 - 127
	01 28	0aaa aaaa	VE-GSPro MFX Parameter 7	0 - 127
	01 29	0aaa aaaa	VE-GSPro MFX Parameter 8	0 - 127
	01 2A	0aaa aaaa	VE-GSPro MFX Parameter 9	0 - 127
	01 2B	0aaa aaaa	VE-GSPro MFX Parameter 10	0 - 127
	01 2C	0aaa aaaa	VE-GSPro MFX Parameter 11	0 - 127
	01 2D	0aaa aaaa	VE-GSPro MFX Parameter 12	0 - 127
#	01 2E	0000 aaaa	VE-GSPro Tone/Rhythm Switch	0 - 255
	01 2F	0000 bbbb	VE-GSPro MFX Switch	
#	01 30	0000 abbb	VE-GSPro PATCH ON/OFF & Number	0 - 255
	01 31	0000 bbbb		
Total Size		00 00 01 32		

- The parameters of VE-RD1 is valid only when the Voice Expansion Board VE-RD1 is installed.
- The parameters of VE-GS Pro is valid only when the Voice Expansion Board VE-GS Pro is installed.



Thank you for purchasing the Roland VE-RD1 Voice Expansion Board.

The VE-RD1 is the Voice Expansion Board specifically designed for the A-90 that features the fulfilled functions as a MIDI master keyboard to add functions as a stage piano.

This Expansion Board includes 64 voice sound generator and 128 different sounds mostly consisting of high quality piano sounds. It also contains Multi Effects such as Reverb, Chorus and Equalizer, that serves for wide sound synthesis.

The VE-RD1 is specifically designed for the A-90. Please do not install it to any other device.

■ Installing the VE-RD1



Always turn the unit off and unplug the power cord before attempting installation of the VE-RD1.



Remove only the specified screws.

To avoid the risk of damage to internal components that can be caused by static electricity, please carefully observe the following whenever you handle the board.

- When handling the board, grasp it only by its edges. Avoid touching any of the electronic components or connectors.
- When handling the board, grasp it only by its edges. Avoid touching any of the electronic components or connectors.

1. With a screwdriver, unscrew the four corner screws of the center LCD cover on the front of the A-90, and remove the LCD cover.

* Please take care not to touch the LCD (liquid crystal display) inside.

* Do not touch any of the printed circuit pathways or connection terminals.

2. Connect the board holder as shown in the diagram.

3. Securely insert the board's connector into the connector in the A-90. At this point, the three board holder pins should be protruding through the board's three holes.

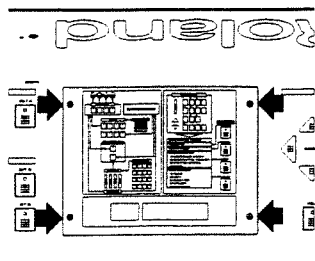
* Never use excessive force when installing the VE-RD1. If it doesn't fit properly on the first attempt, remove the board and try again.

4. Using the locking tool included with the board, turn the board holder clockwise just 1/4 of a turn, and the board will be fixed to the unit.

* When circuit board installation is complete, double-check your work.

5. Finally, attach the LCD cover.

If you ever need to remove the board, after turning off power to the A-90, remove the board by reversing the order of the steps used to install the board.



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

この機器を正しくお使いいただくために、ご使用前に「安全上のご注意」と「使用上のご注意」をよくお読みください。また、この機器の優れた機能を十分ご理解いただくためにも、この取扱説明書をよくお読みください。取扱説明書は必要なときにすぐに見ることができるよう、手元に置いてください。

このたびは、ローランド ボイス・エクスパンション・ボード VE-RD1をお買い上げいただき、まことにありがとうございます。

VE-RD1は、MIDIマスター・キーボードとして充実した機能を持つA-90に、ステージ・ピアノとしての機能を加えることができるA-90専用のボイス・エクスパンション・ボードです。

このエクスパンション・ボードは、64ボイスの音源を搭載し、高品質なピアノ音色を中心とした128の音色を内蔵しています。またリバーブ、コーラス、イコライザーといったマルチ・エフェクトを内蔵しており、幅広い音作りに活用することができます。

VE-RD1はA-90専用です。他の製品には装着しないで下さい。

■ VE-RD1の取り付けかた



VE-RD1を取り付ける前に、A-90の電源スイッチをオフにして、電源プラグをコンセントから外してください。



指定されたネジだけを外してください。

この基板は、静電気により部品が破壊される恐れがあります。基板を取り扱うときは、次の点に注意してください。

- 基板を持つときは、あらかじめ何らかの金属に触れて、体や衣類にたまっている静電気を放電してください。
- 基板を持つときは、基板の縁を持ち、部品やコネクターの部分に直接手を触れないでください。

1. A-90の正面中央のLCDカバーの4箇所のネジをドライバーではずし、LCDカバーを取り外します。

※ 内部のLCD（液晶ディスプレイ）には触れないでください。

※ 回路部やコネクタ部には手を触れないでください。

2. 基板ホルダーを図のような向きに合わせます。

3. ボードのコネクタを、A-90本体のコネクタに完全に差し込みます。このとき3つの基板ホルダーが、ボイス・エクスパンション・ボードの3つの穴から出るようにします。

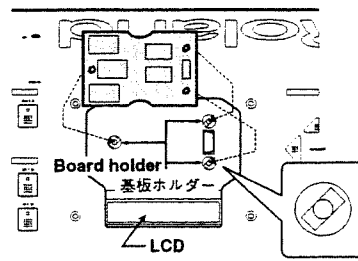
※ 基板を無理に押し込まないでください。装着しにくい場合、いったん基板を外してやり直してください。

4. ボード付属の固定用具で基板ホルダーを時計回りに1/4回転ほど回し、ボードを固定します。

※ 取り付けを終えたら、正しく取り付けられていることを再度確認してください。

5. 最後にLCDカバーを取り付けます。

ボードを取り外す場合は、A-90の電源を切ってから、取り付けたときの逆の手順で取り外してください。



■ To listen to a Demo Songs

To play Demo Songs stored in the VE-RD1, do as follows.

1. Press the PGM CHANGE and AUX2 buttons in PARAMETER SELECT simultaneously.
2. Select a demo song you wish to hear using the SONG SELECT buttons in SEQUENCER CONTROL.
3. Press the START/STOP button in SEQUENCER CONTROL to start playing the song.
4. To stop playing, press the START/STOP button again.
5. Press the EXIT button in DATA ENTRY to return to the previous mode before playing the demo song.

* All rights reserved. Unauthorized use of this material for purposes other than private, personal enjoyment is a violation of applicable laws.

* No data for the music that is played will be output from MIDI OUT.

■ デモ・ソングを聴くときは.....

VE-RD1に収められたデモ・ソングを演奏させるときは、次の操作をします。

1. PARAMETER SELECTのPGM CHANGEボタンとAUX2ボタンを同時に押します。
2. SEQUENCER CONTROLのSONG SELECTボタンで曲を選びます。
3. SEQUENCER CONTROLのSTART/STOPボタンを押すとデモ・ソングの演奏が始まります。
4. START/STOPボタンをもう一度押すと演奏が止まります。
5. DATA ENTRYのEXITボタンを押すと元のモードに戻ります。

※ これらのデモ・ソングを個人で楽しむ以外に権利者の許諾なく使用することは、法律で禁じられています。

※ デモ・ソングの演奏データはMIDI OUTコネクターからは出力されません。

■ Patch List

No.	Name	V	No.	Name	V	No.	Name	V	No.	Name	V
1	St.Concert 1	2	33	SA E.Grand 1	1	65	60s Organ 2	1	97	Square Pad	2
2	St.Concert 2	2	34	SA E.Grand 2	3	66	Sqr Organ	2	98	EPno Pad	2
3	St.Concert 3	2	35	CP E.Grand	2	67	Vibe	2	99	7th Sand	4
4	St.Concert 4	2	36	SA Rhodes 1	2	68	Warm Vibes	2	100	Sweep Pad	2
5	St.Concert 5	2	37	SA Rhodes 2	3	69	AmbienceVibe	3	101	A90 Prologue	2
6	St.Concert 6	2	38	Suitcase	2	70	Dyna Marimba	1	102	A90 Rand Pad	2
7	St.Concert 7	2	39	STAGE Rhodes	1	71	Clav 1	2	103	LFO Strings	2
8	St.Concert 8	2	40	Mr.Suitcase	3	72	Clav 2	2	104	A-90 Aurora	3
9	St.Concertff	1	41	Rhodes p	1	73	Clav 3	2	105	A-90 Waltz	4
10	St.SemiGrd 1	2	42	Rhodes m	1	74	Juno Clav	1	106	A-90 Strobe	2
11	St.SemiGrd 2	2	43	Rhodes f	1	75	Poly Synth	2	107	Fooled Again	1
12	St.SemiGrd 3	2	44	DynoRhodes 1	3	76	Pulse Key 1	3	108	Beauty Vox	2
13	St.SemiGrd 4	2	45	DynoRhodes 2	3	77	Pulse Key 2	1	109	Syn Vox 1	1
14	Euro Piano 1	1	46	Wurly	1	78	Square Key	2	110	Syn Vox 2	1
15	Euro Piano 2	1	47	Wurly p	2	79	St.Strings	2	111	Angel Oohz	2
16	Euro Piano 3	2	48	Wurly mf	2	80	Warm Strings	2	112	Heaven	1
17	Euro Piano 4	2	49	Wurly f	2	81	Slow Strings	2	113	Sawteeth	3
18	Full Grand 1	2	50	D-50 EPiano1	1	82	Strings	1	114	Pulse Lead	4
19	Full Grand 2	2	51	D-50 EPiano2	2	83	OB Thick Pad	3	115	Synth Lead 1	2
20	Full Grand 3	2	52	D-50 Stack	4	84	OB Soft Pad	3	116	Synth Lead 2	1
21	Full Grand 4	2	53	Like Dee	2	85	Soft Pad	1	117	GR Lead	2
22	Full Grand 5	2	54	FM EPiano 1	3	86	Pulse Pad	4	118	20 Years ago	3
23	Full Grand 6	2	55	FM EPiano 2	4	87	SynStrings 1	2	119	SquareLead	2
24	Semi Grand 1	1	56	FM EP 3_1	1	88	SynStrings 2	2	120	Finger Bass1	1
25	Semi Grand 2	1	57	FM EP 3_2	1	89	SynStrings 3	1	121	Finger Bass2	2
26	Semi Grand 3	2	58	FM EP 3_3	1	90	After Rave	2	122	Pick Bass	1
27	Semi Grand 4	2	59	FM EP 3_4	1	91	JP-8Haunting	4	123	Ac.Bass	2
28	Semi Grand 5	2	60	B-3 Organ 1	2	92	Synth Brass1	2	124	Wonder Bass	2
29	Semi Grand 6	2	61	B-3 Organ 2	2	93	Synth Brass2	1	125	Super JX Bs	2
30	JV80 Piano 1	2	62	B-3 Organ 3	1	94	Synth Brass3	1	126	Synth Bass	1
31	JV80 Piano 2	2	63	B-3 Organ 4	1	95	Synth Brass4	1	127	Rubber Bass	2
32	JV80 Piano 3	2	64	60s Organ 1	1	96	Dawn 2 Dusk	3	128	Pedal Bass	2

V : number of voices (使用ボイス数)

USING THE UNIT SAFELY

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

About ⚠ WARNING and ⚠ CAUTION Notices

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

About the Symbols

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

----- ALWAYS OBSERVE THE FOLLOWING -----

⚠ WARNING	
• Do not open or perform any internal modifications on the Expansion board.	
• Do not attempt to repair the unit, or replace parts within it (except when this manual provides specific instructions directing you to do so). Refer all servicing to your dealer, or qualified Roland service personnel.	
• Make sure you always have the unit placed so it is level and sure to remain stable. Never place it on stands that could wobble, or on inclined surfaces.	

⚠ WARNING	
• In households with small children, an adult should provide supervision until the child is capable of following all the rules essential for the safe operation of the unit.	

⚠ CAUTION	
• Install this board in the specified instrument (model no. A-90). Remove only the specified screws when installing.	

■ IMPORTANT NOTES

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

Placement

- This device may interfere with radio and television reception. Do not use this device in the vicinity of such receivers.
- Do not expose the unit to direct sunlight, place it near devices that radiate heat, leave it inside an enclosed vehicle, or otherwise subject it to temperature extremes. Excessive heat can deform or discolor the unit.

In the interest of product improvement, the specifications and/or contents of this package are subject to change without prior notice.



Copyright © 1995 ROLAND CORPORATION

All rights reserved. No part of this publication may be reproduced in any form without the written permission of ROLAND CORPORATION.




安全上のご注意

火災・感電・人身障害の危険を防止するには





⚠ 警告と ⚠ 注意の意味について





 警告	取扱いを誤った場合に、使用者が死亡または重傷を負う可能性が想定される内容を表わしています。
 注意	取扱いを誤った場合に、使用者が傷害を負う危険が想定される場合および物的損害のみの発生が想定される内容を表わしています。 ※物的損害とは、家屋・家財および家畜・ペットにかかわる拡大損害を表わしています。

図記号の例

	△は、注意（危険、警告を含む）を表わしていません。 具体的な注意内容は、△の中に描かれています。 左図の場合は、「一般的な注意、警告、危険」を表わしています。
	⊘は、禁止（してはいけないこと）を表わしています。 具体的な禁止内容は、⊘の中に描かれています。 左図の場合は、「分解禁止」を表わしています。
	●は、強制（必ずすること）を表わしています。 具体的な強制内容は、●の中に描かれています。 左図の場合は、「電源プラグをコンセントから抜くこと」を表わしています。

----- 以下の指示を必ず守ってください -----

 警告	
●この基板を分解したり、改造したりしないでください。	
●修理／部品の交換などで、取扱説明書に書かれていないことは、絶対にしないでください。必ずお買い上げ店またはローランド・サービスに相談してください。	
●この機器を、ぐらついた台の上や傾いた場所に設置しないでください。必ず安定した水平な場所に設置してください。	

 警告	
●お子様のいるご家庭で使用する場合、お子様の取り扱いやいたずらに注意してください。必ず大人のかたが、監視／指導してあげてください。	
 注意	
●指定の機器（A-90）だけに取り付け、取り付け時には、指定されたネジだけを外してください。	

■使用上のご注意

「安全上のご注意」以外に、次のことに注意してください。

設置について

- テレビやラジオの近くでこの機器を動作させると、テレビ画面に色ムラが出たり、ラジオから雑音が出ることがあります。この場合は、この機器を遠ざけて使用してください。
- 直射日光の当たる場所や、発熱する機器の近く、閉め切った車内などに放置しないでください。変形、変色することがあります。

修理について

- お客様がこの機器を分解・改造された場合、以後の性能について保証できなくなります。また、修理をお断りする場合があります。

製品の仕様および内容は、改良のため予告なく変更することがあります。

 Roland®

71451090

UPC

71451090



10901

 Roland®