WAVESTATION SR

Player's Guide

by Dan Phillips

Advanced Vector Synthesis
Wave Sequencing

AV Synthesis System

KORG

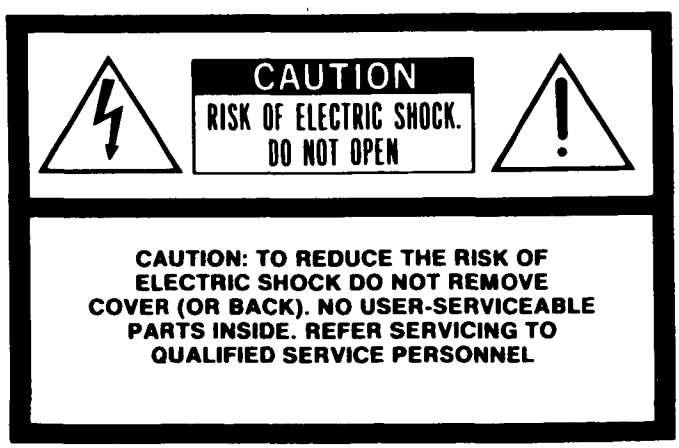
③ Ⓔ

IMPORTANT SAFETY 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 high volume levels 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.

SAVE THESE INSTRUCTIONS



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.

GROUNDING INSTRUCTIONS

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

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

THE FCC REGULATION WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, that is,in strict accordance with the manufacturer's instructions, may cause interferences to radio and television reception. It has been type tested and found to comply with the limits for a class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause 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 the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, D.C.20402, stock No. 004-000-000345-4.

CANADA

THIS DIGITAL APPARATUS DOES NOT EXCEED THE "CLASS B" LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATION OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE LA "CLASSE B" PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

CONTENTS

1 WAVESTATION SR OVERVIEW

1.1 About this Manual

Congratulations on buying the KORG Wavestation SR! This Player's Guide shows you how to set up the instrument, and contains a number of tutorials to take you through all of the basic operations, step by step.

Chapters 1 through 6 concentrate on the essential basics of the Wavestation SR, including selecting and playing sounds, using Multisets, and connecting up to the world of MIDI. The four Tours, chapters 7 through 10, introduce the Wavestation SR's editing controls. They show you where to go to immediately make the most useful changes – such as editing filter brightness or amplifier velocity response – or to play with the fun things like Vector Synthesis and Wave Sequencing.

After familiarizing yourself with the Wavestation SR using this guide, or if you require more information about any display page, please see the accompanying Wavestation SR Reference Guide.

1.2 Instant Gratification

So, you've just opened up your new Wavestation SR, and now you want to find out what it's all about. You probably already have some idea of how flexible and versatile an instrument it is, and of the depth that Wave Sequencing and Vector Synthesis can bring to your sounds. New and different sounds, after all, are the essence of the Wavestation SR - and before we get too far, you'd probably like to hear a few of them.

Let's make some noise.

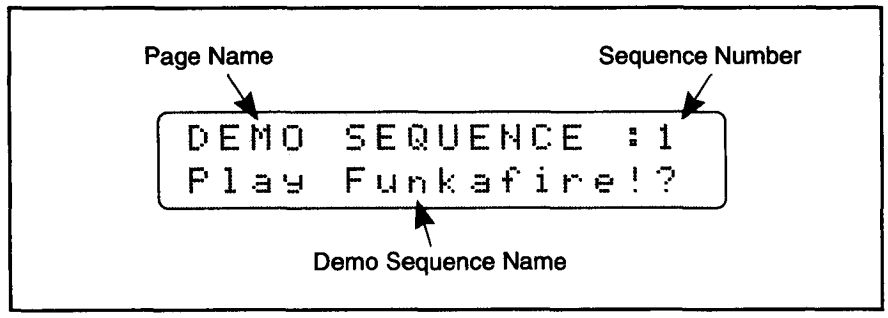
Playing the Demo Sequences

☛ Connect the Wavestation SR to your master controller and audio system. If at all possible, use both the 1/L and 2/R outputs for stereo sound. After hooking up the audio, switch everything on. For more complete instructions on setting up, please see the beginning of Chapter 4.

When power is first turned on, the Wavestation SR will be on either the PERF or MULTI page. These are where you select different Performances or Multisets to play - but we'll get into that later.

☛ For now, press the PERF and BANK buttons together to go to the DEMO SEQUENCE page.

You'll see this screen:



The name of the Demo Sequence to be played is shown on the bottom line of the screen; you can select another sequence by using the Up or Down Cursors.

- Press the +1/YES button to hear the Demo. After it finishes the first sequence that you've selected, the rest of them will play back, one after another. Enjoy.
- To stop the Demo Sequence, press any button.

1.3 Ultra-Brief Instructions

For those who have some experience with synthesizers, here are the briefest possible instructions for using the Wavestation SR.

- Select new Performances on the PERFORM page by using the +1/YES and –1/NO buttons or the Up and Down Cursors.
- To switch memory banks, press the BANK button.
- Press the PERF button to play single Performances, and the MULTI button for 16-channel multitimbral operation.

To edit:

- Select the desired page using the PAGE+ and PAGE– keys; the name of the current page is always displayed on the top line of the screen. When the EDIT button's LED is lit, pressing that button will bring you to a new set of Pages (a level) for editing the currently selected item (Multiset, Performance, Patch, Scale, etc.). The last Page of each level allows you to exit back up to the previous level.
- Select the desired parameter by using the LEFT and RIGHT cursors.
- Set the desired value for the parameter using +1/YES and –1/NO.
- Parameters displayed in the top right corner of the display are changed by using the UP and DOWN cursors (see page 11 for more details).

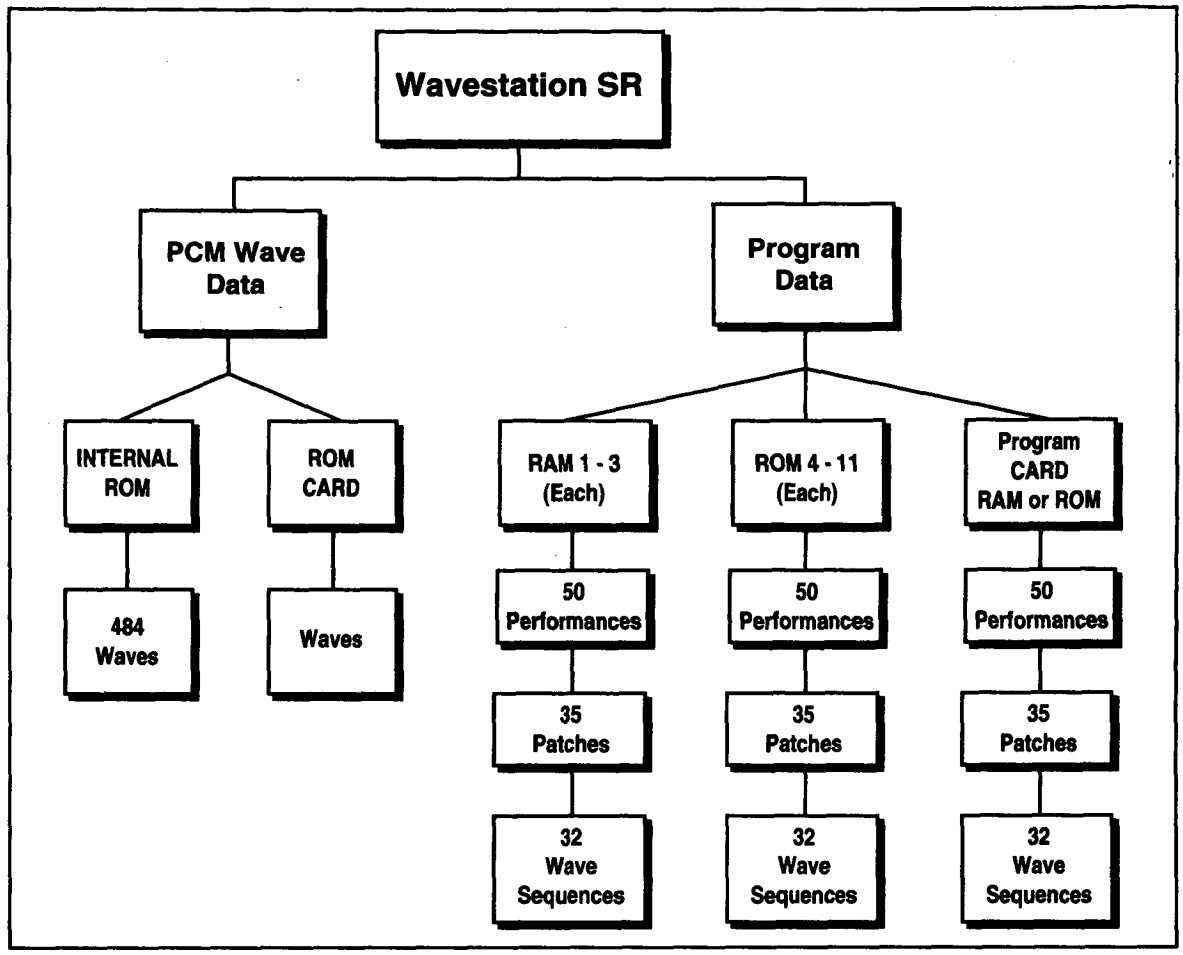
The remaining sections in this chapter explain the organization of this manual and define a few common terms. Most of these terms have to do with the way that the Wavestation SR's sound resources are organized.

1.4 What is a Bank?

The Wavestation SR has 11 internal memory banks: 3 RAM banks, and 8 ROM banks. There is also an optional, plug-in CARD bank.

For a closer look at the contents of the banks, please see Figure 1-1.

Figure 1-1: Wavestation SR Memory Banks



The 8 ROM banks contain the Wavestation SR's factory sounds. These sounds are permanent, and can't be changed.

RAM1, 2, and 3 are your work areas for custom sounds and *can* be changed, although initially they are also set with factory sounds. The RAM banks are backed up with a long-life lithium battery (if the internal battery voltage drops, a warning appears).

Banks hold Performances, which are the sounds that you play on the Wavestation SR; banks also hold Patches and Wave Sequences, which are the building blocks of Performances. Each bank contains 50 Performances, 35 Patches, and 32 Wave Sequences. With the 11 internal banks, this gives you a total of 550 Performances, 385 Patches, and 352 Wave Sequences; with a RAM or ROM Card plugged in, you have 600 Performances, 420 Patches, and 384 Wave Sequences.

In addition, there is a ROM wave memory of 484 PCM Waves, which provide the raw sound material for Patches and Wave Sequences.

Cards allow you to build up a library of sounds, and can also be used for quick backup. There are two types of cards for the different types of sound data. PROGRAM DATA RAM or ROM cards store Performances, Patches, and Wave Sequences; PCM ROM cards contain sampled PCM Waves.

Let's look briefly at each of these kinds of sound data.

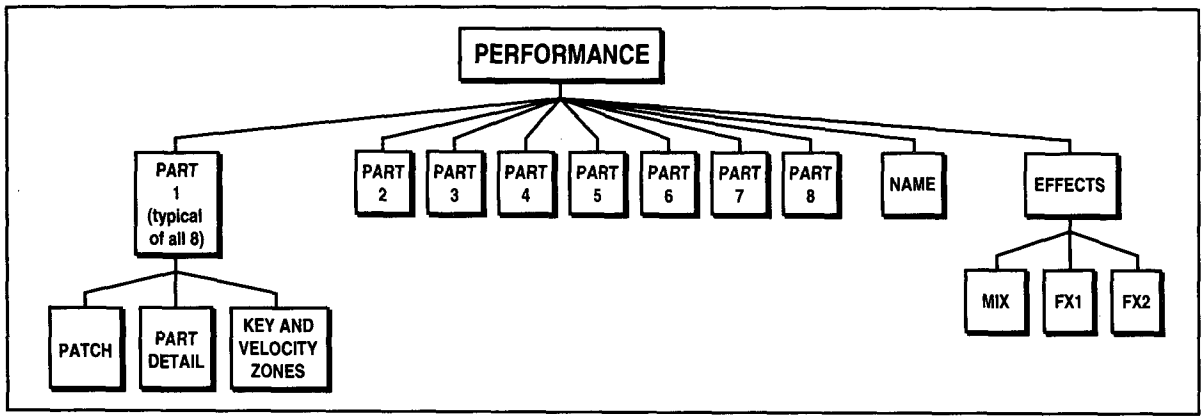
1.5 What is a Performance?

The simplest answer is that Performances are the highest level of sound control in the Wavestation SR. Performances have no sounds in themselves, but organize and add effects to Patches, which do create sounds.

Besides specifying the Patches being played, Performances also control important parameters such as the keyboard mode (single, split, or layered, with or without velocity-controlled mixing) and a pair of effects settings.

There are 50 Performances in each bank, so you have a minimum of 550 Performances available - 600 if you're using a Performance Card.

Figure 1-2: Performance Structure



Parts

Performances consist of eight Parts. Each Part holds a Patch together with some parameters to control how the Patch is played, such as transposition, volume level, and note-on delay (on the EDIT PERF page) and playback ranges for velocity and MIDI note number (on the ZONES page).

Because they have up to eight Parts, Performances multiply the sonic richness and detail of a sound. As you play, listen for how the factory Performances employ their Patches; for example, how the Patches may be layered, assigned to specific ranges of MIDI notes for splits, or switched in with different velocities.

Effects

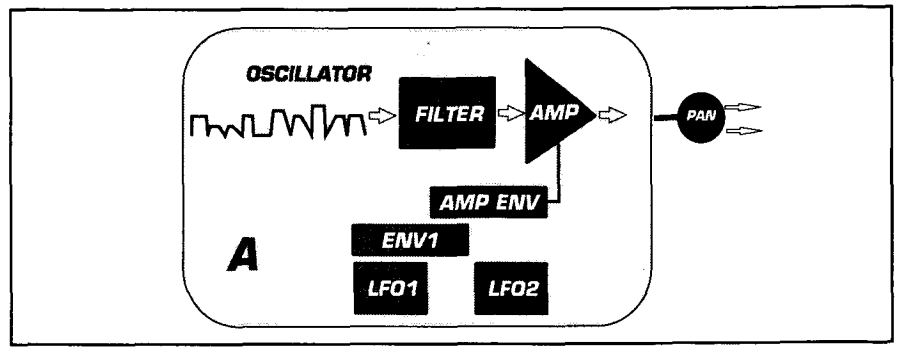
Each Performance also memorizes an effects and output routing configuration, two effects program selections for the twin effects processors, and all of the parameters contained in those two effects.

To learn more about the Effects, please see Chapter 8.

1.6 What is a Patch?

Patches are specific setups for the synthesizer voices, which produce roughly the equivalent of a single instrumental sound. Each patch can have 1, 2, or 4 voices, and each voice contains an oscillator, filter, amplifier, amplifier envelope, general purpose envelope, and two LFOs.

Figure 1-3: A Voice Patch



Each Bank holds 35 Patches, for a total of 385 (420 with a ROM or RAM Program card inserted).

To hear an individual Patch you can:

- Select a Performance which has only one Part.
- Solo a single Part.

For more about Patches, please see Chapter 9 and the Reference Guide.

1.7 What is a PCM Wave?

For their raw sonic material, Patches rely on digitally recorded waveforms, known as PCM Waves (PCM stands for Pulse Code Modulation, which is a common way of storing audio in digital form). Many of these are recordings of acoustic instruments, such as piano, drums, and bass; others are samples of synthesized sounds, or digital timbres created specifically for the Wavestation product line. PCM Waves can be single-cycle or few-cycle waveforms that loop continuously (such as an analog sawtooth wave), transients followed by loops (such as a piano), or transients which play only once (such as drums).

These PCM Waves are played by a Patch's oscillators, or used within Wave Sequences, and then processed through the Wavestation SR's filters, amp envelopes, effects, and so on. There are 484 internal waveforms available, and more can be accessed via optional PCM Cards.

For more about PCM Waves, please see Chapter 9.

1.8 What is a Wave Sequence?

A Wave Sequence is simply a list which allows an oscillator to play specific PCM waves in succession. Each step of the sequence can be given a specific duration – or be controlled by the *gate time* during which a key is held down.

Also, Wave Sequence steps can be crossfaded, and thus smoothed together. The Wavestation family of instruments are the first to offer Wave Sequencing.

Each Bank holds 32 Wave Sequences, for a total of 384 when using a Program CARD. The total Wave Sequence Step memory per bank is 500 steps, for a total of 6000 (with an optional CARD). One Wave Sequence can have up to 255 steps.

For more about Wave Sequences, please see Chapter 10.

1.9 What is a Multiset?

In MULTI mode, you can use the Wavestation SR to play 16 different Performances at once - one from each MIDI channel. You might, for instance, play a drum kit Performance on channel 1, a synth bass on channel 2, a lead sound on channel 3, and so on. This is often called *multitimbral* operation. Assignments of Performances to MIDI channels are stored in the Wavestation SR's 32 Multisets, which also contain volume and pan settings for each channel, and allow you to turn the channels on and off.

Each channel of a Multiset also responds *independently* to MIDI Program Changes and Volume messages. This means that, in MULTI Mode, the Wavestation SR really functions as up to 16 discrete synthesizers. If you like, you can also select entire Multisets with MIDI System Exclusive commands, or (with the help of the MIDI REMAP page) ordinary Program Changes.

Normally, each Performance has its own Effects programming. However, in MULTI Mode you can have 16 Performances – but you can't have 32 effects! The Wavestation SR therefore ignores all of its Performance Effects programming, and instead each of the Multisets has its own Effects assignments. These effects have exactly the same capabilities as the Performance Effects Selections, Effects Parameters, and Routing.

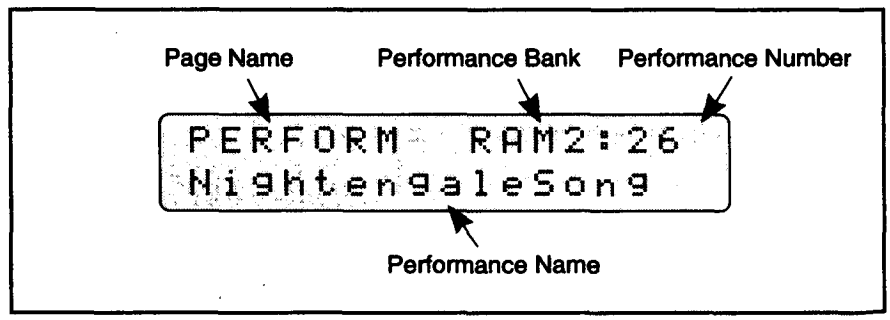
Multimode Setups are stored in internal RAM, and can be dumped to an editor/librarian or sequencer via MIDI System Exclusive.

1.10 What is a Page?

The parameters for editing sounds (Performances, Patches, and Wave Sequences) and other parameters, such as tuning and MIDI settings, are organized into related groups called *pages*. The title of the page you are on is always shown at the top left of the display. You can go from page to page by using the PAGE+ and PAGE– buttons, or move to the pages of a different level (see below) with the EDIT button.

Pages are shown throughout this guide, as below:

PERFORM page



Each page may have from one to many parameters, often more than can be displayed at one time; you can use the Right and Left cursors to scroll through them one by one. On many pages, you can also use the Up and Down cursors for a special function; this is described in Section 2.3, Page Controls.

For more about pages, please see Chapter 4, Basic Operation.

1.11 What is a Level?

Just as similar parameters are organized into pages, related pages are grouped into levels. The four main levels are reached simply by pressing their corresponding front-panel buttons: PERF, MULTI, WRITE/COMPARE, and MIDI/GLOBAL.

The Performance (PERF) and Multiset (MULTI) levels each allow you to access several levels "below" them, such as Edit Multiset and Edit Performance. These lower levels can only be reached when you're on a particular parameter - kind of like getting around in a several-story house, with many rooms on each floor but only a few stairways. These parameters are always the names/numbers of editable items; specifically, Multisets, Performances, Patches, Effects, Scales, and Wave Sequences. When you're over one of these "stairways," the green LED on the EDIT button will light up, and pressing that button will bring you to the lower level.

There are two ways to get back up to the previous level. The last page in each level contains a single command, "Go Back a Level;" pressing +1/YES takes you back up. Pressing MIDI/GLOBAL and PAGE- together will do the same, on any page. You can also always go to one of the top levels simply by pressing its front-panel button.

The next page is a chart showing all of the Wavestation SR's pages and levels.

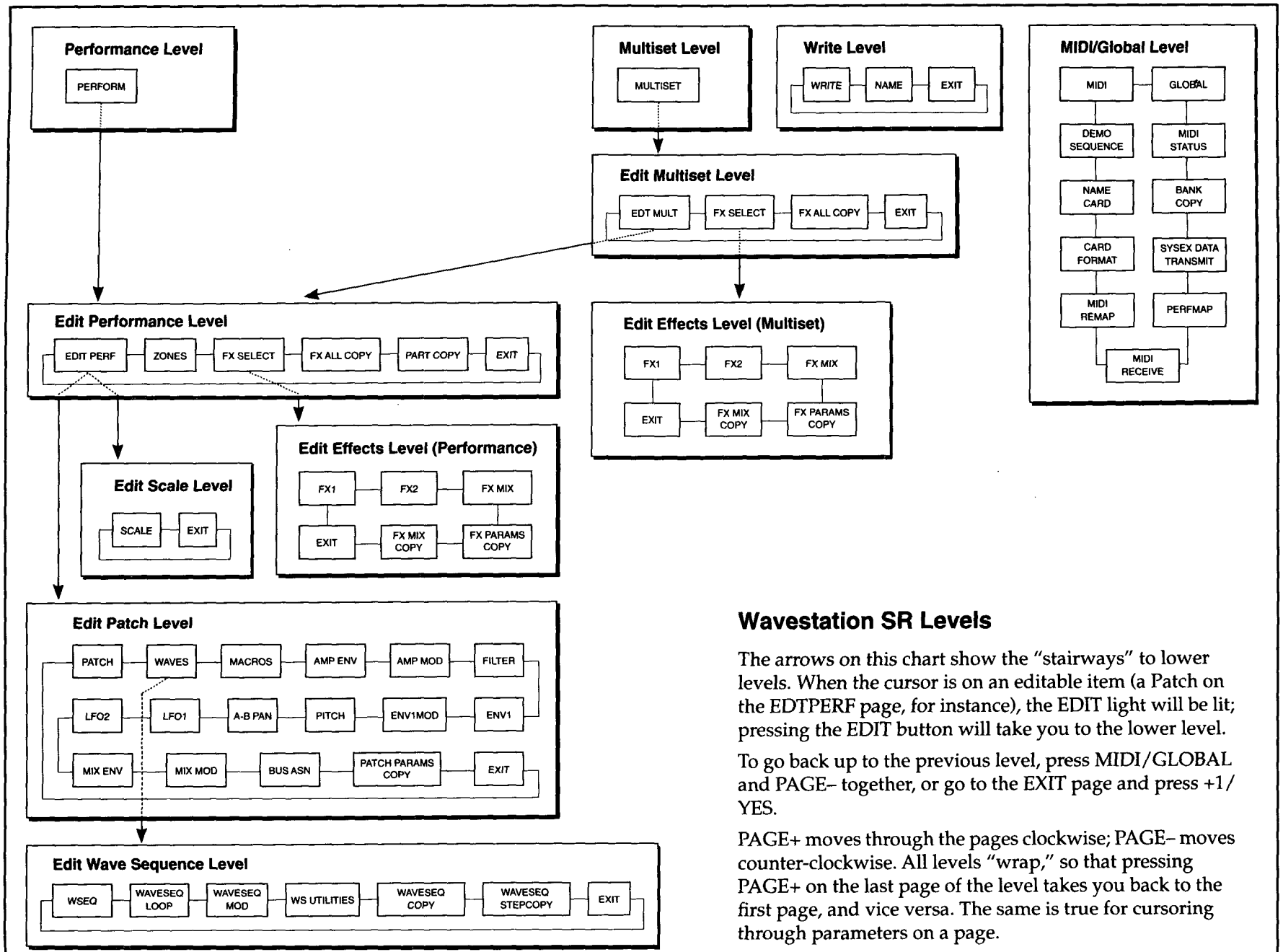


Figure 1-4: Wavestation SR levels

Wavestation SR Levels

The arrows on this chart show the "stairways" to lower levels. When the cursor is on an editable item (a Patch on the EDTPERF page, for instance), the EDIT light will be lit; pressing the EDIT button will take you to the lower level.

To go back up to the previous level, press MIDI/GLOBAL and PAGE– together, or go to the EXIT page and press +1/YES.

PAGE+ moves through the pages clockwise; PAGE– moves counter-clockwise. All levels "wrap," so that pressing PAGE+ on the last page of the level takes you back to the first page, and vice versa. The same is true for cursoring through parameters on a page.

2 FRONT PANEL

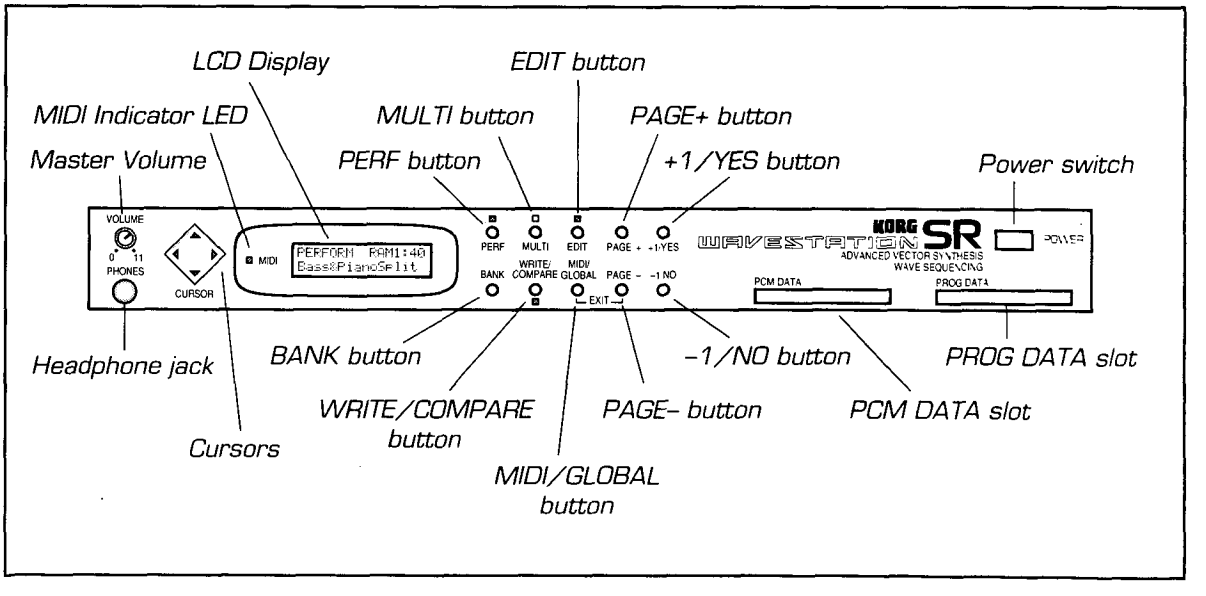
2.1 General

The front panel has a number of controls and displays which, in addition to your master controller, are the way that you communicate with the Wavestation SR. There are also two memory Card slots, one for program data and the other for extra PCM Waves, and a headphone output. This chapter gives a brief description of each of these items.

There are three main types of controls:

- Master controls include the Master Volume knob and the Power switch.
- Page controls allow you to move among the Wavestation SR's pages and levels. These include the PERF, MULTI, WRITE/COMPARE, MIDI GLOBAL, EDIT, and PAGE+/– buttons.
- Data entry controls allow you to select and edit parameters. You use the Cursors to select between the parameters on the current Page, and the +1/YES and –1/NO buttons to adjust the parameter value. Additionally, the BANK button lets you switch quickly between the Wavestation's memory banks.

Figure 2-1: Front Panel



2.2 Master Controls

MASTER VOLUME knob

This control sets the stereo output level of jacks 1/L and 2/R and the headphones. It does not affect the individual outputs, jacks 3 and 4.

POWER switch

The power switch is located on the front panel.

2.3 Page Controls

PAGE+ and PAGE – buttons

These buttons select pages of parameters within the Wavestation SR's current level (on the Edit Performance level, for instance, only pages which are related to editing Performances are shown). The name of the current page is always shown in the top left-hand corner of the screen.

WRITE/COMPARE button

This button allows you to quickly save any changes which you make to a Wavestation SR Performance, Patch, Multiset, or Scale. To prevent the accidental loss of desired edits, these edits are always held in their own memory area (called a *buffer*). When you edit, the LED on the WRITE/COMPARE button lights up. Pressing this button once brings you to the WRITE page, where you can save the new data.

Once you're on the WRITE page, pressing the WRITE/COMPARE button toggles between the edited version and the original, and back again. This comparison may be repeated as many times as you wish.

PERF button

Pressing the PERF button brings you instantly to the PERF page, the main page for selecting and playing sounds. The LED on the button will also light up. This indicates that the Wavestation SR is in Performance mode, in which you can play a single Performance at a time.

MULTI button

When you press the MULTI button, the Wavestation SR goes into Multi mode, which allows you to play a different Performance from each of the 16 MIDI channels. This is indicated by the MULTI button's LED lighting up.

Pressing MULTI also brings you to the MULTI page, where you can select between different Multisets - groups of 16 Performances to be played from the 16 MIDI channels.

EDIT button

This button allows you to go down into the next level of Pages, so that you can make changes to the currently selected item (Multiset, Performance, Patch, Scale, or Wave Sequence). Whenever you can EDIT something, this button's LED will light up. For more information, please see Section 1.11, "What is a level?"

MIDI/GLOBAL button

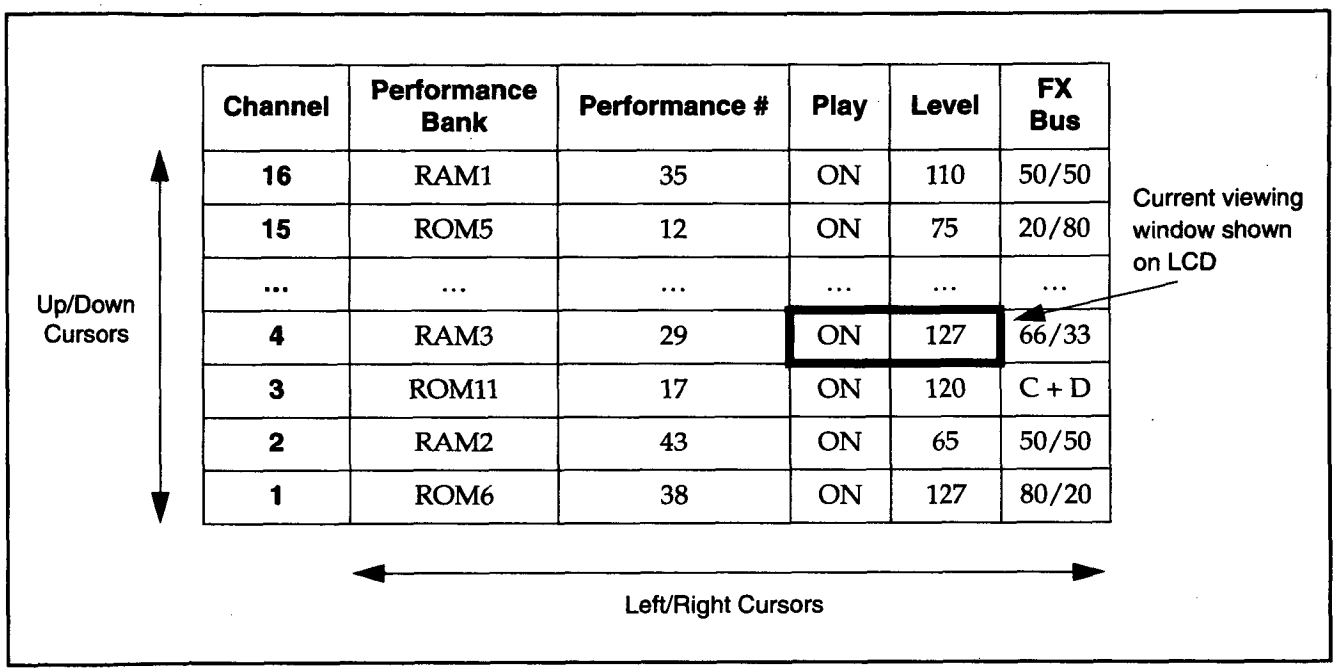
Pressing the MIDI/GLOBAL button brings you to the level of the same name. The Pages under MIDI/GLOBAL allow you to make many changes to the global setup of the Wavestation SR, including such things as the MIDI Basic Channel, global transposition, and so on.

EXIT key combination

Pressing the MIDI/GLOBAL and PAGE- buttons together brings you back up to the previous level. There are other key combinations for making data entry easier, as described below in Section 2.4, Data Entry Controls.

CURSOR Left/Right/Up/Down switches

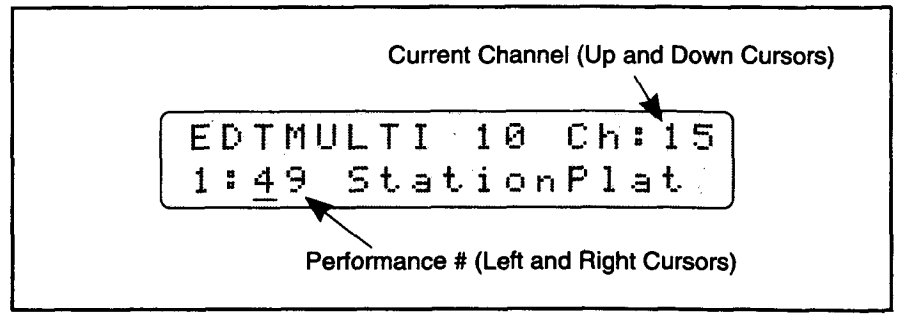
The Wavestation SR's cursors allow you to work within a two-dimensional virtual screen-space, much bigger than the actual LCD on the front panel. The LCD is a viewing "window" into the complete set of page parameters, and the cursors move this window around. For instance, a complete display of the EDTMULT (Edit Multiset) page might look like this:



Channel	Performance Bank	Performance #	Play	Level	FX Bus
16	RAM1	35	ON	110	50/50
15	ROM5	12	ON	75	20/80
...	...	...	...	...	...
4	RAM3	29	ON	127	66/33
3	ROM11	17	ON	120	C + D
2	RAM2	43	ON	65	50/50
1	ROM6	38	ON	127	80/20

The Multisets have 16 different Channels, each with the same parameters: Performance Bank and Number, Volume Level, and so on. The Left and Right cursors move between the parameters of the current Channel, and the Up and Down cursors select the different Channels of the Multiset. The cursor line appears below the currently selected parameter, and the number of the current Channel appears in the upper right-hand corner of the screen, as shown below:

Edit Multiset page example



These basic rules apply to all of the Wavestation SR's pages. Parameters appear on the bottom line of the display, and you move between them by using the Left and Right cursors. Anywhere that there are a set of objects with the same parameters to be adjusted (such as the Channels of a Multiset), you move Left and Right between parameters, and Up and Down between objects.

A rule of thumb is that anyplace you see a number with a colon (":") in front of it in the upper right-hand corner, you can change it with the Up and Down cursors. This includes the current Performance on the PERFORM page, the current Multiset on the MULTISET page, the current Channel on the EDTMULT page, the current Part on the EDTPERF and ZONES pages, the current Scale on the SCALE page, the current Wave on all of the pages on the Edit Patch level, and the current Wave Sequence Step on all of the pages on the Edit Wave Sequence level.

2.4 Data Entry Controls

+1/YES and –1/NO

On the PERFORM page, these buttons scroll through the Performances in the current Bank. On most other pages, these adjust parameter values (you select the parameter to be changed by using the cursor switches). Values can be numbers, but they are just as often options described by words.

+1/YES is also used to carry out commands, which are always phrased as questions such as, "Copy All FX?" Pressing +1/YES will carry out the command; –1/NO will cancel.

Key Combination Shortcuts

Press these keys together	Result
PAGE + and +1/YES	+ 10
PAGE – and –1/NO	– 10
EDIT and +1/YES	Maximum Value
+1/YES and –1/NO	Middle Value
MIDI/GLOBAL and –1/NO	Minimum Value
BANK and –1/NO	Step through Banks in reverse order
PERF and BANK	Go to Demo Sequence page
MIDI/GLOBAL and PAGE –	Exit to next higher level
MIDI/GLOBAL and EDIT	Solo current Part on Edit Performance level; Mute current Wave on Edit Patch level
WRITE/COMPARE and EDIT	Instant Compare

BANK button

Bank allows you to quickly step through the Wavestation's twelve memory banks (RAM 1 - 3, ROM 4 - 11, and the optional CARD) when selecting Performances, Patches, or Waves and Wave Sequences. To step through

the Banks in reverse order, press BANK while holding –1/NO.

2.5 Displays

Liquid Crystal Display (LCD)

This 2-line by 16-character back-lit LCD presents the Wavestation SR's sound and setup information in a clean and consistent manner.

Information and programmable parameters are organized into related groups called *pages*. The title of the page you are currently on is always shown at the top left of the display. Each page may have from one to many parameters (filter cutoff, current Performance, etc.), usually too many to be displayed at one time; you can use the cursors to scroll through them one by one. For more information on the display system, please see Chapter 4, Basic Operation.

MIDI Indicator LED

This LED lights up whenever the Wavestation SR receives any MIDI data which it has been set to recognize. This can be very useful when troubleshooting your MIDI setup. As shown below, the current Mode of the Wavestation SR determines the way that the MIDI Indicator will function; for more information, please see Section 12, TROUBLESHOOTING.

In PERF/OMNI mode, all data is recognized, and so the LED will light whenever any MIDI data is received.

In PERF/POLY mode, only data received on the Basic Channel will cause the LED to be lit; all other data is ignored.

In MULTI/NORMAL mode, only data received on channels set to ON will cause the LED to be lit.

In MULTI/MONO mode, only data received on the specified number of channels will cause the LED to be lit.

2.6 Card Slots

The two card slots let you expand the sound capability of the Wavestation SR.

NOTE: Do not insert or remove cards while sound is being produced. Only insert Wavestation-type cards with their labels facing upwards. Program Cards will not work in the PCM Data slot, and vice versa.

PROG DATA slot

RAM or ROM cards in this slot hold Performances, Patch data, and Wave Sequences. The Wavestation SR can use any of the Program Cards produced for the Wavestation keyboard or Wavestation A/D. For a RAM card, the KORG model MCR-03 is recommended.

PCM DATA slot

ROM cards in this slot hold PCM (*sampled*) waves, which serve as source material for the oscillators.

NOTE: The Wavestation SR uses the new Korg PCM card format, instead of the old format used by the Wavestation keyboard and A/D. This new format has four times the memory of the old, so that you can get many

more waveforms on a single card. When you shop for PCM cards, make sure to look for those marked for the Wavestation SR; the old-style cards will not work (they won't even fit in the slot!).

2.7 Outputs

PHONES jack

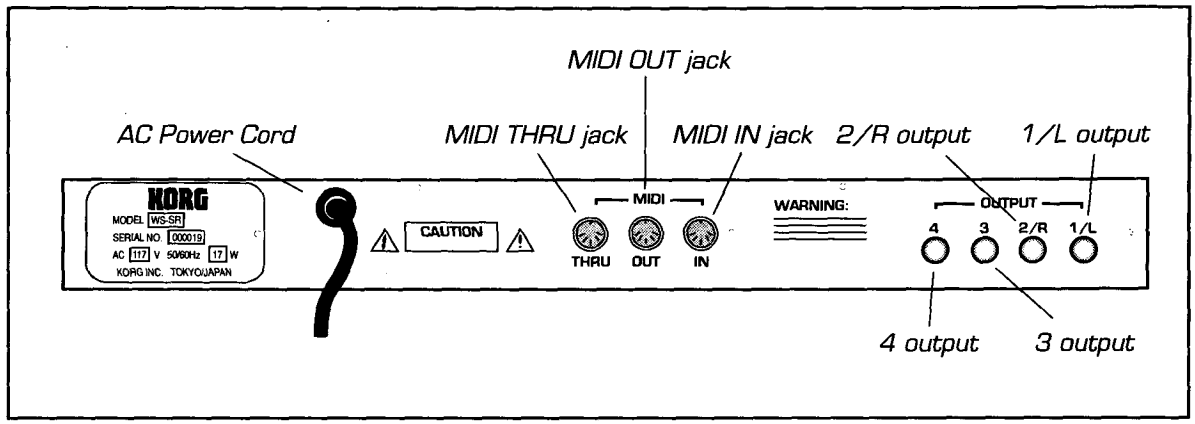
This standard quarter-inch phone jack provides a stereo mix of the Wavestation SR's output, identical to the back panel's outputs 1/L and 2/R. It accommodates stereo headphones of any impedance; KORG model KH-1000 headphones are recommended.

3 BACK PANEL

3.1 General

The back panel provides connectors for power, MIDI, and audio output.

Figure 3-1: Back Panel



3.2 Inputs

AC Power cord

This cord is handy for getting AC power into the Wavestation SR. If you are in doubt about your line voltage, please contact your dealer.

MIDI IN jack

This input allows the Wavestation SR to be played by any MIDI controller (such as a keyboard, wind controller, MIDI guitar, percussion pads, or alternate controller), sequencer, or computer.

3.3 Outputs

MIDI OUT jack

This sends out control data, such as Performance selections and System Exclusive data, for controlling another instrument, recording by a sequencer, or interfacing to a computer editor/librarian.

MIDI THRU jack

This sends out an exact copy of any data received at MIDI IN. The MIDI THRU can be used to connect a string of instruments in series, so that they can all be played by a single controller or sequencer.

1/L and 2/R outputs

For normal stereo use, use these phone jack outputs.

The Wavestation SR's flexible audio output system lets you customize the routing of any Part of a Performance, or even any Wave of a Patch, to the normal stereo outputs 1/2 or the auxiliary outputs 3/4.

3 and 4 outputs

These auxiliary outputs are usually set up to allow specific Parts of a Performance, or Waves of a Patch, to be externally mixed, equalized, or processed. To learn how to route sounds to the outputs, read about the Multi Digital Effects (MDE) processor in Chapter 8.

NOTE: The Master Volume knob affects only the stereo outputs 1/2, and not outputs 3 and 4.

4 BASIC OPERATION

4.1 General

CAUTION! Do not connect the Wavestation SR to any equipment that is not switched off! To prevent turn-off transients which can damage speakers, switch off the power amplifier first.

If you have any difficulties while setting up your Wavestation SR, please refer to Section 10.3, Troubleshooting.

4.2 Preparation

Power

- Check that the Wavestation SR power switch is set to OFF. Only turn this switch back ON after all connections have been made to your power, MIDI, and audio setups.
- Connect the AC power cord from the Wavestation SR's back panel to a power outlet. The outlet's voltage should match that specified on the plate to the left of the Wavestation SR's power input.

Lower Volumes

- Lower the Wavestation SR VOLUME knob.
- Reduce volume settings on associated mixers and amplifiers.

Audio Connection

- Connect the Wavestation SR's audio outputs to your sound system.

  To hear the Wavestation SR in stereo, use outputs 1/L and 2/R. Stereo playback is highly recommended, if your amplification system allows it.

  You may also listen through headphones, using the PHONES jack on the front panel.

Your audio system is as crucial to your sound as the instrument body is to a violin or guitar. A weak or distorted sound system can rob the Wavestation SR of its inherent high fidelity.

In addition to 1/L and 2/R, the Wavestation SR offers outputs 3 and 4. These can be used as an additional stereo pair, or as individual outputs to isolate specific sounds for mixing or external processing.

MIDI Connection

- Since the Wavestation SR has no keyboard of its own, you must play it from an external MIDI controller. To do so, connect a cable from your controller's MIDI OUT port to the Wavestation SR's MIDI IN port.
- If you are working in a sequencing environment, you may wish to use your sequencer's MIDI through function (if it provides one) to route the MIDI OUT of your master controller through the sequencer

and back into the Wavestation SR. For more information, please see your sequencer's manual.

Note that the effect of MIDI input is subject to the Wavestation SR's Mode and Channel settings, in addition to various parameters on the MIDI, MIDI RECEIVE, and MIDI REMAP pages. We'll talk more about MIDI in Section 4.4, Simple MIDI Setup.

4.3 Power-On

To prevent speaker damage caused by turn-on transients, use the following power-on sequence.

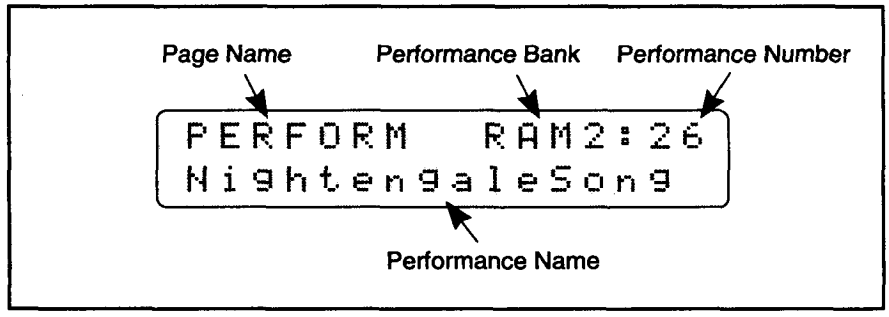
Start-up Instructions

- Switch power on to the Wavestation SR and other sound-generating devices first. The KORG logo will appear briefly in the Wavestation SR's display.
- Switch on low-level devices such as mixers and signal processors.
- Finally, switch on the power amplifier(s).
- For power-off, reverse this sequence.

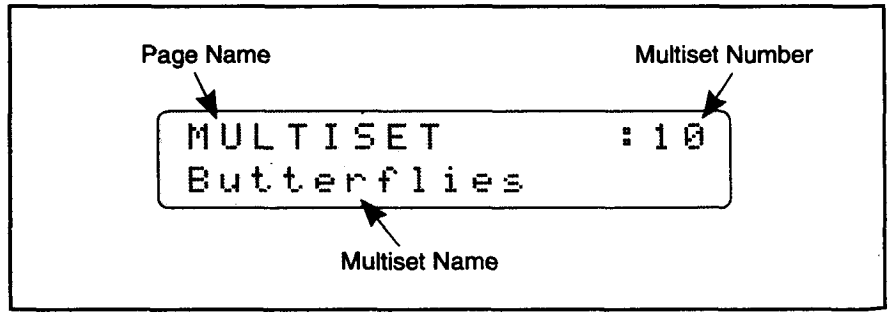
Normal Indications

Normally, after a moment the Wavestation SR displays the PERFORM page or the MULTISET page:

PERFORM page



MULTISET page



The current Performance or Multiset number and name actually displayed on your instrument may be different from this example. When you power up the Wavestation SR, it will remember the Performance or Multiset that you had selected before last turning it off. The Performance page is described in detail in Section 4.6; Multisets are the subject of Section 5, USING MULTISETS.

Volume Adjustment

- While playing the Wavestation SR from your controller, gradually turn the SR's MASTER VOLUME knob clockwise (to raise the volume), and then adjust your sound system volume to the desired level.

Pre-Play Check

- Check that desired Program and/or PCM Cards are in place.
- To prevent undesired modulation, check that your controller's Modulation wheel is fully lowered.
- If you are using a volume pedal, check its initial setting.

4.4 Simple MIDI Setup

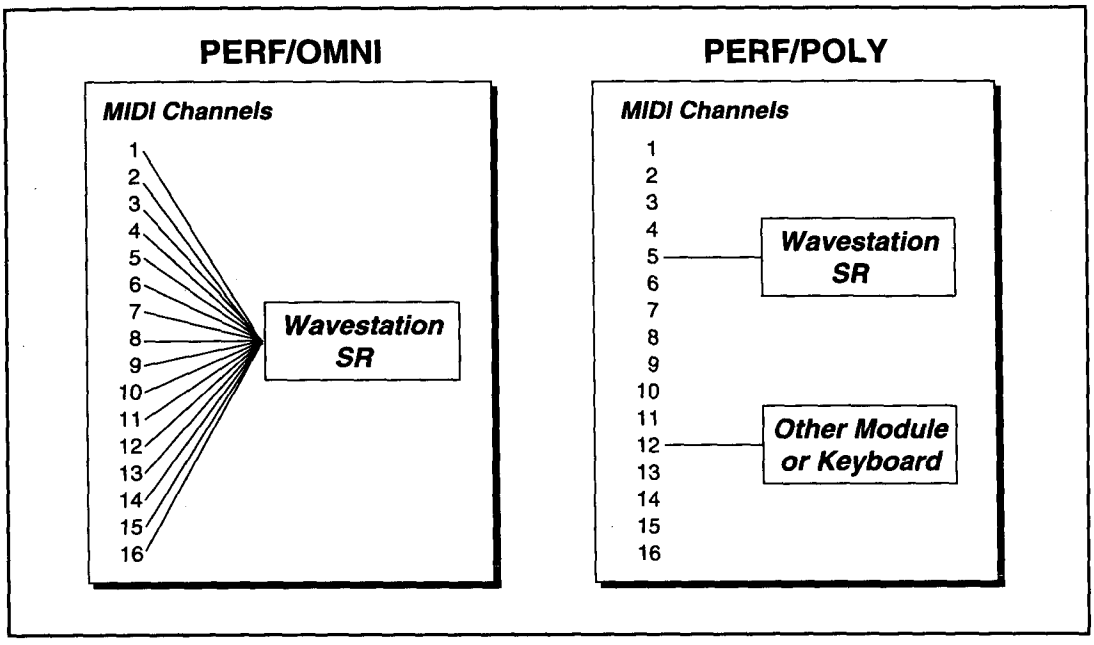
Since the Wavestation SR is a MIDI module with no controller of its own, the MIDI setup is crucial to its use. It has two basic operating modes, each of which is represented by a button on the front panel. PERF Mode is for playing a single Performance at a time, such as you might do when playing live, or (sometimes) when using a sequencer. MULTI Mode allows you to use a sequencer to play up to 16 Performances at a time; this means that the Wavestation SR can simultaneously provide several or all of the different parts in an arrangement, from drums to bass to leads and more.

To set the Wavestation SR to one of these modes, simply press the corresponding front panel button. The LED on the button will light up and stay on, indicating the current mode; the display will also go to the main page of the mode, allowing you to select Performances in PERF, or Multisets in MULTI. These settings are remembered, even when the power is turned off.

For the rest of this section, we'll concentrate on using PERF Mode, which is probably better for checking out the factory Performances and getting acquainted with the instrument. For information on MULTI Mode, please see Section 5, USING MULTISETS.

PERF Mode actually has two variations: OMNI and POLY. In PERF/OMNI Mode, the Wavestation SR recognizes data received on any and all of the 16 MIDI channels, and is thus ready to play in a very simple set-up, with a master controller and several sound modules layered together. This is the mode in which the Wavestation SR is shipped.

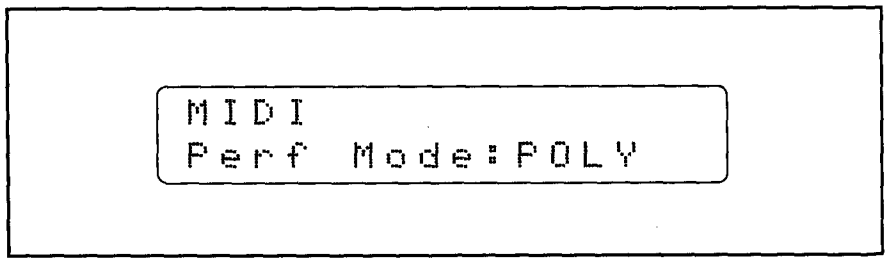
Figure 4-1: PERF/OMNI and PERF/POLY Modes



In most situations - such as when working with a sequencer, or using a master controller to produce programmable splits and layers - you'll instead want the Wavestation SR to receive MIDI data only on a particular channel. This is the case in PERF/POLY Mode; only MIDI received on a single, user-programmable channel, called the Basic Channel, is recognized. To change the Wavestation SR to PERF/POLY Mode:

- Press the PERF button to make sure that the Wavestation SR is in PERF Mode.
- Press the MIDI/GLOBAL button to go to the MIDI page.
- Cursor to the second field on the MIDI page, labeled Perf Mode.

MIDI page, MIDI/Global level



This is the MIDI Mode used when the PERF LED is lit.

- Use the +1/YES and –1/NO buttons to select POLY.

Now, you'll need to adjust the Basic Channel of the Wavestation SR to fit the rest of your MIDI setup.

4.5 Adjusting the Basic Channel

As mentioned above, the Basic Channel is the MIDI Channel to which the Wavestation SR will respond while in PERF/POLY Mode (it is also important in MULTI Mode, as discussed in Section 5, USING MULTISETS). For most setups, you should choose a Basic Channel which is not used by any other MIDI device in your setup. To change the Basic Channel:

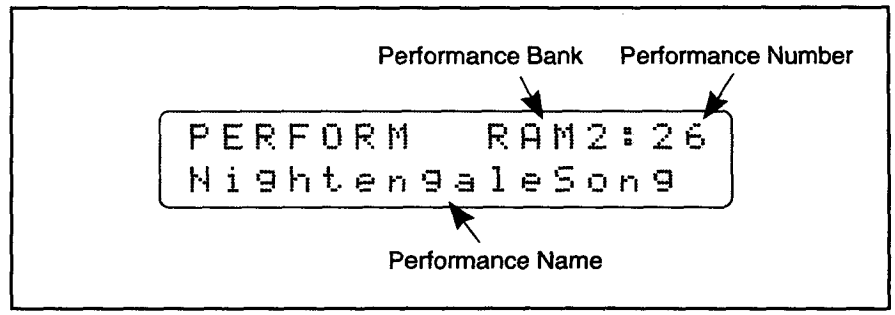
- Cursor to the first field on the MIDI Page, labeled Basic Channel.
- Use the +1/YES and –1/NO buttons to select the desired MIDI channel.

In PERF/OMNI Mode the Basic Channel number is ignored. In MULTI Mode, the Basic Channel is the lowest-numbered received channel; for more information, see Sections 5.2 and 5.3 in the next chapter, USING MULTISETS.

4.6 Selecting Performances

When you first turn it on, the Wavestation SR goes to either the PERFORM or MULTISET page. You can always get back to those pages, from anywhere in the Wavestation SR, just by pressing the PERF or MULTI buttons. For now, we'll look at the PERFORM page; MULTISET is the subject of chapter 5.

- Press the PERF button to go to the PERFORM page.



You can use either the Up and Down cursors or the +1/YES and –1/NO buttons to select Performances.

The PERFORM page is at the top level of the Wavestation SR's Performance mode. Performances, as described in Section 1.5 of this Guide, are the Wavestation SR's basic sound structure. There are up to 600 Performances, divided into twelve Banks (RAM 1 - 3, ROM 4 - 11, and optional CARD) of 50 Performances each.

The number and Bank of the current Performance are displayed at the top right of the screen; the Performance's name is shown at the bottom. To select another Performance:

- Press the +1/YES and –1/NO buttons, or the Up and Down cursors, until the name of the desired Performance appears.

This calls up each of the current Bank's Performances in order (0, 1, 2,..., 49). Like all other parameters in the Wavestation SR, Performance numbers "wrap;" that is, if you're on Performance 49 and you press +1/YES, it'll go back to Performance 0, and vice-versa.

There are a few data-entry shortcuts which you may find useful. Holding down either the +1/YES or –1/NO, for instance, will scroll you quickly through the Performances. Special key combinations can be used to step in increments of 10, or to go instantly to the highest, lowest, or middle val-

Use these shortcuts to speed up entering numbers and values.

ues. These shortcuts work for selecting Performances, as well as for all other parameters in the Wavestation SR.

Key Combination Shortcuts

Press these keys together	Result
PAGE + and +1/YES	+ 10
PAGE – and –1/NO	- 10
EDIT and +1/YES	Maximum Value (Performance 49)
+1/YES and –1/NO	Middle Value
MIDI/GLOBAL and –1/NO	Minimum Value (Performance 0)
BANK and –1/NO	Step through Banks in reverse order
PERF and BANK	Go to Demo Sequence page
MIDI/GLOBAL and PAGE–	Exit to next higher level
MIDI/GLOBAL and EDIT	Solo current Part on Edit Performance level; Mute current Wave on Edit Patch level
WRITE/COMPARE and EDIT	Instant Compare

- To select Performances from your MIDI controller, you may use MIDI Program Changes. There are only 128 Program Changes, however, while the Wavestation SR has up to 600 Performances (with a Program Card inserted). Korg has thus implemented a new part of the MIDI spec, the Bank Select message, to allow you simultaneous access to all of the Performances. For more information on Bank Select, please see Section 4.8 below.
- Another way to change Performances over MIDI is to use the Performance Map. This allows you to assign any incoming MIDI Program Change to any Wavestation SR Performance, in any order. For instance, Program Change 0 might be set to select RAM2 Performance 14, while Program Change 1 calls up ROM4 Performance 37. This is discussed in more detail in Section 6.4, The Performance Select Map.

4.7 Changing Banks

The name of the current Bank of Performances (RAM 1 - 3, ROM 4 - 11, or CARD) appears in the upper right-hand corner of the screen.

- To select the next memory bank, press the BANK button. To step through the Banks in reverse order, press the BANK and –1/NO buttons together.

BANK cycles through the bank choices, allowing you to quickly switch between them. (Note that the CARD Bank will only appear when a Program Card is inserted.)

Banks may also be changed via MIDI, as discussed below.

4.8 MIDI Bank Select and Program Change

The original MIDI Program Change command allowed you to choose between a maximum of 128 programs - which seemed like a lot at the time. Technology has progressed since then, and now the Wavestation SR can hold up to 600 Performances when a Program Card is inserted - too many for Program Changes alone to handle. By using the newly created Bank Select message in conjunction with Program Changes, you can access each one of the Wavestation SR's Performances via MIDI.

The Wavestation SR's twelve Banks are divided into six MIDI Banks, each accessed by a different value of the MIDI Bank Select message (MIDI Controller #32). Each MIDI Bank has 100 Performances, since they are comprised of two internal Banks each. MIDI Program Changes 0-49 select Performances from the first internal Bank (RAM1, for instance), and Program Changes 50-99 select Performances from the second (such as RAM2).

MIDI Bank Select lets you select any of the Wavestation SR's 600 Performances via MIDI.

This means that, unless you are using the Performance Select Map (as discussed in Section 6.4 below), MIDI program changes operate as follows:

Wavestation SR Performance Bank	MIDI Bank	MIDI Program Change
RAM1	0	0 - 49
RAM2	0	50 - 99
RAM3	2	0 - 49
ROM4	2	50 - 99
ROM5	3	0 - 49
ROM6	3	50 - 99
ROM7	4	0 - 49
ROM8	4	50 - 99
ROM9	5	0 - 49
ROM10	5	50 - 99
ROM11*	1	0 - 49
CARD*	1	50 - 99

**ROM11 is the same as the original Wavestation's single ROM bank. To maintain compatibility with the Wavestation family, ROM11 and CARD use MIDI Bank 1.*

When it receives a Bank Select message, the Wavestation SR waits until the next Program Change message, at which point it changes both the Bank and the Performance number. If a Program Change is received without being preceded by a Bank Select, the Wavestation SR simply selects the Performance from the current MIDI Bank.

Changing banks by using the BANK button also changes the current MIDI Bank. If you have used the Bank button to select a Performance in RAM1, for instance, MIDI Program Changes alone will only select Performances from RAM1 or RAM2 (MIDI Bank 0). To use a MIDI keyboard or other controller to select a Performance from a different MIDI Bank, you must first send the appropriate Bank Select message (if your controller can't send Bank Select, you can use the Performance Select Map, as described in Section 6.4 below).

The Wavestation SR itself always sends this message when you change a Performance from the front panel, so if you are recording Program Changes from the instrument into a sequencer, Bank Selects will happen automatically.

NOTE: The Bank Select message is a MIDI Controller, just like the Mod Wheel or Mod Pedal. If you are using an older sequencer (or other MIDI processor) and filtering out Controllers, Bank Selects will probably be filtered out as well. If Performances are not being changed properly by your MIDI system, make sure that you are not filtering Controllers. Some older sequencers may also send Bank Select *after* Program changes, if they are recorded on the same clock tick. This will cause the Bank Select to be ignored until the next Program Change is received. Shifting the Bank Select to just before the Program Change will solve this problem.

4.9 Playing

All standard MIDI messages, such as the full MIDI note range, velocity, and wheels, are recognized by the factory Performances. Specific controllers may or may not have an obvious effect, depending on the specific Patches which are used in the current Performance.

When playing the SR, try out all of the modulation sources available on your controller.

☛ When auditioning Performances, be sure to try all of the physical modulation sources available on your controller: not just velocity, but aftertouch, the wheels, and the sustain footswitch. You should also try out setting up your master controller to act as a vector joystick (see the Reference Guide [MIDI REMAP]).

Polyphony

The Wavestation SR can play up to 32 notes simultaneously, depending on the current Performance.

Aftertouch

The Wavestation SR responds to both monophonic and polyphonic aftertouch. Monophonic aftertouch affects all voices being played by the current Performance. Polyphonic aftertouch is note-specific, so that each voice responds individually to its own aftertouch amount.

Both types are used as Aftertouch by the SR. It is not necessary to program a patch to respond to one type or another.

Pitch Bend wheel

The Wavestation SR's internal settings determine its response to your master controller's Pitch Bend wheel. The Global page contains the default Pitch Bend range; each Patch can also override this with its own range setting.

Modulation wheel

The Wavestation SR can respond to your controller's Modulation wheel in a completely programmable manner. The resulting modulation effect may combine vibrato, tremolo, chorusing, panning, reverb, and other expressive effects, as programmed by a variety of Patch and Effects parameters.

☛ To prevent unwanted modulation, you can periodically check that the MODULATION wheel is fully lowered on your controller.

4.10 Using Cards

The Wavestation SR has two card slots: one for Program cards, which are used to store Performances, Patches, and Wave Sequences, and the other for PCM Wave cards, which are used to access additional digitized sound waveforms. There are also two types of Program cards: RAM (Random Access Memory) and ROM (Read Only Memory).

RAM Program cards can be used just like the internal RAM 1 - 3 Banks, so that you can store your own program data and re-write and re-arrange it at will. ROM Program cards, on the other hand, can't be erased or altered by the Wavestation SR. You can buy ROM cards pre-programmed with new and different Performances, Patches, and Wave Sequences from Korg and many third-party sound developers.

RAM Cards

Before you can use a new RAM card, you must first format it for the Wavestation SR. To do so:

- Go to the CARD FORMAT Page on the MIDI/GLOBAL Level and insert the card into the slot. The screen will show the question, "FORMAT CARD?"
- Press the +1/YES button, and the card will be formatted.

WARNING! Be careful not to format a card with important data on it - doing so will erase all of its data.

Back up Program data from RAM to CARD, or from CARD to RAM

RAM cards are a convenient way to back up your Performances, Patches, and Wave Sequences. To back up an entire internal RAM Bank to a card:

- Insert a blank, formatted RAM card into the PROG slot.
- Go to the BACKUP Page, on the MIDI/GLOBAL Level.
- Cursor to the DataType Parameter, and use +1/YES or –1/NO to set this to ALL.
- Cursor to the right, and set the desired RAM Bank as "Frm" and CARD as "To."

"Frm" is the Bank which the data will be moved from, and "To" is the Bank to which it will be moved.

- Cursor again to the right, so that the cursor is under MOVE?, and press +1/YES.

To move an entire CARD bank into RAM, simply follow the instructions above, but select CARD as the "Frm" Bank and RAM 1/2/3 as the "To" Bank.

You can use Program RAM cards just like the internal RAM banks. However, after a while, you may create some Performances that combine Patches and Wave Sequences from different Banks. For example, you might have a CARD Performance that uses a RAM1 Patch, or a RAM2 Patch that uses a CARD Wave Sequence; you'll have to keep these relationships straight. The blank data sheets provided at the back of this manual may help. In general, if a Performance calls for a CARD Patch or Wave Sequence which isn't there, it doesn't play that part of the sound.

NOTE: When removing a RAM card from the slot, or switching off the Wavestation SR's power, check that the memory protect switch *on the card* is switched to ON (protect). Otherwise, without the instrument's power,

the card's internal battery will drain, and its data may be lost. If during operation a RAM card's battery goes too low, a warning appears, so you'll know that it needs to be replaced.

PCM Wave Cards

PCM Wave cards are always ROM, and contain digitally recorded or synthesized waveforms to supplement those provided in the Wavestation SR. Card PCM Waves can be used just like the internal Waves, as raw material for new Patches and Wave Sequences. Generally, PCM Wave cards come with a Program card which uses the new waveforms.

NOTE: The Wavestation SR uses the new Korg PCM card format, instead of the old format used by the Wavestation keyboard and A/D. This new format has four times the memory of the old, so that you can get many more waveforms on a single card. When you shop for PCM cards, make sure to look for those marked for the Wavestation SR; the old-style cards will not work (they won't even fit in the slot!).

4.11 Master Tune and Transpose

The Wavestation SR comes out of the box tuned to A=440 Hz. If you are playing with a piano or other instrument which doesn't match this pitch, you can adjust the Wavestation SR's fine tuning. You can also quickly transpose the whole instrument by up to two octaves up or down.

To fine tune the Wavestation SR:

- Press the MIDI/GLOBAL button to go to the level of the same name.
- Press PAGE– until you get to the GLOBAL page. You'll see the Master Tune parameter.
- While playing from your controller, use +1/YES and –1/NO to raise or lower the basic pitch. Fine tuning is expressed in cents, which are 1/100 of a semitone.

0 cents is the default setting, for A=440 Hz.

-99 is the minimum, at which the Wavestation SR is almost a semitone flat.

+99 is the maximum; in this case, the Wavestation SR is almost a semitone sharp.

After setting, you should rarely need to adjust this. The Master Tuning adjustment endures even when the power is turned off, because it is stored in battery-backed (*non-volatile*) RAM.

To transpose the entire Wavestation SR:

- From the GLOBAL page, cursor right to the Transpose parameter.
- Use +1/YES and –1/NO to set the desired transposition. Each number equals one semitone, so that -1 is down a half step, +12 is up an octave, and so on.

-24 is the minimum, at which the instrument is playing two octaves below normal.

+24 is the maximum; at this setting, the instrument is playing two octaves higher than usual.

Not Enough Tuning Range?

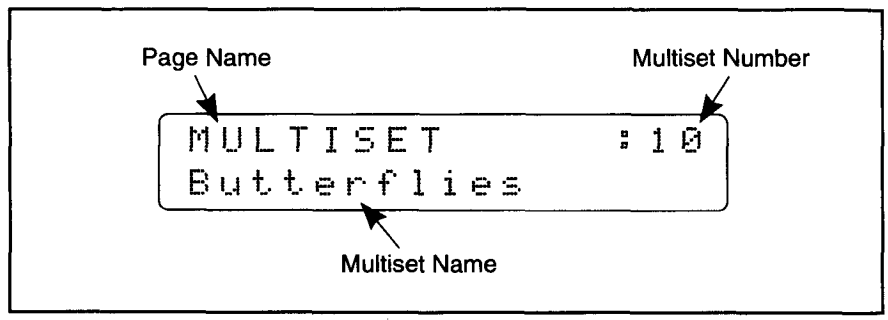
If all Performances are off by the same interval, check that the Transpose parameter is set to 0, or a multiple of 12. Failing that, there are a number of parameters in Performances, Patches, and Wave Sequences which can affect tuning; for a detailed explanation, please see, "Tuning does not seem to be correct," in Section 12, TROUBLESHOOTING.

5 USING MULTISETS

5.1 An Introduction to Multisets

As mentioned in Chapter 4, the Wavestation SR has two basic operating modes: PERF and MULTI. While PERF makes it easy to select and play a single Performance at a time, MULTI allows you to play up to 16 of them simultaneously - almost like having 16 individual Wavestations. This is often called *multitimbral* operation; when used with a sequencer, it allows the Wavestation SR to supply several or all of the parts (such as drums, bass, strings, etc.) for a song.

Pressing the MULTI button puts the instrument into MULTI Mode, and causes the button's LED to light up (you can always tell if you are in PERF or MULTI Mode simply by which button's LED is on). When you press the MULTI button, the Wavestation SR will also go to the Multiset page, which looks like this:



Multisets control which Performances play on each MIDI channel, along with each one's volume and panning; the entire Multiset shares a set of effects.

A Multiset is a group of 16 Performances, one for each MIDI channel. For instance, you might have a drum kit on channel 1, a split keyboard/bass on channel 2, a layered string pad on channel 3, and so on; all of these can then be played simultaneously and independently from a sequencer. These Performance assignments are programmed into the Multiset, but each channel also responds independently to MIDI Bank Select and Program Change messages.

Each Performance has its own volume and pan settings in the Multiset, so that you can do mixing internally. Each channel even responds independently to the MIDI Volume and Pan controllers, so you can use your sequencer to do automated mixing, changing them in real time.

Normally, Performances also have their own effects programming - but to do this in Multi Mode, you'd need to have 32 different effects processors! Therefore, in Multi Mode the Wavestation SR ignores all of the Performances' effects, and instead each of the Multisets has its own effects assignments. These have exactly the same power as the Performance effects, and are shared by *all* of the Performances in the Multiset.

In addition to use in sequencing, the Multisets also make it easy to create multi-timbral programs for alternate controllers, such as MIDI guitars. For more information on Multisets, Mono Mode, and MIDI guitars, please see Section 11.2, Guitar Controllers.

5.2 Setting the Wavestation SR to MULTI mode

Normally, simply pressing the MULTI button will put the Wavestation SR into Multi Mode, and nothing else needs to be done. The first time, however, you should customize the Multi Mode MIDI settings for your particular setup.

☛ Press the MIDI/GLOBAL button to go to the MIDI page.

☛ Cursor right to the third field on the MIDI page, labeled Multi Mode.

This is the MIDI Receive Mode used when the MULTI LED is lit.

☛ Use the +1/YES and –1/NO buttons to select the desired mode. For most uses, this should be set to NORMAL.

NORMAL means that the Wavestation SR receives MIDI data on up to 16 channels, routing the data to up to 16 different Performances according to the current Multi Mode Setup.

MONO is most often used in conjunction with MIDI guitar controllers. It is similar to normal MULTI Mode, except that each channel plays monophonically - only one note at a time. When used with a MIDI guitar, for instance, you might have 6 MONO Channels, each corresponding to a single guitar string.

☛ After setting up the MIDI page parameters, press the MULTI button to enter Multi Mode.

5.3 Selecting which Channels to Use

Depending on your setup, you may have several synthesizers hooked up to a single MIDI port on your computer or sequencer. For this tutorial, let's say that you're adding the Wavestation SR to a studio with an M1 on MIDI channels 9 through 16 and an old analog synth on channel 1. The Wavestation SR can respond to up to 16 MIDI channels simultaneously, but in this case, you only want it to listen to channels 2-8.

There are two ways of limiting the channels which are received by the Multisets. The first allows you to make a single, global setting which affects all of the Multisets; in most cases, this is the way to go, since it keeps your MIDI setup consistent and predictable. You can also turn each channel's MIDI reception on or off within a specific Multiset, to change the MIDI configuration on a song-by-song basis. We'll look at the global method here; for the other method, see the Reference Guide's description of the EDT MULTI page's Play parameter.

Setting Channel Reception Globally

☛ On the MIDI page, cursor to the Basic Channel parameter (this is the one that appears when you first press the MIDI button).

In this example, the lowest MIDI channel that we want to receive is 2, so you'll make that the Basic Channel.

☛ Set the Basic Channel to 2.

Now, you want to make the Wavestation SR listen to channels from 2 to 8 - a total of 7 channels. This is done by setting the MIDI page's Num Multi Chans (Number of Multi Channels) parameter.

☛ Cursor to Num Multi Chans, and set this to 7.

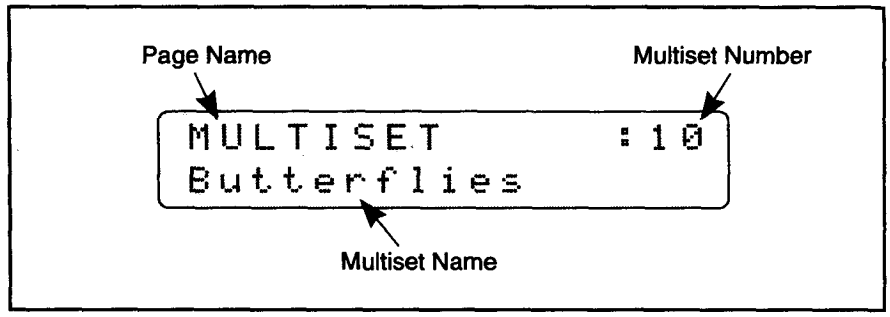
Now, the Wavestation SR will start receiving on channel 2, and continue on up to channel 8. Channels outside this range - in this case, 1 and 9 - 16 - will be ignored.

For your own setup, you can set the Basic Channel and Number of Multi Channels to any values you like. Often, it will be easiest to leave the Basic Channel at 1.

When you are on the EDT MULTI page, and have selected a channel which is outside of this received MIDI range, the word OFF will flash next to the channel number to indicate that it will not be heard (this will also happen if that channel's Play parameter, on the EDT MULTI page, is set to OFF).

5.4 Selecting Multisets

Multisets are selected in much the same way as Performances are. Pressing the MULTI button brings you to the MULTISET page:



The number of the current Multiset appears in the upper right-hand corner of the display, and the name takes up the bottom line. There are a total of 32 Multisets.

- To select another Multiset, use the Up and Down cursors, or the +1/YES and –1/NO buttons.

Multisets can be selected by MIDI System Exclusive or Program Changes.

Selecting Multisets via MIDI

When you change to a different Multiset, a special MIDI System Exclusive "Multiset Change" message is sent out. This can be recorded by a sequencer and then played back to the Wavestation SR to automate Multiset changes.

You can also use the MIDI REMAP page to allow you to select Multisets with MIDI Program Changes. When this feature is used, Program Changes on the Basic Channel call up the Multiset of the same number. Bank Select and Program Change work normally on all other channels, allowing you to change Performances individually after the Multiset has been selected.

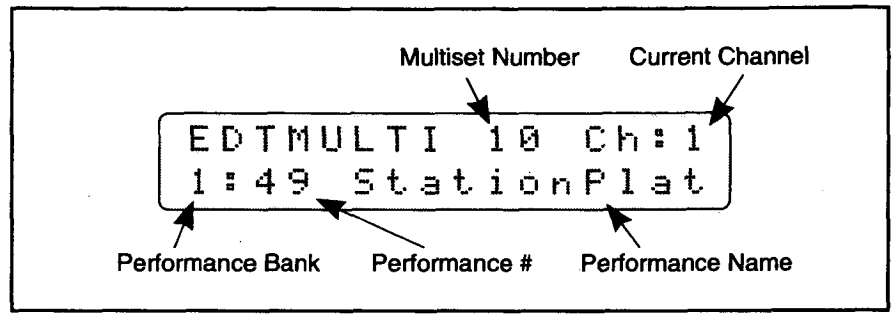
- Press the MIDI button to go to the MIDI/GLOBAL level.
- Press PAGE+ until you get to the MIDI REMAP page.
- Cursor twice to the left, and you'll see the Multi w/Prog (Change Multiset with Program Change) parameter. Press +1/YES to turn this ON (if it isn't already).

Now Program Changes on the Basic Channel will select a new Multiset.

5.5 Changing the Performances in a Multiset

Let's say that you want to create a Multiset for a song that you're working on. The first thing you'll want to do is to assign a few Performances to MIDI Channels. This is done on the EDT MULTI (Edit Multiset) page.

- From the MULTISET page, pressing the EDIT button will take you to the EDTMULTI page.



A different Performance, with its own level and panning, may be selected for each MIDI channel. The current MIDI channel is shown in the upper right corner of the display; you can change this number by using the Up and Down cursors. If you've just entered the page, the channel will be set to the Basic Channel.

If the word OFF is flashing next to the channel number, then the current channel is outside of the range set in section 5.3 (or the channel's Play parameter, on the EDT MULTI page, is set to OFF).

- Select the Performance desired for the first MIDI channel by cursoring to the Bank and Performance number fields, and using +1/YES and –1/NO.
- Go to the next MIDI Channel by using the Up cursor, and select a Performance for that Channel. Repeat this until you have all the Performances you need (you can always come back and change this later).

Each channel responds independently to MIDI Program Changes.

Changing Performances via MIDI

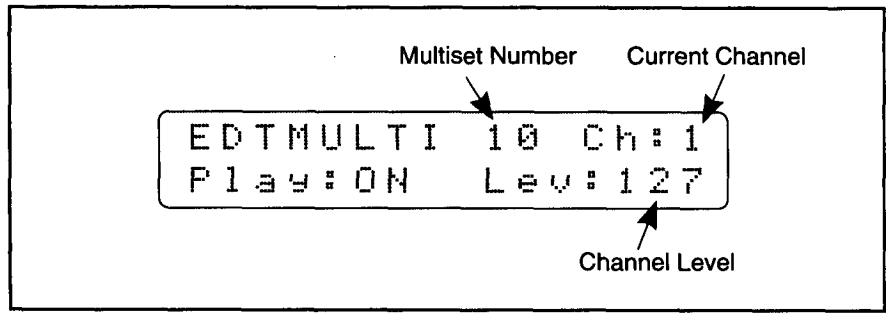
A Multiset selects up to 16 different Performances, more than you're likely to use at one time. If you want to use different sounds in different parts of a song - one pad for the verse, for instance, and another for the chorus - you can simply put the two Performances on two separate MIDI channels. This eats up channels, however, and it's possible that you'd want more than 16 different Wavestation SR sounds during the course of a song. For this reason, you can also use a familiar trick - just send a Program Change (and Bank Select, if necessary) on the appropriate channel, and the Performance will change accordingly.

NOTE: If you are also set up to select Multisets with Program Changes, you can't independently change the Performance on the Basic Channel.

5.6 Changing the Volume and Pan of a Channel

After you've assigned Performances to the Multiset channels, it's time to set their volume levels and panning. These can be independently controlled for each channel, so that you can do an entire mix internally. Setting these parameters couldn't be easier.

☛ On the EDT MULTI page, cursor right to the Lev (Volume Level) parameter.



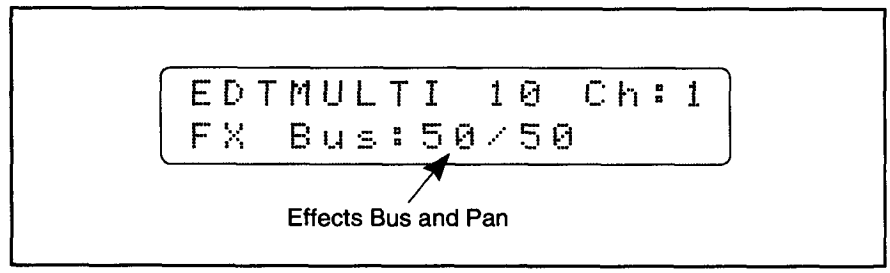
☛ Set the Level for each Performance; 0 is softest, and 127 is loudest.

Each channel also sends out and responds to MIDI Volume and Pan messages.

Changing the Level also sends out MIDI Volume messages (Controller #7) on the current channel. The Level will also respond to MIDI Volume messages received on its channel.

The Play parameter controls whether or not the current channel will respond to MIDI input; for more information, see the Reference Guide under EDT MULTI.

☛ Cursor right to the FX Bus (Effects Bus) parameter.



☛ Set the Pan position for each Performance.

BUS-A is hard left, BUS-B is hard right, and 99/1 through 1/99 are intermediate pan positions, from left to right. Selecting PERF uses the panning and effects routings set up in the original Performance.

Each channel responds to incoming MIDI Pan messages (Controllers #10 and #42). Controller #10 sets the pan position for new notes, without affecting those that are currently sounding; controller #42 is used to assign the channel to special FX Bussing, such as BUS D or ALL. MIDI Pan is also sent out of the Wavestation SR as you change the FX Bus value. For more information on MIDI Pan, see under EDT MULTI in the Reference Guide.

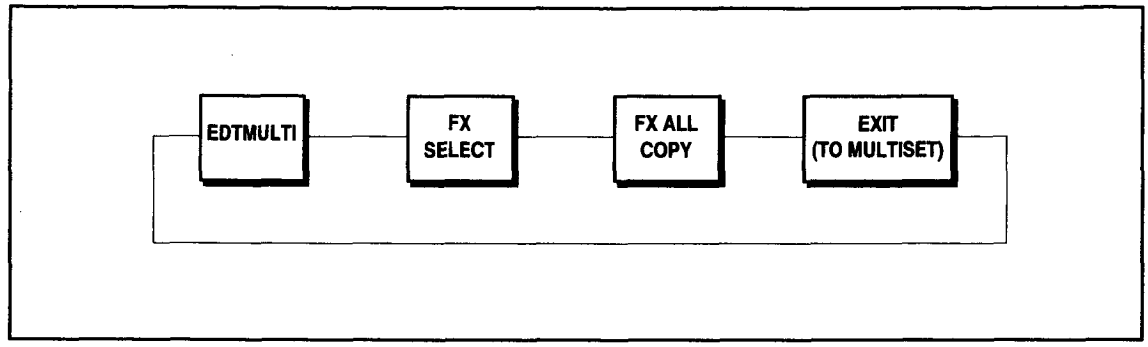
Using the FX Bus parameter and Dual Mono effects, you can use up to four separate effects at once.

You can also use the FX Bus parameter to send Performances through individual effects programs. In fact, using the Dual Mono effects, you can process Performances with up to four discrete effects. For instance, you could have a guitar with distortion, horns with slapback echo, a synth lead with a long delay, and a chorused pad - *all at the same time*. For more infor-

mation on effects routing and Dual Mono effects, please see Section 8.9, Parallel Effects, Outputs 3/4, and Multisets. For more information on FX Bussing in general, see Sections 8.2 and 8.3.

There are several other Edit Multiset level pages, used for setting up the effects of the Multiset, as shown below:

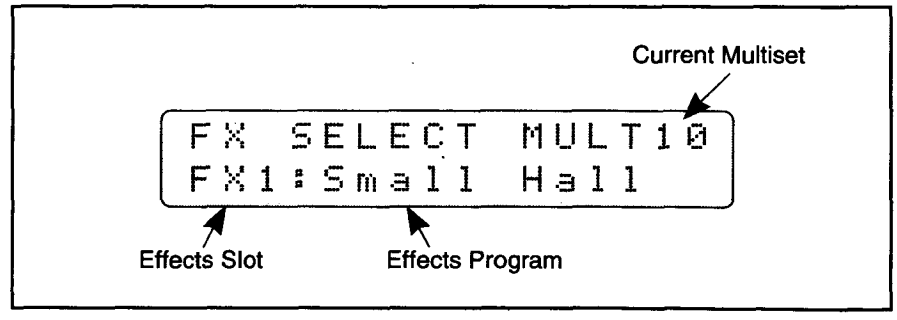
Figure 5-1: Edit Multiset level pages



5.7 Using Multiset Effects

All of the Performances in a Multiset share a single pair of effects settings, identical to those in Performances. As with Performances, there are two FX slots, each of which may hold any of 55 effects programs (such as Reverb, Chorus, etc.). There are basically two levels of Multiset effects editing: calling up different effects programs for the two FX slots, and actually altering the effects programs themselves. For now, we'll just look at calling up different programs; for low-level editing and a more detailed explanation of the Wavestation SR's effects, please see Section 8, EFFECTS TOUR.

☛ From the EDT MULTI page, go to the FX SELECT page by pressing PAGE+.



Each Multiset has its own set of Effects.

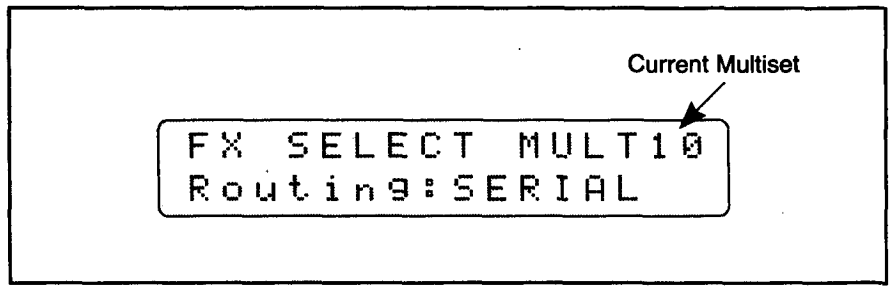
The first screen shows the program assigned to the first FX slot.

☛ Select an FX program by using the +1/YES and –1/NO buttons.

A complete list of the available programs is in Section 8, EFFECTS TOUR.

☛ Cursor right to go to the FX2 slot; choose an FX program as you did for FX1.

☛ Cursor right to the Routing parameter.



Without going into too much detail, the routing controls the way in which signals go through the effects and on to the outputs. Serial routing means that the output of FX1 feeds into FX2, allowing combined effects such as chorus and reverb; most Performances use this routing.

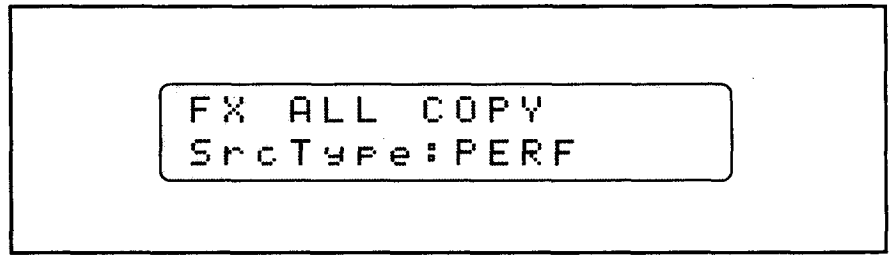
Parallel routing allows you to keep the effects distinct, and run different Performances through the two FX Slots; for instance, you could have a guitar Performance going through a distortion program in FX1, and an electric piano going through a chorus in FX2. You can even use the Dual Mono effects in conjunction with Parallel mode for up to 4 discrete effects. For several detailed tutorials on this subject, see Section 8.9, Parallel Effects, Outputs 3/4, and Multisets.

For more information on effects and effects routing, please see Section 8, EFFECTS TOUR.

5.8 Copying Effects from a Performance

As discussed above, Performance effects go away when you're in MULTI mode. Sometimes, though, you may want to use a Performance's original effects when playing it in a Multiset. You can do this by using the FX ALL COPY feature.

☛ From the FX SELECT page, press PAGE+ to go to the FX ALL COPY page.



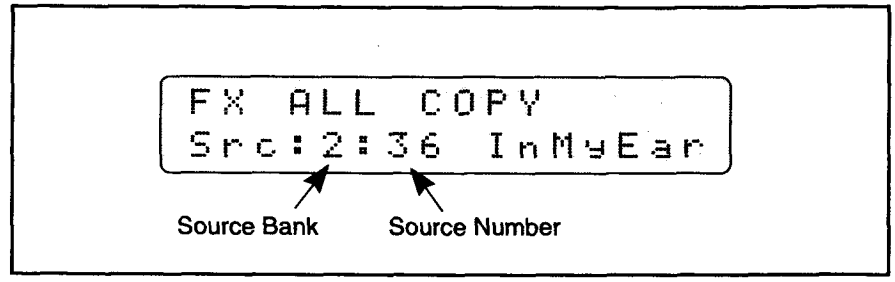
You can copy effects from a Performance, or from another Multiset.

The SrcType (Source Type) parameter determines whether you'll be copying from a Performance (PERF) or a Multiset (MULT).

☛ Select PERF with +1/YES.

Now, you have to select which Performance to copy from.

☛ Cursor right to the Src (Source) parameter.



These are the Bank and number of the Performance to be copied from; part of the name is shown to the right of the number. As you enter the page, the cursor is on the Bank.

- Choose the Bank of the Performance to copy from (If Multisets were selected as the Source Type, this field would show up as Ms, short for Multiset).
- Cursor right to the number, and use +1/YES and -1/NO to select a Performance whose effects you like.
- Cursor right again, to go to the Dst (Destination) parameter. This will be set to the number of the current Multiset; keep it there.

The destination is the Multiset (or Performance) to which the effects will be copied. Notice that the destination type is always the same as the current Wavestation SR Mode, with Performances in PERF Mode and Multisets in MULTI.

- Cursor right one more time to the Copy All Effects command. Like all commands in the Wavestation SR, this one ends with a question mark; answering "YES" will execute the command.
- Press the +1/YES button to do the copy.

Now the Multiset has the same effects settings and effects routing as the source Performance. You can also copy effects from one Multiset to another, from one Performance to another, or from a Multiset to a Performance.

5.9 Using the FX Control Channel

Like the rest of the Wavestation SR's programming structure, the effects offer extensive MIDI modulation capabilities. For instance, you can use the Mod Wheel to change the Reverb Wet/Dry mix, or control the Chorus LFO rate with Aftertouch. When you're in PERF mode, the effects respond to MIDI along with the Performance itself. In Multi mode, though, trying to make the single set of effects respond to all 16 channels could be confusing; what happens if channel three's Mod Wheel is at 0, while channel five's is at 64?

Multiset effects can be modulated and changed by messages on the FX Control Channel.

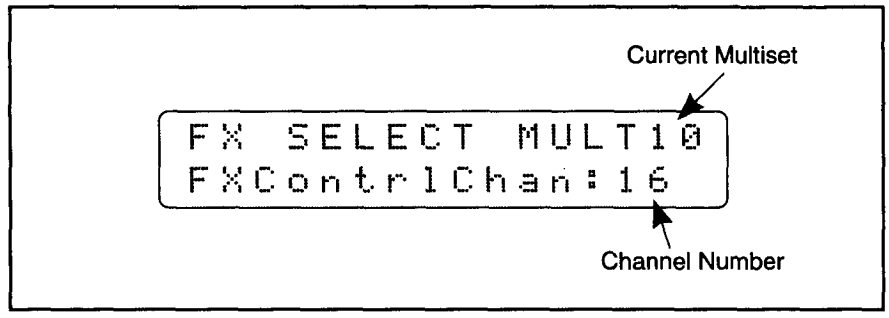
The FX Control Channel solves this problem by specifying a single MIDI channel to be used for effects modulation (you can still play a Performance on that channel as well). You can also use Program Changes on the FX Control Channel to call up new effects for a Multiset; for more information on that feature, please see the Reference Guide's description of the MIDI REMAP page.

Setting the FX Control Channel

The FX Control channel can be set independently for each Multiset, which gives you a lot of flexibility - you can change it for each different song, if you like. Like most MIDI channel settings, though, it's generally best to

decide which channel to use, and then use the same one every time. This keeps your setup more consistent, so you always know which channel's doing what (now, was channel three my M1R, or the garage door...?).

- On the FX SELECT page, cursor left to the FX Contrl Chan (FX Control Channel) parameter.



- Enter the channel from which you'd like to control the effects.

The FX Control Channel must be within the range of received MIDI channels, which you have already set through the Basic Channel and Number of Multi Channels parameters.

If you have a MIDI channel to spare, it's best to dedicate one to the FX Control channel; however, you can always play a Performance on the channel as well. If you do choose to play a Performance on the FX Control Channel, keep in mind that MIDI controllers will affect both the effects and the Performance.

Remember, the FX Control Channel must be set separately for each Multiset.

Modulating Effects

Modulating effects can add variety and expression to a mix, differentiating one section of music from another. All of the Wavestation SR's effects programs offer at least one modulation routing; as an example, let's look at controlling the Dry/Wet Mix of a reverb.

- Go to the FX SELECT page (from EDT MULTI, press PAGE+).
- Cursor left to the Routing parameter, and make sure that SERIAL is selected.
- Cursor left again to FX2, and use +1/YES or –1/NO to select the Small Hall effects program.
- Press EDIT to go to the EDIT FX page.

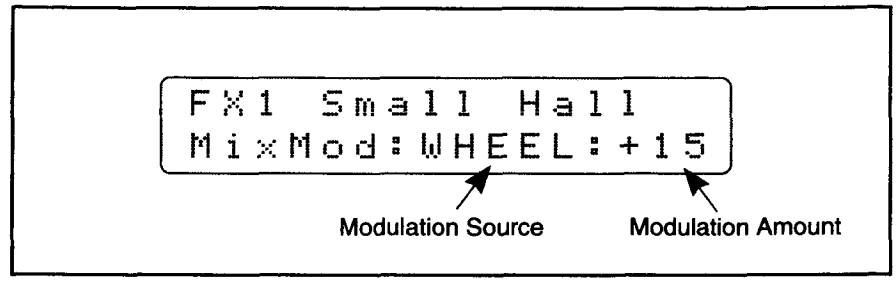
The EDIT FX page allows you to alter the low-level parameters of the currently selected effect - in this case, Small Hall.

As you enter the page, you'll be on the Dry/Wet Mix parameter. This controls the balance of the dry, unprocessed signal to the reverb output; it should come up at 70/30 (70% dry, 30% wet).

- Set the Dry/Wet Mix to DRY. This is the minimum value for the parameter, so you can either press –1/NO repeatedly, or use the minimum value shortcut and press MIDI/GLOBAL while holding down –1/NO.

Now, the signal should be completely dry, with no reverb effect.

☛ Cursor right to the MixMod parameter.



This screen actually contains two parameters, separated by a colon (:). The first sets the modulation source for the Dry/Wet Mix, and the second determines the amount of modulation that source will add.

The Mod Wheel, for instance, can change the amount of reverberation.

This source can be set to any one of the many effects modulators, including Velocity, Aftertouch, Foot Pedal, or any MIDI continuous controller; see Section 8.3, FX Mix, for a complete list. For now:

☛ Set the MixMod source to WHEEL, which stands for the MIDI Mod Wheel.

☛ Cursor right to the amount parameter, and set it to +15 (since this is the maximum, you can also use a shortcut and just press EDIT while holding down +1/YES).

Now, set up your MIDI controller to send on the Wavestation SR's FX Control Channel. Set the Mod Wheel to its lowest position, and play back a sequence into the Multiset. As it plays, gradually raise the Mod Wheel; the reverb will gradually fade in, until eventually the output will be nothing but the washy, reverberated sound. You can also do this abruptly, to accentuate a break between musical sections. Since this is simply a MIDI controller, it can easily be recorded into and edited in your sequencer.

5.10 Naming and Saving Multisets

Once you've set up a Multiset, with all its Performances, panning, volume, and effects, you should probably write it to memory, so that you can go back to it later on. You should also give the Multiset a name, which will make it easier to find and identify.

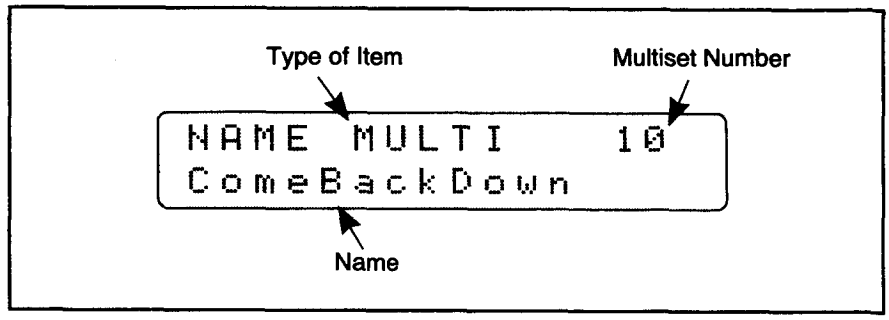
Naming and Writing are pretty much the same for Multisets, Performances, Patches, and Wave Sequences. They happen on the WRITE level, under the button of the same name.

Naming a Multiset

☛ From MULTISET, EDT MULTI, or any of the Multiset effects pages, press WRITE to go to the Write level.

You'll see the WRITE MULTI page, but we want to name the Multiset first.

☛ Go to the NAME page by pressing PAGE+.



The NAME page is used for Performances, Patches, and Wave Sequences as well as Multisets; it decides what you want to name by looking at where you're coming from. Since you were editing a Multiset when you pressed WRITE/COMPARE, it shows "MULTI" on the top line. The number of the Multiset is displayed for your reference only - you can change this on the WRITE page.

A Multiset's name can have up to 15 characters. To move along the name, use the Left and Right cursors; to enter a letter, number, or punctuation mark, use +1/YES and –1/NO. The data entry accelerators can save you a lot of time here - there's a table of them below.

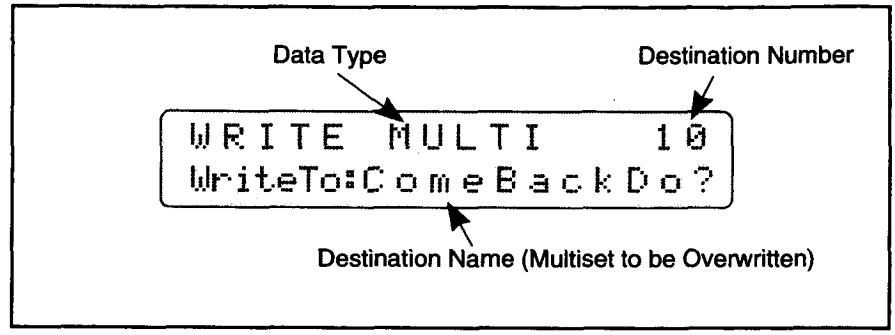
Key Combination Shortcuts

Press these keys together	Result
PAGE + and +1/YES	+ 10 characters
PAGE – and –1/NO	– 10 characters
EDIT and +1/YES	Maximum Value ("z")
+1/YES and –1/NO	Middle Value ("a")
MIDI/GLOBAL and –1/NO	Minimum Value (Space)
PAGE + and PAGE –	On NAME page only, the number zero ("0")
UP cursor	Changes current letter to uppercase
DOWN cursor	Changes current letter to lowercase
BANK and –1/NO	Step through Banks in reverse order
PERF and BANK	Go to Demo Sequence page
MIDI/GLOBAL and PAGE –	Exit to next higher level
MIDI/GLOBAL and EDIT	Solo current Part on Edit Performance level; Mute current Wave on Edit Patch level
WRITE/COMPARE and EDIT	Instant Compare

Writing a Multiset

When you've finished entering in a name, it's time to actually write the Multiset to memory. This function is sometimes called saving.

☛ Go back to the WRITE page by pressing PAGE–.



The Wavestation SR can hold 32 Multisets, numbered 0-31. The destination number defaults to the current Multiset, and the first 10 characters of the destination name are shown on the bottom line.

NOTE: Memory Protect Internal must be set to OFF before anything can be written. The first time that you use WRITE, cursor to the right to make sure that the Protect Int parameter is set to OFF. You only have to do this once. After setting this, cursor back to the main WRITE screen.

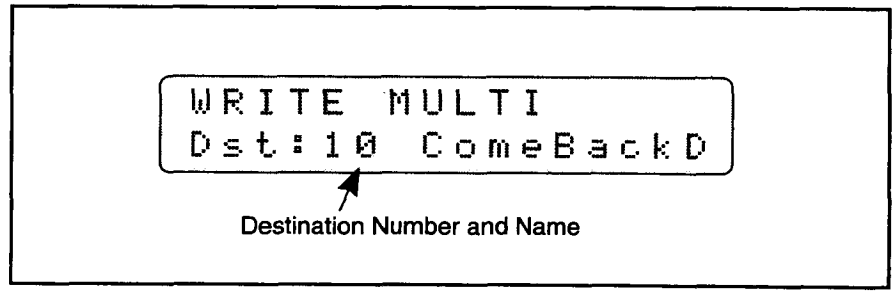
To save the changes to the current Multiset:

☛ Press +1/YES. The changes will be written, and the screen will return to the MULTISET page.

If you want to write the Multiset to a new location:

☛ Cursor right to the Destination parameter.

Write page, Destination parameter



☛ Use +1/YES and –1/NO to select another Multiset to write over.

☛ After selecting the destination, cursor left back to the WriteTo...? command.

Note that the bottom line displays the name of the Multiset which will be overwritten, as opposed to that of the current Multiset; that way, you know what you're erasing, and can write to a different number if necessary.

☛ Press +1/YES. The Multiset will be written to the new location, and the screen will return to the MULTISET page.

Comparing Edited and Saved versions

Once you're on the WRITE page, pressing the WRITE/COMPARE button again toggles between the edited and saved versions of the Multiset. The first press will display the message, "Playing Saved," and you will hear the unedited version; pressing again will display, "Playing Edited," and the edits will return. You can do this comparison as many times as you like.

5.11 Multiset MIDI Example

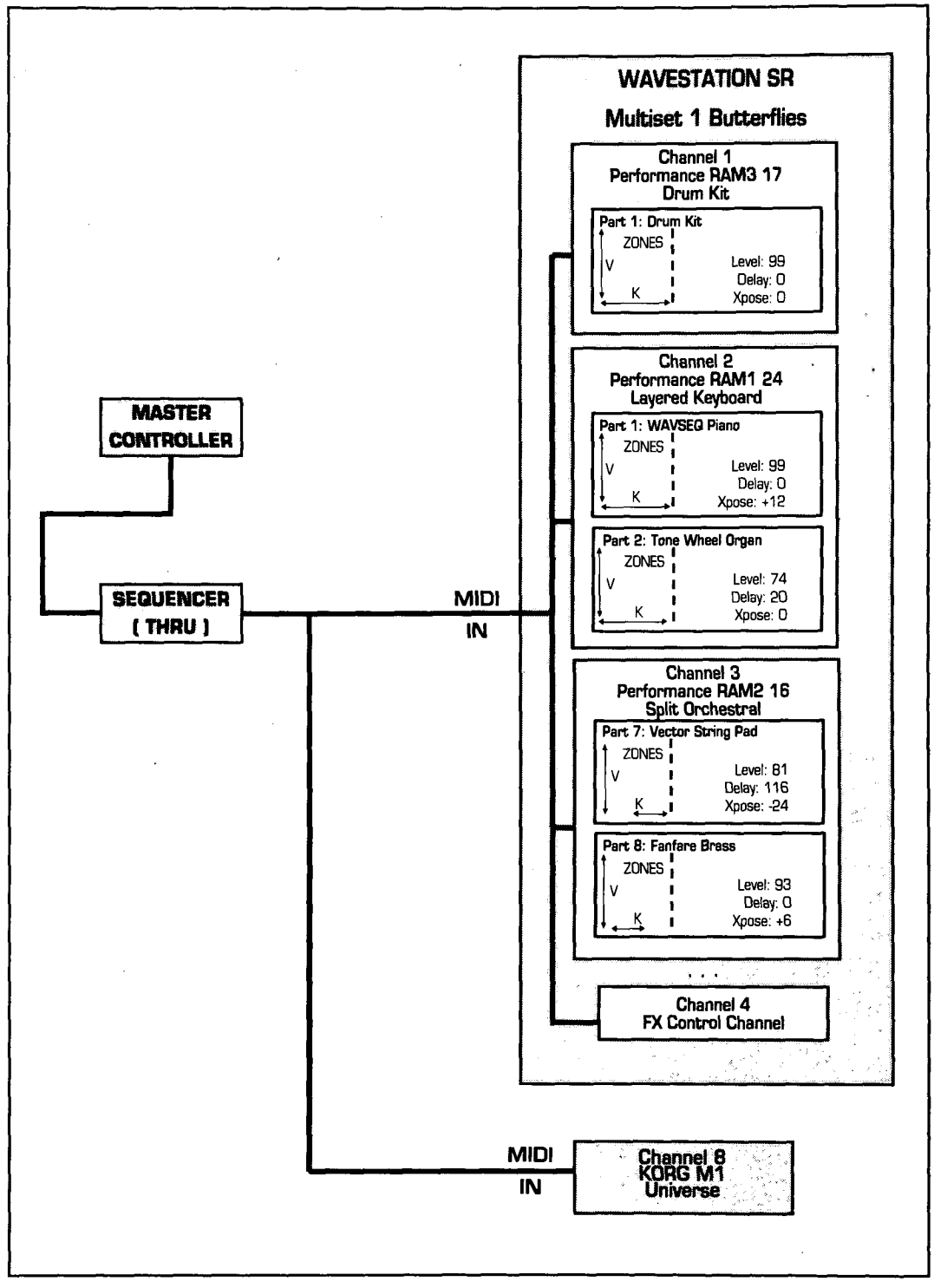
The figure on the next page shows how you might use the Wavestation SR's MULTI Mode in a sequencer environment.

To create the sequence, the MIDI output of a controller has been routed through the sequencer and into the Wavestation SR. This allows you to play the Wavestation SR along with any other synthesizers in your setup, without having to constantly re-configure the MIDI wiring.

In this example, the Wavestation SR's Basic Channel is set to 1, and the Number of Multi Channels to 4, so that only MIDI channels 1 through 4 affect the Wavestation SR. A drum kit is on channel 1; a layered keyboard sound, made of organ and piano Patches, is on channel 2; and a split consisting of strings and brass is on channel 3. The FX control channel, which allows you to modulate the Multiset effects in real time using MIDI controllers, is set to 4.

A Korg M1 synthesizer, playing a slow pad, is responding to channel 8. The Wavestation SR doesn't play on this channel, since it's outside the range set by the Basic Channel and Number of Multi Channels.

Figure 5-2: Multi-Timbral Example



6 MIDI & GLOBAL FEATURES

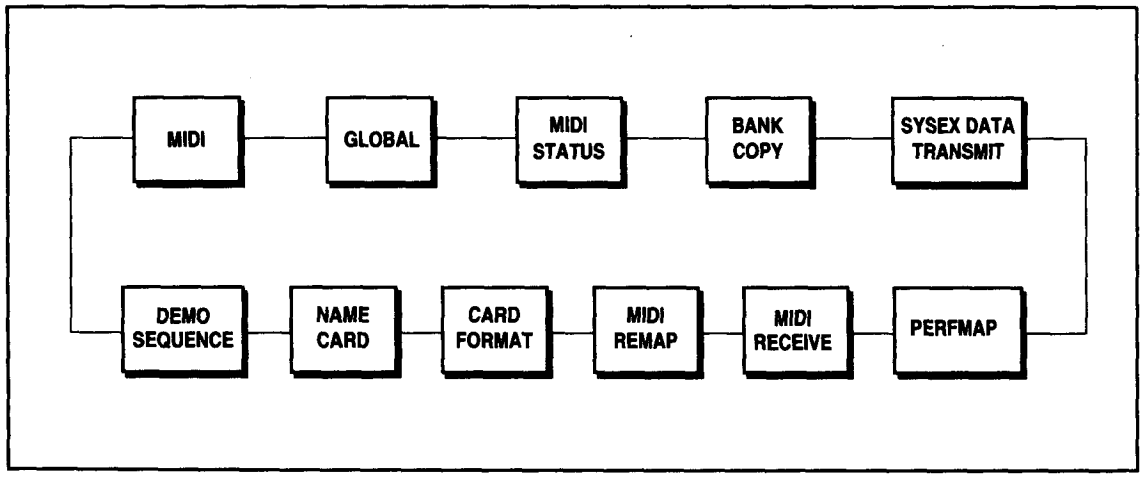
6.1 General

The last two chapters covered the basic MIDI/Global operations needed for playing Performances and Multisets; here, we'll cover a few slightly more advanced applications. Other MIDI applications are discussed in the Reference Guide, under their respective pages.

All of the MIDI and Global settings are non-volatile, so they remain in the Wavestation SR even if you turn the power off.

Figure 6-1 shows the organization of the MIDI/Global level's pages. Pressing the MIDI/GLOBAL button will bring you to this level, and then the PAGE+/– buttons allow you to move between the various pages of MIDI parameters.

Figure 6-1: MIDI/GLOBAL level pages

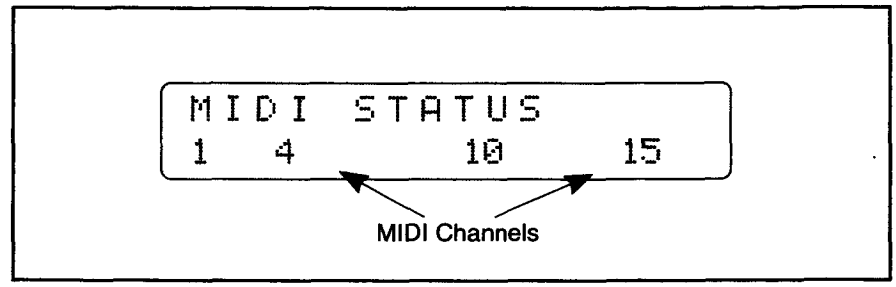


6.2 MIDI Status Page

The Wavestation SR includes a feature that's very handy for troubleshooting a MIDI setup: the MIDI STATUS page. This page is a graphic display of when, and on what channel, data is being received at the MIDI IN jack. To get there:

- Press the MIDI/GLOBAL button.
- Use PAGE+ until you see the MIDI STATUS page, pictured below.

MIDI STATUS page, MIDI/Global level



When data is received on a particular channel, that channel's number appears briefly on the screen. If data is not being received, you know that the problem probably lies in either the MIDI controller or, more likely, a cable or its routing.

The MIDI STATUS page is like a 16-channel version of the MIDI Indicator LED.

This is an expanded version of the front panel MIDI Indicator LED. The primary difference between the two is that this page shows all MIDI activity, regardless of the Wavestation SR's MIDI settings, while the MIDI Indicator LED only lights for data that the Wavestation SR will respond to.

For instance, let's say that the Wavestation SR is set to MIDI POLY Mode, so that it only responds to data on the Basic Channel. If the Basic Channel is set to 1, and the Wavestation SR receives data on that channel, the MIDI LED will light, and a "1" will appear on the STATUS page. If it receives data on other channels, such as 3 or 15, the STATUS page will show activity on those channels, but the MIDI Indicator LED will *not* be lit - because the Wavestation SR is not currently set to respond to those channels.

NOTE: If data is being received, but does not seem to be having any affect on the sound (notes are not playing, for instance, or the pitch wheel doesn't change the pitch) please check the MIDI RECEIVE page to make sure that the Wavestation SR is set to recognize all desired data. The MIDI RECEIVE page is discussed in the Reference Guide.

The demo sequences provide an easy way to test the audio connections to the Wavestation SR. If playing the demo produces any sound, then you know that your audio connections are OK. Instructions for playing the demo sequences are at the very beginning of this Guide, in Section 1.1.

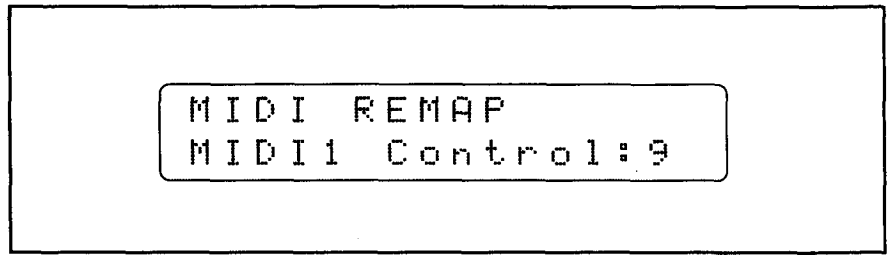
For more information, see Chapter 12, TROUBLESHOOTING.

6.3 MIDI Controller 1 and 2 Assignment

In addition to its normal response to MIDI Controllers, as outlined in the MIDI Implementation Chart at the back of this manual, the Wavestation SR allows you to assign two additional MIDI Controllers as modulation sources. These appear as MIDI 1 and MIDI 2 in the Modulation Matrix. To set the two assignable MIDI Controllers:

- Press the MIDI/GLOBAL button.
- Use PAGE+ to go to the MIDI REMAP page.

MIDI REMAP page, MIDI/Global Level



MIDI1 and MIDI2 Control set the Controller to be used as MIDI1 and MIDI2, respectively.

- Set MIDI1 Control to a favorite MIDI controller (for instance, if you use a wind controller, you might want to set this to 2, the Breath Controller).
- Cursor right once to MIDI2 Control, and set this to another favorite controller.

The assignable MIDI1 and MIDI2 let you use any MIDI Controller in the Modulation Matrix.

MIDI1 and MIDI2 can respond to any controller between 1 and 95. They can also simply be set to OFF, in which case they won't respond to anything. Some of the MIDI controller numbers have been specifically defined, including:

1 Modulation Wheel or Lever
2 Breath Controller
4 Foot Controller
7 Main Volume
8 Balance
10 Pan
11 Expression Controller
12 Effects Controller

In addition, controllers 16 and 17 are commonly used for the X and Y axes of a joystick (such as the vector joystick on the Wavestation).

While this feature is intended for use with continuous controllers (numbered 0 through 63), switch controllers (64 - 95) can also be used. When a switch controller (such as the Damper Pedal) is turned off, it sends a value of 0; when it's turned on, it sends a value of 127.

Some of the defined switch controllers include:

64 Damper Pedal
66 Sostenuto Pedal
67 Soft Pedal
69 Hold 2
91 External Effects

NOTE: You can disable recognition of all controllers on the MIDI RECEIVE page. This will include both those controllers recognized by default, and those set as MIDI Controllers 1 and 2.

6.4 The Performance Select Map

Setting up a complex, multi-module setup for a piece of music normally requires sending out separate program changes to each individual module. In a live situation with a single MIDI controller, doing this manually can be impractical; it's much more convenient to be able to select a single program on the controller to set up all of the modules at once. Some MIDI controllers (such as the Wavestation keyboard) can accomplish this by simultaneously sending out different program changes on different channels. If your master controller does not have this capability, however, there are other ways of accomplishing the same thing.

One way to do this is to change the program numbers in each module to match the master controller's program change. Suppose, for instance, that you wanted to send out a MIDI program change 14 to set up a system to play electric piano, acoustic bass, strings, and synth brass. You could juggle around the programs in each module so that the first module's program 14 was electric piano, the second module's program 14 was acoustic bass, the third's program 14 was strings, and so on. Obviously, however, this requires a lot of work to set up and maintain, and probably also entails copying the same patch to a number of different program locations (you'll be using that electric piano in more than one song).

The Performance Select Map makes it easy to fit the Wavestation SR into a performance setup.

A more elegant method is to leave the programs in their original locations, and instead map incoming MIDI program changes to select different program numbers. For instance, that electric piano might be the module's ROM Performance 26, but would be set to be called up by MIDI Program Change 14. You might even map a number of different MIDI Program Changes - say, 14, 56, and 97 - to all call up that same electric piano.

The Performance Map allows you to do just this. All 128 possible MIDI Program Change commands may be mapped to any of the Wavestation SR's 550 Performances (600, if a ROM or RAM Card is inserted).

For example, you can easily construct a map that does this:

Received MIDI Prog Change#	Bank	Performance
0	CARD	49 ULTIMO
1	RAM1	0 Ski Jam
2	RAM1	0 Ski Jam
3	ROM4	34 Belletts
...		
127	ROM7	30 Gated Kit

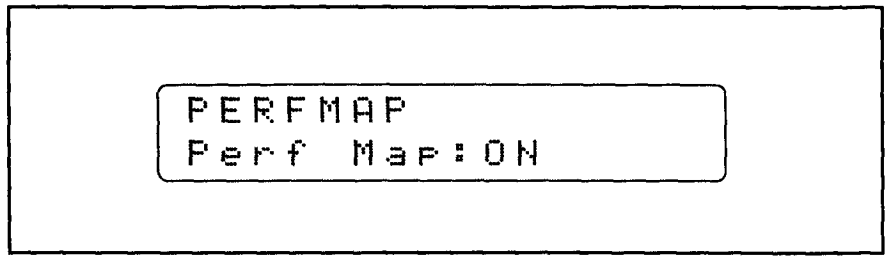
This also makes it easy to select programs from different banks, even if your controller doesn't send MIDI Bank Select.

Editing the Performance Select Map

The PERFMAP page is on the MIDI/Global level. To get there:

- Press the MIDI/GLOBAL button (if you aren't on that level already).
- Press PAGE+ until you see the PERFMAP page.

PERFMAP page, MIDI/GLOBAL Level

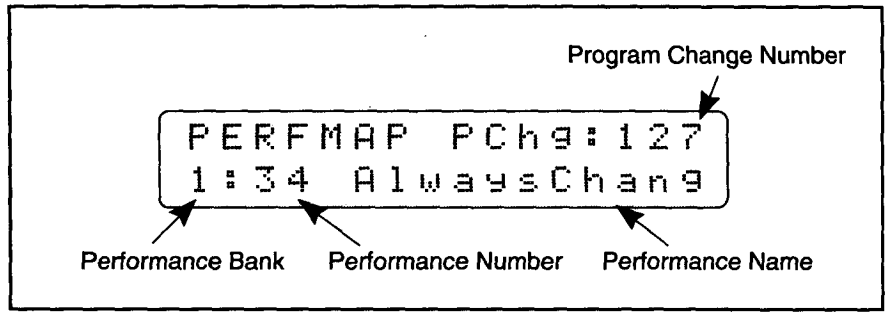


The Perf Map parameter switches the Performance Map on and off.

OFF is the default. This means that the map is not used, so Performances are selected as explained under Section 4.8, MIDI Bank Select and Program Change.

ON means that the custom map is used.

☛ Cursor once to the right, to get to the map itself.



The upper right-hand corner shows the incoming MIDI Program Change which will select the Wavestation SR Performance on the bottom line.

☛ Use the Up and Down cursors to select the desired MIDI Program Change number.

☛ Select the desired BANK (RAM 1 - 3, ROM 4 - 11, or CARD).

☛ Cursor right one more field to select the desired Performance within the bank.

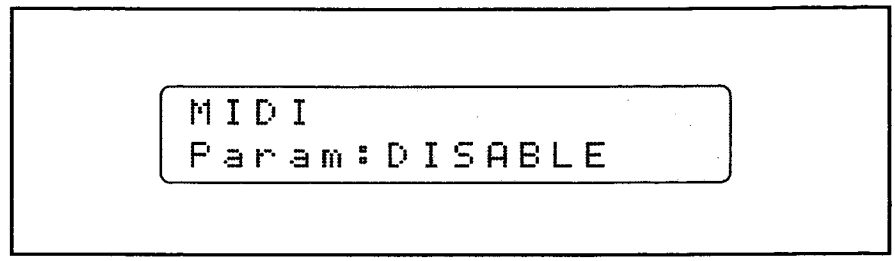
6.5 System Exclusive Parameters

The Wavestation SR can send out MIDI System Exclusive messages whenever any parameter is edited - ENV 1 level one, for instance, or LFO 2 rate. These messages may be recorded by a sequencer and later received by the Wavestation SR. This allows yet another way to automate real-time timbre changes, such as MIDI-synced filter sweeps. To use this feature:

☛ Go to the MIDI page.

☛ Cursor left to the Param field.

MIDI page, MIDI/Global level



The default setting here is DISABLE. If you are not specifically using SysEx parameters, leave it at that setting to avoid sending unnecessary data.

If Param is set to RECV & TRANS, the Wavestation SR will both send out and receive MIDI System Exclusive parameters. RECEIVE means that parameters are recognized, but not transmitted; TRANSMIT means that they are sent out, but not received.

☛ Use +1/YES and -1/NO to set SysEx parameters to be transmitted, received, both, or neither, as you like.

This setting has no effect on SysEx data dumps.

Specific parameter codes are covered in the Appendices to the Reference Guide.

6.6 Turning the Effects On and Off

Effects are an integral part of the Wavestation SR, and are equally important to many Performances. However, there may be times when you'd like to turn the effects off. For instance, when performing in reverberant rooms or with large groups, you might want to quickly strip out your processing in favor of a "dry" sound, without having to edit and save Performances. You might also want to do this when trying out external signal processing ideas, or when programming a new Performance.

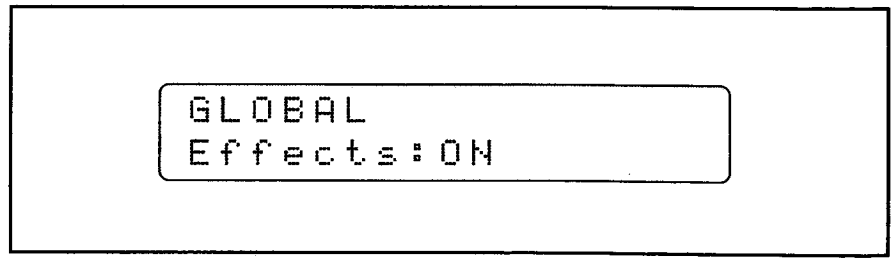
You can use the GLOBAL page to temporarily turn off all of the effects.

The GLOBAL page's Effects parameter allows you to do just this, by globally disabling the Multi Digital Effect (MDE) processor.

☛ On the MIDI/Global level, press PAGE+ to go to the GLOBAL page.

☛ Cursor to the Effects parameter.

GLOBAL page, MIDI/Global level



☛ Use +1/YES or -1/NO to turn the effects on or off.

ON, the default, means that the effects are programmed by the Performance. This is the normal mode of operation.

OFF means that the MDE effects are disabled. Routing is disabled as well; Busses A - D go to outputs 1 - 4.

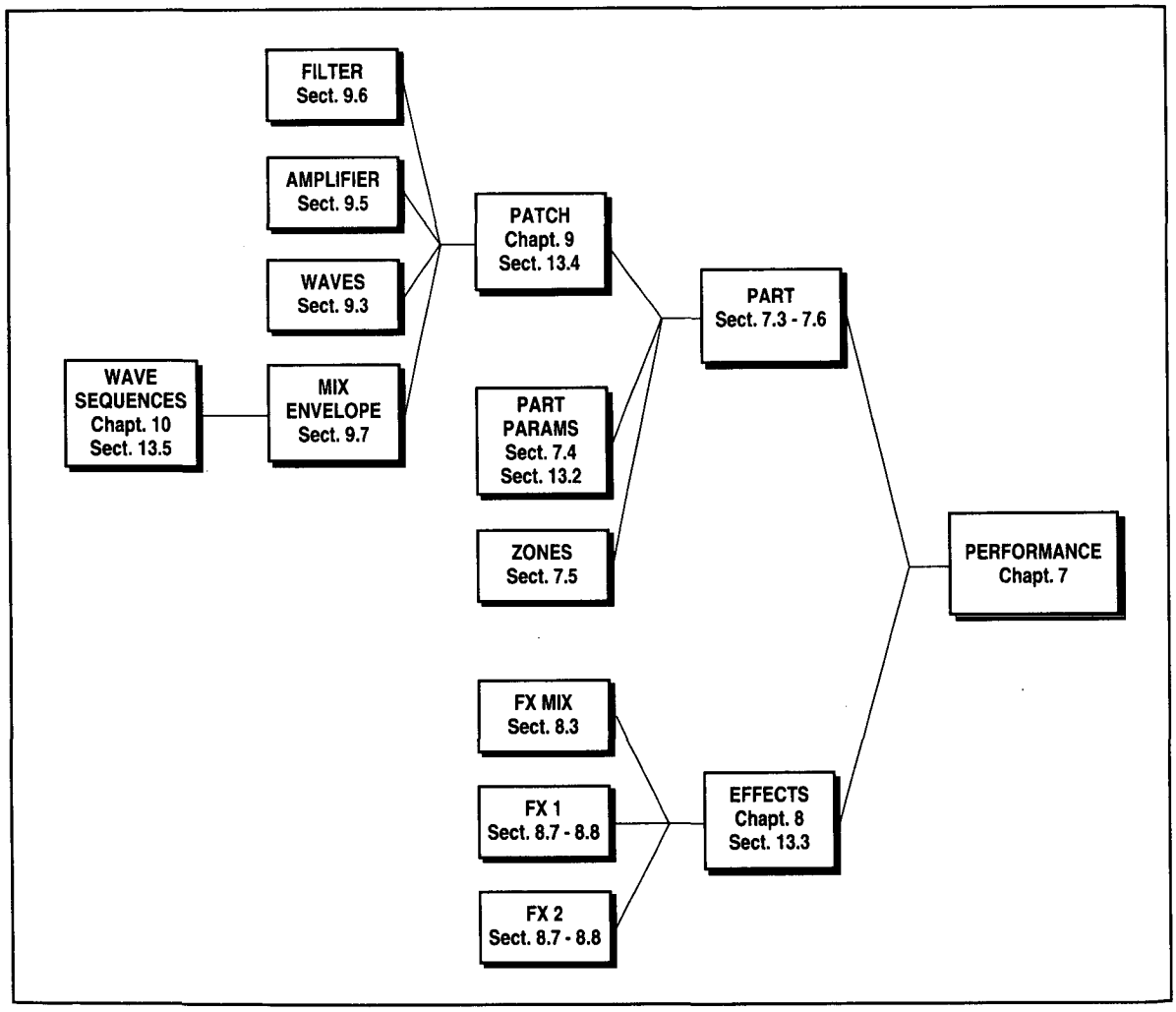
7 PERFORMANCE TOUR

7.1 Overview of Editing

Chapters 7 through 11 tour across the Wavestation SR's editing system, showing you where to make some of the most important and useful custom settings. The goal is to start you making real, useful edits as quickly as possible. Therefore, we will concentrate on the "how," and not the "why," of each operation.

Figure 7-1 is a map of the Wavestation SR's synthesis *architecture,* along with references to corresponding sections in the remainder of this manual.

Figure 7-1: Wavestation SR Performance Signal Flow



If you were to create a new sound strictly by following the signal flow, you would start with an initialized Patch, setting the oscillator structure and sync mode, picking waves or wave sequences, and applying vector synthesis. Then you might set up Macros for the voice amp, filter, pitch and pan, possibly touching up the details for individual waves or modules. Af-

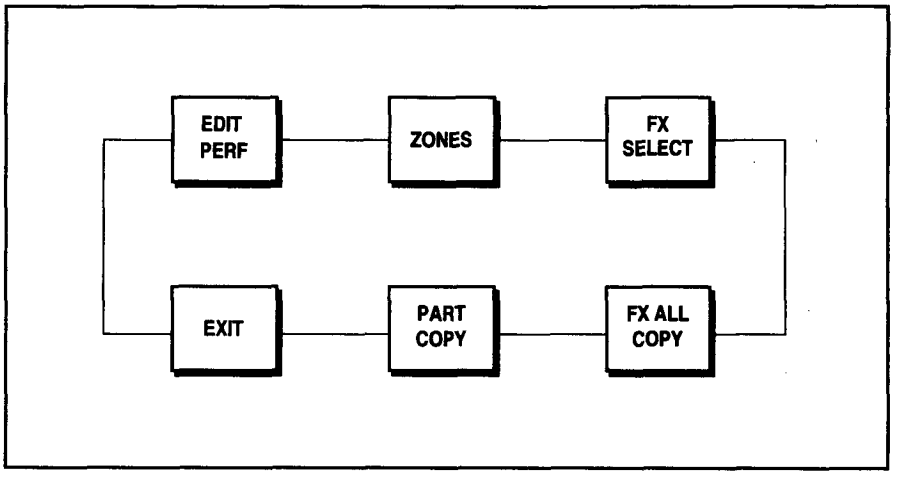
ter building or editing up to eight such Patches, you would assign them to newly initialized Parts of a Performance, set their key and velocity zones and other playback details. As a final touch, you would probably pick an effects configuration and assign the Parts to the Multi Digital Effects (MDE) processor. You might even use the MDE to route patches to the auxiliary output jacks.

To program the Wavestation SR, you need to be aware of this signal flow. However, while *learning* to program, it is probably easier to reverse that order: start with Performances and work backwards in signal flow, or *down* the menu structure. This is the approach we'll take in these tours.

7.2 Overview of Performances

Figure 7-2 shows how the pages of the Edit Performance level are organized. Use this and the following charts to keep your bearings throughout the tours.

Figure 7-2: Edit Performance Level Pages



Memory Protection

NOTE: To preserve the factory sounds in the RAM Banks and tour with peace of mind, check that the GLOBAL page's Protect Int (Memory Protect Internal) is set to ON. This means that however much sound editing you do, you can't write over the sounds in RAM.

Before disabling memory protection, it may be a good idea to back up the factory RAM Banks either to a RAM card, or via MIDI System Exclusive dumps (for more information on MIDI System Exclusive, please see the Reference Guide under SYSEX DATA XMIT). You don't need to back up the ROM Banks - they'll always be there, and can't be erased.

7.3 Assigning Patches to Parts

Recall from Chapter 1 that a Performance has 8 Parts, each of which may contain a Patch. Parameters on the EDT PERF and ZONES pages control the ways in which that Patch is played, including its transposition, volume level, note-on delay, and velocity and MIDI note number ranges (for layers and splits).

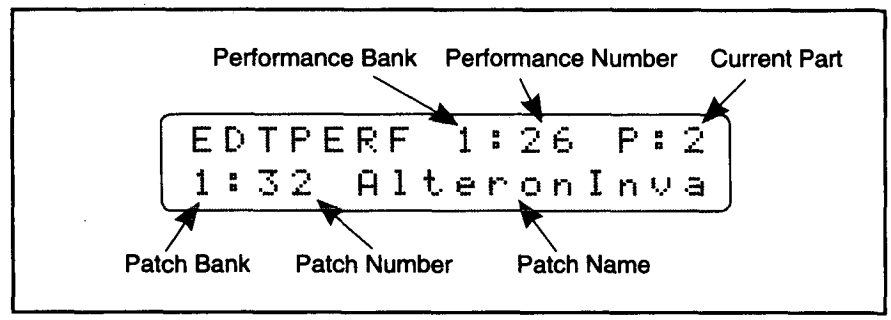
So, one of the first things to try with a Performance is to select different Patches for its eight Parts. You can easily change the Patches assigned to each Part on the EDIT PERF page. To get there:

- Press the PERF button to go to the PERFORM page (if you're not there already).

Notice that the EDIT button's LED is lit. This means that pressing the EDIT button will take you to the next level down - in this case, to Edit Performance.

- Press the EDIT button.

EDT PERF page, Edit Performance Level



Use the Up and Down cursors to browse through the different Parts.

This is the EDT PERF page. The number of the current Part is displayed in the upper right-hand corner of the screen.

- Change the current Part by using the Up and Down cursors.

This way, you can quickly browse through a Performance to see which Patches it uses. Now, to change the Patch assigned to the Part:

- Select the desired Patch Bank with +1/YES and –1/NO, or use the Bank button.
- Cursor to the Patch number field and select the desired Patch, using +1/YES and –1/NO. As you change the number, the name will change as well (on this page, Patch names are abbreviated).

There are 35 Patches in each bank, numbered 0-34. You can also select the symbol "--" which means that the Part doesn't use any Patch, and thus makes no sound.

Editing the Patch selection turns the WRITE/COMPARE light on. This is to remind you that you are working with something you might want to save.

- Play the new Performance, listening for the changed Patch.

If a Performance is heavily layered and you choose a soft Patch, the change may not be obvious. If you like, you can solo the current Part to listen to it more carefully.

- Cursor to the left until you see the Solo Part command.
- Press +1/YES to solo the Part.

The display will automatically go to the Patch parameter, allowing you to browse through the Parts. To turn solo back off:

- Cursor to the left until you see the Un-Solo Part command.
- Press +1/YES again to turn solo off, and hear the Part in context with the rest of the Performance.

7.4 Editing Other Part Parameters

The EDT PERF page has a number of other parameters for each Part, in addition to the Patches which are played; you can use the Left and Right cursors to browse through them. A few are described below; for information on other Part parameters, please see the EDT PERF section in the Reference Guide.

The FX Bus parameter controls the panning of the Part, and also its routing into the MDE Effects. You'll learn more about this in the next chapter.

The Level parameter allows you to adjust the relative volume level of each Part.

The Transpose parameter works much like the one on the GLOBAL page, with the value equal to the transposition in semitones (+1 is up a half step, -12 is down an octave, etc.). This can be very useful when stacking two Patches with different ranges, or in creating parallel harmonies.

7.5 Keyboard and Velocity Zones

Each of the eight Parts of a Performance can be made to play only within a certain range of notes, or between certain velocity levels. These ranges are called keyboard and velocity zones. You can use zones to create keyboard layers and splits, and velocity layers and switches.

Each of the eight Parts can respond to different Key and Velocity ranges.

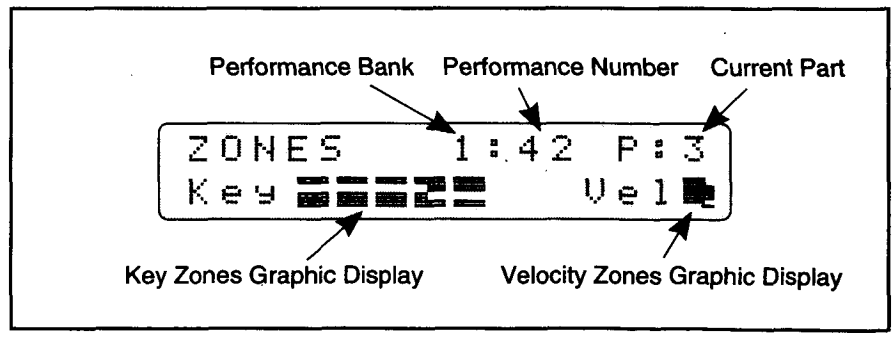
While you can set the zones for each part individually, there are also four macros for commonly used zoning schemes: layering, splitting, velocity switching, and velocity layering. After using a zoning macro, you can still tweak the results by hand. To get an idea of the ZONES page's possibilities, let's look at a particular example.

- Press the PERF button, and select ROM11 Performance 3, Metropolitan.
- Go to the EDT PERF page by pressing EDIT.
- Use the Up and Down cursors to browse among the Parts.

Notice that only the first 3 Parts have Patches assigned to them.

- Set the current Part back to 1.
- Press PAGE+ to go to the ZONES page.

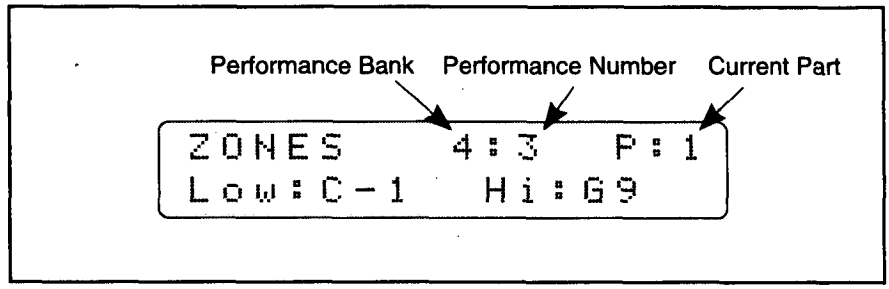
ZONES page, Edit Performance level



This first page is a graphic display of the zones for all eight Parts, with Part one at the top and eight at the bottom. Each block of the Key Zones represents one octave of the standard five-octave keyboard; the Velocity Zones are represented in a single-block display.

☛ To adjust these parameters, cursor right to the next screen.

ZONES page, Key Zones parameters



The first two parameters, shown above, select the lowest and highest keys on which the Part will play. Since C-1 is the lowest note in the MIDI range, and G9 the highest, this Part will respond to all MIDI notes.

☛ Use the Up and Down cursors to browse among the other 2 Parts.

They, too, are set to use the entire MIDI note range.

☛ Cursor to the right beyond "Hi."

This brings you to the next screen, which sets the lowest and highest velocities for the Part. Notice that the lowest velocity is 1; since a velocity of 0 is the same as a Note Off, this is the lowest possible key velocity. The Hi velocity is set to 127, which is the maximum; this means that the Part will sound, no matter what velocity a note is played at.

You can split and layer Parts across the MIDI note range, or arrange them into velocity switches and layers, with a single command.

Keyboard Splits

You can adjust any of the zone parameters by hand, but often you can get pretty close by using one of the zoning macros - so let's look at those first. We'll start off by making a three-way split of the Performance. As was mentioned in Chapter 1, you don't need to worry about destroying the saved Performance; all edits are kept in a separate memory buffer until you specifically use Write (and since this is a ROM Performance, you can't write over it anyway).

☛ Cursor right until you see the Split All Parts command.

☛ Press +1/YES.

Now, play the edited Performance from your controller. Notice that the three sounds, which had been layered together, are now distributed evenly across the keyboard. The lowest numbered Part, the synth bass, is on the bottom; the clav, the next Part, is in the middle; and the highest numbered Part, the electric piano, is on the top. The Split function assumes a five-octave controller.

☛ Cursor back to the high/low note and velocity parameters, and see how they've been changed for the different Parts.

Note that Parts without Patches assigned to them are ignored; for automatic zoning to work, there must be more than one non-empty part.

Keyboard Layers

Now, let's make it so that the Parts are layered together again. It just so happens that the next function on the page, Layer All Parts, is designed to do exactly that.

☛ Cursor right to the Layer All Parts command.

☛ Press +1/YES.

Now, the Parts all play over the entire range.

Velocity Switches and Layers

The next two macros adjust the velocity zones of the Parts. The first one, Vel Switch, spreads the Parts over the velocity range, just like Split All Parts did for the note range.

☛ Cursor right to the Vel Switch Parts command, and press +1/YES.

Now, try playing from your controller again. Notice that the synth bass Part sounds when you play at low velocities, the clav takes over at middle velocities, and the electric piano pops out at high velocities.

The next command, Vel Layer, is similar - but instead of creating discrete velocity zones, the zones overlap.

☛ Cursor to the Vel Layer Parts command, and press +1/YES.

When you play this from your controller, you'll notice that the synth bass still sounds at low velocities - but at medium velocities, the clav is layered on top of it, and at higher velocities, all three Parts sound.

This happens because all Parts are set to a maximum velocity of 127, but each Part is assigned an increasingly higher minimum velocity. In this case, Part 1 is played from the entire velocity range, Part 2 from 43-127, and Part 3 from 85-127. This allows you to quickly set a basic timbre (such as a pad) to always sound, with other timbres (such as attack transients) being added to the basic sound when the keyboard is played harder. The harder you play, the more layers are heard.

You can enter Key and Velocity zones just by playing on your MIDI controller

Manual Adjustment

You can also adjust all of the zone parameters by hand. You can use the normal +1/YES and -1/NO buttons to enter zone information - or you can just use your MIDI controller.

☛ Cursor back to the high and low note parameters.

☛ Play different notes on your MIDI controller, and notice how the selected note name changes in the display.

The same trick works for the velocity points, as well.

A Zone Example

The figure on the next page is an example of a Performance in which the player can alter the instrumental mixture by range and by touch. To make this a bit more intuitive, let's look at the example from the point of view of each Part.

The Bass Patch plays on the bottom quarter of the keyboard, with a soft to medium touch.

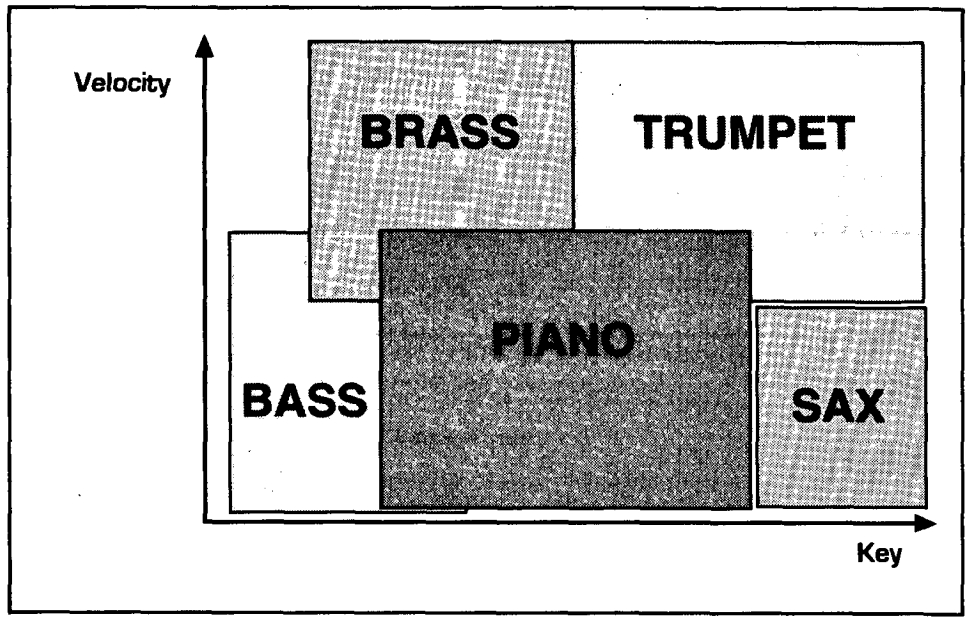
The Piano plays across the middle half of the keyboard, also with a soft to medium touch.

Sax plays at the high end of the keyboard, with low velocity.

As you play medium-loud in the lower range, the Brass part is layered with bass and piano, and with the Trumpet Part next to it.

The Trumpet Part takes over on loud notes played from the center and upwards.

Figure 7-3: Zone Example



7.6 Initializing a Part

After experimenting with existing Parts, you may want to start from scratch with a blank Part. You can do this by *initializing* the Part, which clears it out and sets all its parameters to their defaults.

- On the EDT PERF page, scroll to the Init Part command.
- Press +1/YES.

To prevent you from accidentally erasing the Part, the Wavestation SR will ask you, "Are You Sure?"

- If you're sure that you want to initialize the Part, press +1/YES again.
- Repeat this for all undesired Parts in the Performance.

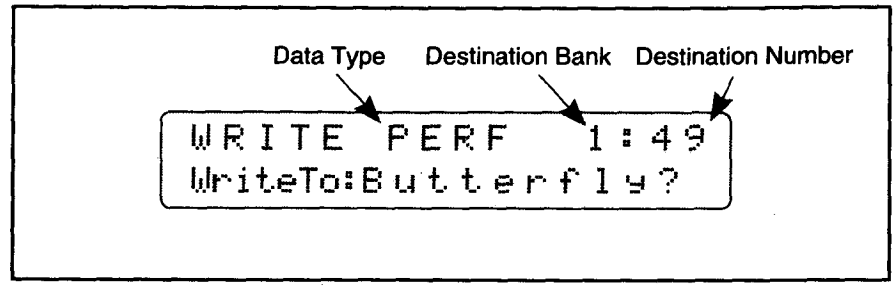
7.7 Writing a Performance

Try to save everything that sounds good or would take a lot of work to rebuild. RAM Cards make this easy. You can also write to RAM1, 2, or 3, or use the SYSEX DATA XMIT page to record the data with a MIDI sequencer, data disk, or librarian program. For more information on Sysex, see the Reference Guide [SYSEX DATA XMIT].

NOTE: Before attempting to write to a RAM card, disable its protection switch. After a writing session, re-enable the Protection switch to prevent battery drain when the SR's power is switched off. The GLOBAL page Memory Protect must also be OFF for the memory bank (Internal or Card) into which you are writing.

- From the EDT PERF page, or from any other page on the Edit Performance or Performance levels, press the WRITE/COMPARE button to go to the WRITE PERF page.

WRITE PERF page, Write level



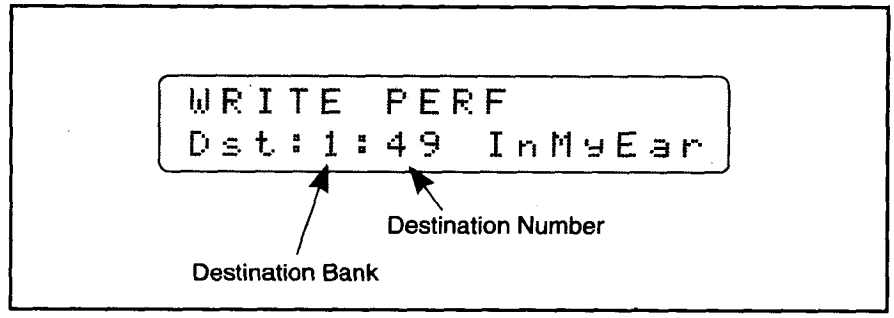
To save the changes to the current Performance:

☛ Press +1/YES. The changes will be written, and the screen will return to the PERFORM page.

If you want to write the Performance to a new location:

☛ Cursor right to the Destination parameter.

WRITE page, Destination parameter



☛ Use +1/YES and -1/NO to select the Bank and Number of the Performance to write over.

☛ After selecting the destination, cursor left back to the WriteTo...? command.

Note that the bottom line displays the name of the Performance which will be overwritten, as opposed to that of the current Performance; that way, you know what you're erasing, and can write to a different number if necessary.

☛ Press +1/YES. The Performance will be written to the new location, and the screen will return to the PERFORM page.

Comparing Edited and Saved versions

Once you're on the WRITE page, pressing the WRITE/COMPARE button again toggles between the edited and saved versions of the Performance. The first press will display the message, "Playing Saved," and you will hear the unedited version; pressing again will display, "Playing Edited," and the edits will return. You can do this comparison as many times as you like.

7.8 Copying a Single Performance Between Banks

You can use the BANK COPY page to move an entire Bank of Performances between Banks, or to or from a RAM Card, as described in Section 4.10, Using Cards. Sometimes, though, you may just want to copy one or two

Performances. When doing this, it's important to remember that the Performance uses Patches and Wave Sequences to create its sound, but these files are not automatically kept with the Performance.

If a CARD Performance uses a RAM2 Patch, for instance, its sound will change if the RAM2 Patch is altered, or if the Card is taken to another machine with different sounds in RAM2. For this reason, it's best to copy the Patches and Wave Sequences along with the Performance.

NOTE: You don't need to copy ROM Patches and Wave Sequences to the new Bank - they can always be used in their original locations. (If you want to use the sound on a Wavestation keyboard or Wavestation A/D, though, you'll need to copy any data from ROM 4-10 - those instruments only have one ROM Bank, the equivalent of ROM 11.)

You'll want to make sure that there are spaces for all of the Patches and Wave Sequences in the destination Bank. It may help to fill out a chart showing all of the locations in the Bank, such as the one provided in Section 13.6, RAM Bank Data Form.

When copying a single Performance to a Card, make sure to copy the Patches and Wave Sequences as well.

You'll start by copying the first Patch's Wave Sequences, and then the first Patch itself, repeating this for all the Patches and their Wave Sequences. After all of these are copied, you'll copy the Performance itself. Doing the copying in this order is important! This way, the Patches will automatically be changed to use the new Wave Sequence locations, and the Performance to use the new Patch locations; otherwise, you'd have to do that by hand.

- Select the Performance that you want to copy.

Selecting the Patch

- Press the EDIT button to go to the EDT PERF page. Use the Up or Down cursors to select Part 1.
- Press the EDIT button again, to go to the PATCH page for that Part.

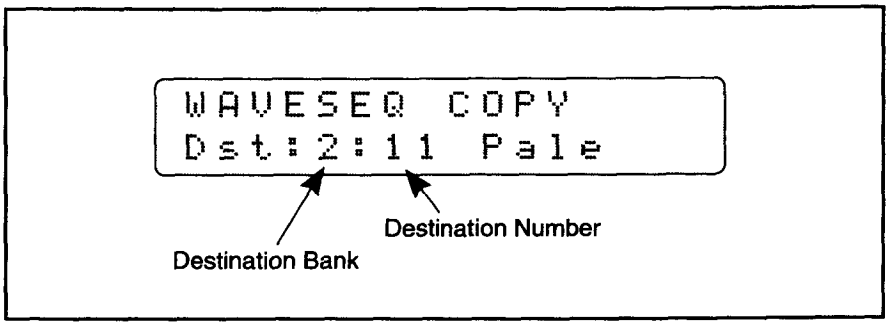
Copying the Wave Sequences

- Press PAGE+ once to go to WAVES.
- Use the Up and Down cursors to look for any Wave Sequences (they're marked with asterisks* to make them easy to spot). If there are any, select the first one and then press EDIT once again, to go to the WSEQ page. If there aren't any, go on to copying the Patch.
- Press PAGE+ until you see the WAVESEQ COPY page.

The current Wave Sequence will already be selected as the Src (Source) - the Wave Sequence that will be copied from.

- Cursor to the right to select the Dst (Destination) - the Wave Sequence that will be copied to.

WAVESEQ COPY page, Destination parameter



- Press the Bank button to select the Bank that you want to copy to. Then, cursor to the number/name parameter and use +1/YES or -1/NO to select the first empty location in your destination Bank.
- Cursor right to the Copy Wave Seq? command. Press +1/YES to copy the Wave Sequence to the destination.
- Press MIDI/GLOBAL and PAGE- together to exit to the WAVES page.

Notice that the Patch now references the new Wave Sequence location.

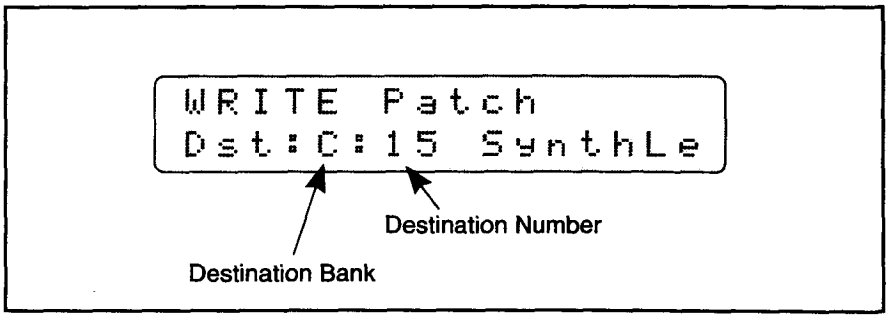
- Use the Up and Down cursors to look for any other Wave Sequences used by the Patch, and copy them to new locations just as you did the first. If the same Wave Sequence is used more than once, you don't have to make another copy of it - just change the Wave to use the new location instead.

Follow the above instructions for all of the Wave Sequences in the Patch. After they're all done, it's time to copy the Patch.

Copying the Patch

- From the WAVES page (or anywhere on the Edit Patch level), press WRITE.
- Cursor to the right to show the Dst (Destination) Patch.

WRITE page, Destination parameter



The Destination is the Patch location that will be written to. You need to select a location in the new Bank.

- Select the destination Bank by using the BANK button.

The display will change to show the Patch at this new location.

- Select the Patch number that you want to write to by using +1/YES and -1/NO.

☛ Cursor left back to the WriteTo command, and press +1/YES to write the Patch to the new location.

After writing the first Patch, go back to the EDT PERF page to find any other Patches which need to be copied. Copy any Wave Sequences that the Patch uses, and then copy the Patch itself. If the same Patch is used more than once, copy the first one to the new Bank and then just change the other Parts to use the new location.

After copying all of the Patches and Wave Sequences, you can write the entire Performance to the new Bank. For this step, follow the directions under Section 7.7, Writing a Performance.

8 EFFECTS TOUR

8.1 Overview of the Effects System

The Wavestation SR includes a self-contained digital effects processor. This module provides two independent and identical effects slots, called FX1 and FX2. Each of these can run one of 55 different effects programs (such as reverb, delay, distortion, and so on).

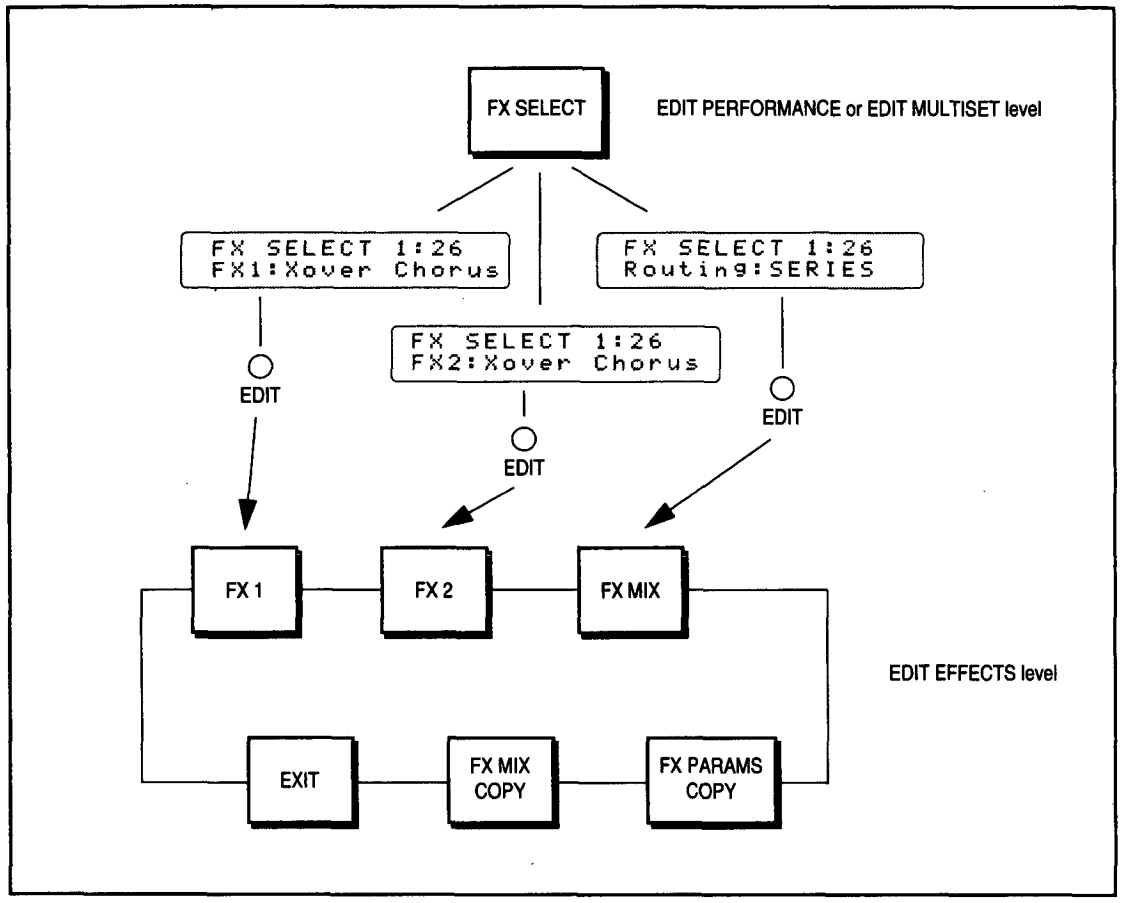
The effects also control all the signal routing associated with the effects. This includes the configuration of FX1 and FX2 (series or parallel), the routing of Parts and Performances through or bypassing of FX1 and FX2, and the mixing and assignment of Parts and Effects outputs to the four back-panel audio jacks.

There are two levels of effects editing. On the Performance and Multiset levels, you can select the effects programs for FX1 and FX2, and choose either parallel or series processing. These adjustments are covered in the next few sections.

The lower level of effects editing involves adjusting the specific parameters for each of the effects programs. As you select different programs, you'll find that the parameters vary according to the program type. For detailed explanations of each type of effects program, please see the Reference Guide [FX 1 (2)].

In PERF mode, each Performance has its own pair of effects. In MULTI mode, you can use up to 16 Performances simultaneously - but you can't have 32 separate effects! Because of this, each Multiset has its own separate effects settings which override the effects of the individual Performances.

Figure 8-1: Edit Effects Level pages



8.2 Effects Buses and Routing

To make sure that your sounds receive the desired processing and appear at the correct output jacks, you have to know a little bit about how the effects routing works.

The effects have four inputs (A - D), usually used as two stereo pairs, A/B and C/D. In PERF mode, you route Parts to these inputs by using the EDT PERF page's FXBus parameter, as discussed below in Section 8.5; in MULTI mode, you route Performances with the EDTMULTI page's FX Bus parameter, as discussed in Section 5.6.

There are four outputs (1 - 4), which correspond to the back-panel jacks. The relationships between the inputs, the FX1 and FX2 processors, and the back-panel outputs can be configured in different ways. To look at this:

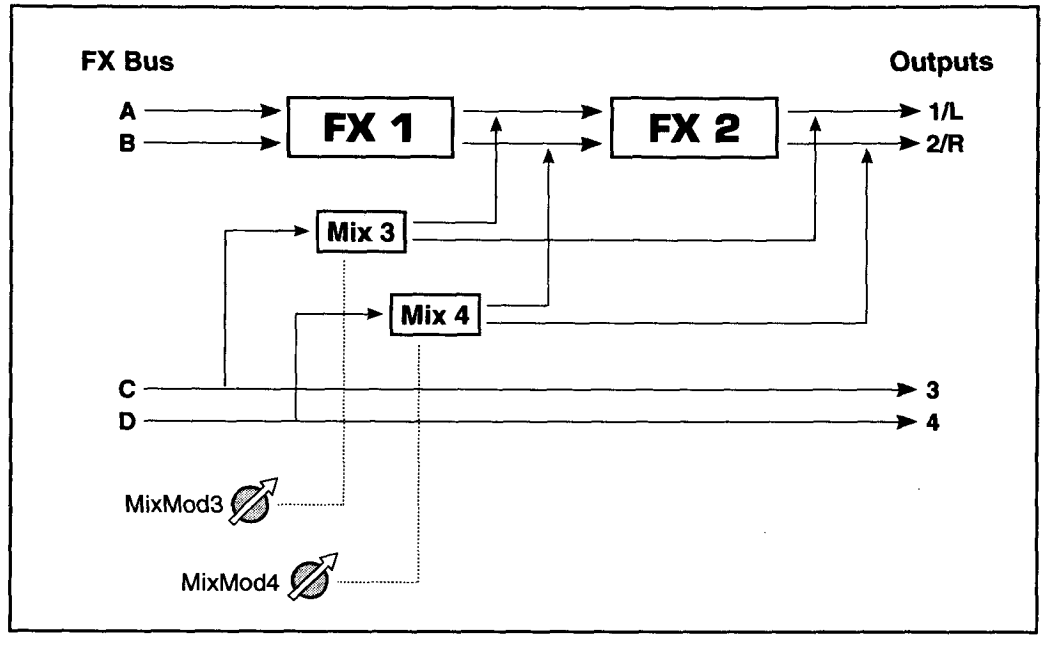
- Press PERF to go to the PERF level (you can do all of the following effects operations within a Multiset, as well, but for now we'll deal with Performances).
- Go to the Edit Performance level by pressing EDIT.
- Press PAGE+ until you see the FX SELECT page.
- Cursor to the Routing parameter.

This parameter sets the basic effects configuration to either Series or Parallel mode, as shown below.

Series Routing

The series mode makes "multi-effects" processing possible for inputs A/B. For instance, you could have a chorus going into a reverb, or distortion going into a delay.

Figure 8-2: Series Effects Routing

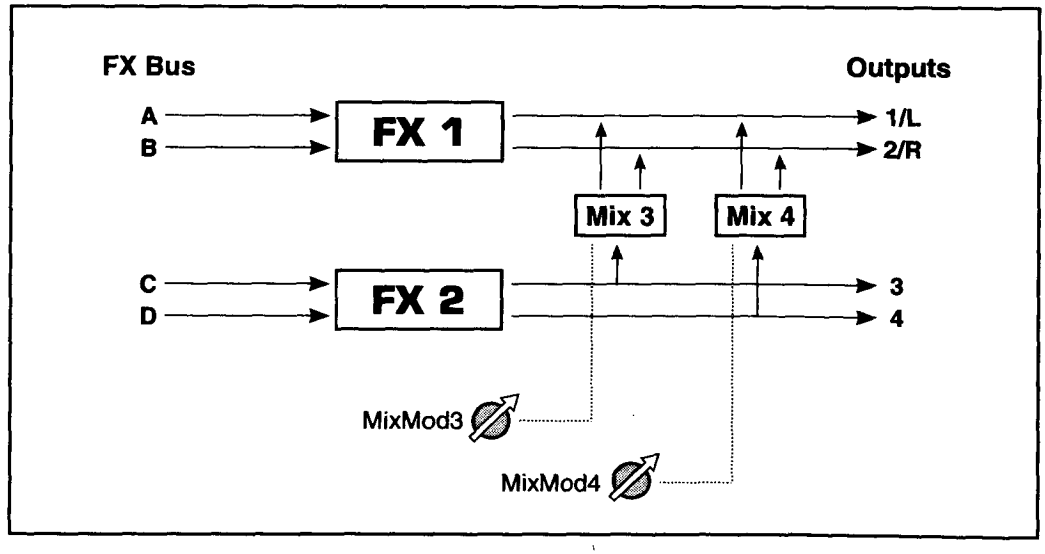


Input at A/B goes through FX1 and FX2 to outputs 1/2. Inputs C/D are left unprocessed at the outputs 3/4, or can be dynamically mixed (using the Mix 3 and 4 parameters) into FX2 as well.

Parallel Routing

The parallel mode allows separate processing for the A/B and C/D inputs. You might, for instance, have inputs A/B going through a flanger, while C/D go through an overdrive.

Figure 8-3: Parallel Effects Routing



In Parallel routing, the input at A/B goes through FX1 to output 1/2. Inputs C/D go through FX2 to output 3/4. Also, the outputs of FX2 can be mixed into outputs 1/2 using Mix3 and Mix4, with independent and dynamic control over each signal's panning.

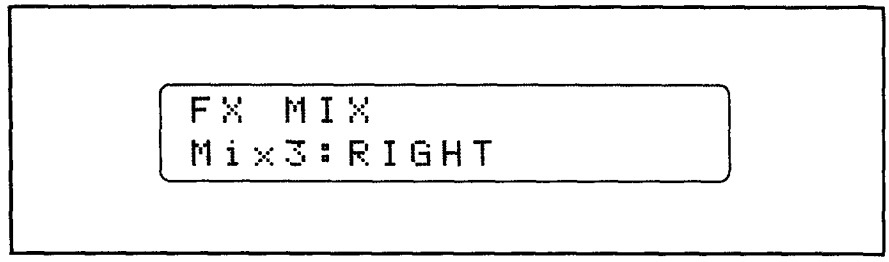
8.3 FX Mix

The FX MIX page offers more control over the effects routing, including the Mix 3/4 and mix modulation parameters. To adjust these:

☛ With the FX SELECT page's Routing parameter selected, press EDIT.

This takes you to the Edit Effects level, on the FX MIX page.

FX MIX page, Edit Effects level



Notice that the Routing parameter is available on this page, as well.

☛ Cursor right to the Mix3 parameter.

Mix 3/4

Both the Series and Parallel routings include the Mix 3/4 parameters, but they function slightly differently. The diagrams above give a graphic representation of the mix functions.

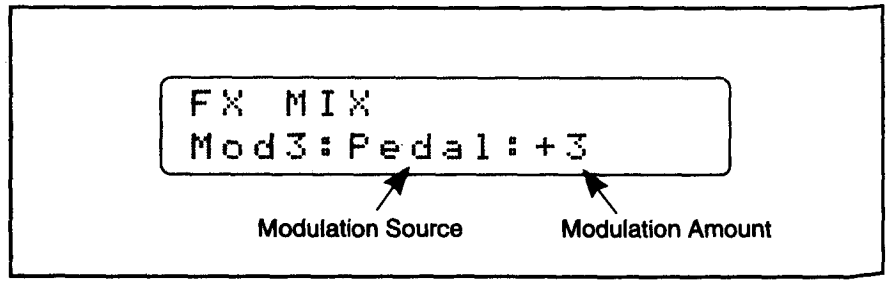
In the Series routing, Buses C and D are always sent to outputs 3 and 4, respectively. Using Mix 3/4, you can also send them through FX2, or directly to the main stereo outputs 1/L and 2/R. This is controlled separately for C and D, with Mix 3 affecting C and Mix 4 affecting D.

In the Parallel routing, Buses C and D always go through FX2, and then on to outputs 3 and 4. Using Mix 3/4, the output of FX2 can also be sent to the main stereo outputs, with independent panning for each channel. Mix 3 controls the left channel of FX2, and Mix 4 controls the right.

When the Stereo Vocoders are used, the Effects Mix works in a slightly different way; for more information, see the description of the Stereo Vocoder-Delay effects in the Reference Guide.

☛ Cursor right to the Mod3 parameter.

FX MIX page, Edit Effects level



You can use Mod 3/4 to create a dynamic FX Mix, or for MIDI-controlled panning.

Mod 3/4

The Mod 3/4 parameters allow you to modulate Mix 3/4 in real time. In Series mode, for example, you can easily control reverb or flanging depth from a footpedal; in Parallel mode you can dynamically control the pan of FX2's output. You can choose any modulation source from the effects modulation sources, as described in Section 8.4 below. Mod3 and Mod4 allow you to pick a controller for varying the initial levels set by Mix3 and Mix4; the controller choices are described below.

Modulation Amount 3/4

This is the depth of the effect produced by the modulator selected under Mod 3/4. A positive amount moves the mix from left to right or dry to wet. A negative amount moves the mix from right to left or wet to dry.

8.4 FX Modulation Sources

The Effects can be modulated by any of the sources available to the Patch Modulation Matrix, plus a few more on the side. Below is a complete list.

NONE — When NONE is selected, no modulation is used.

WHEEL — This is the MIDI Modulation Wheel.

AT — This is Channel Aftertouch (note that, in the Patch modulation matrix, both Polyphonic and Channel Aftertouch are recognized - but as the effects are modulated globally, as opposed to on a key-by-key basis, having Polyphonic Aftertouch here wouldn't make much sense).

VEL — This modulation source uses the last Note-On velocity. This value will remain even after the note is released.

KEY — Similar to VEL above, KEY uses the MIDI note number of the highest key currently held down; if none are down, then the last key's number is used.

ENV — This is the combined value of all currently playing amplitude envelopes.

KEYDN — The "key down gate" is useful for making reverb or delay effects instantly vanish (or increase, for that matter) when you stop playing. As long as a key is held down, the maximum modulation amount is in effect; when no keys are held down, the modulation stops.

FXSW — This is the Effects Switch, which may be assigned to any MIDI Controller on the MIDI Remap page (the default is Controller #12). It is meant to be used with one of your controller's footswitches. When the footswitch is held down, the modulation is at its maximum amount; when it is released, the modulation stops.

FXTOG — Like FXSW above, FXTOG also receives the Effects Switch, and is meant to be used with one of your controller's footswitches. Unlike FXSW, FXTOG is a toggle switch; pressing down and releasing the switch once sets the modulation to its maximum amount, and doing this again turns the modulation off.

PEDAL — This receives the MIDI Mod Pedal (Controller #4).

MIDI 1 — This is MIDI Controller 1, which may be assigned to any MIDI Controller on the MIDI Remap page.

MIDI 2 — MIDI Controller 2, like MIDI Controller 1, may be assigned to any MIDI Controller on the MIDI Remap page.

WH+AT — This is the sum of the Mod wheel and Aftertouch.

JOYAC — This is the horizontal axis of the Joystick controller, which may be assigned to any MIDI Controller on the MIDI Remap page (in case you don't have a controller with a Joystick); the default is Controller #16. Even when it is used as an FX mod source, JOYAC also adjusts the vector mix, as described in Section 9.7, Vector Synthesis.

JOYBD — The Wavestation Joystick has two axes (that's as in, "the plural of axis," as opposed to, "that large dangerous thing that Jack Nicholson carried around in The Shining"); this is the vertical one. The MIDI Remap page allows you to assign it to any incoming MIDI Controller; Controller #17 is the default. Even when it is used as an FX mod source, JOYBD also adjusts the vector mix, as described in Section 9.7, Vector Synthesis.

8.5 Routing Patches and Performances into the Effects

Each Part in a Performance can have a different routing into the effects, which (depending on the Routing setting) can make it go through FX 1, FX 2, neither, or both. This also controls the panning of the Part across the stereo outputs 1 and 2.

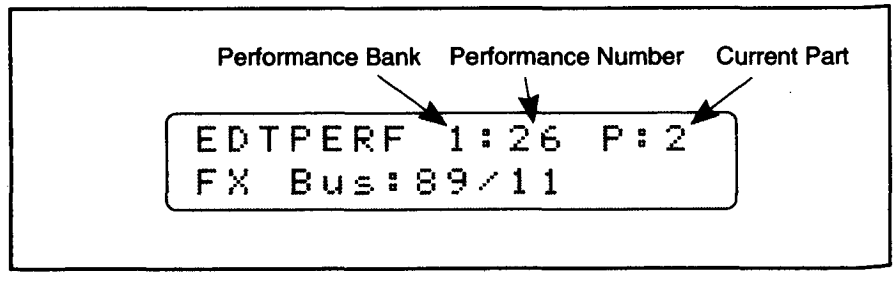
The effects routing and panning can also be separately controlled for each Performance in a Multiset. When this is done, it overrides the settings for the individual Parts. For a description of effects routing and panning in Multisets (which is essentially the same as for Parts in a Performance), see Section 5.6, Changing the Volume and Pan of a Channel.

Each Part of a Performance (or each Performance in a Multiset) can have its own effects routing.

The routing for a Performance Part is done on the EDTPERF page.

- ☛ Press PERF to go to the PERF level.
- ☛ Go to the Edit Performance level by pressing EDIT.
- ☛ Cursor to the FX Bus parameter.

Edit Performance level



- ☛ Select the desired bus assignment. The options and their meanings are described below; you might want to take another glance at the Parallel and Series FX structures in figures 8-2 and 8-3.

BUS-A	Bus A only.
99/1 - 1/99	Panned between A and B; 99/1 is almost hard left, 50/50 is center, and 1/99 is almost hard right.
BUS-B	Bus B only.
BUS-C	Bus C only.
C+D	Centered between C and D.
BUS-D	Bus D only.
ALL	All four buses.
PATCH	This uses the FX Bus settings from the Patch's Bus Assignment page. This selection is not available for a Performance in a Multiset; instead, you can select PERF, which uses the Performance's FX Bus settings.

8.6 Selecting Performance or Multiset Effects

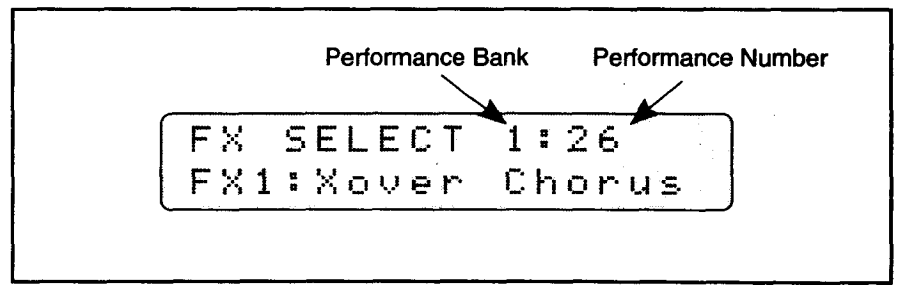
Having learned about the effects system, you can now choose the desired routing configuration, and try out the different effects. The effects programs themselves may be chosen on the FX SELECT page, on the Edit Performance or Edit Multiset levels.

For Performances:

- From the PERF page, press EDIT to go to the Edit Performance level.
- Go to the FX SELECT page by using PAGE+.

For Multisets:

- From the MULTISET page, press EDIT to go to the Edit Multiset level.
- Go to the FX SELECT page by using PAGE+.



Not all effects sound good with all sounds, and both may benefit from careful editing. For example, to discourage muddiness as you increase the reverb depth, you may want to shorten some envelope times in the Patch.

- Choose the desired effect program for FX1.
- Cursor to the right, and select another effect program for FX2.

A descriptive list of the effects choices follows.

8.7 Effects List

No Effect
This setting passes the signal on directly, without processing. If you want dry outputs, you can also use the GLOBAL page Effects On/Off parameter - for more information, see Section 6.6, Turning the Effects On and Off.

REVERB - EQ

Small Hall - *Small hall reverb - EQ*
The tight, well-defined reverberation patterns of a light, spacious hall.

Medium Hall - *Medium hall reverb - EQ*
Short and emphasized early reflections characteristic of a warm, spacious hall.

Large Hall - *Large hall reverb - EQ*
The natural, spacious and dense ambience characteristic of a concert hall.

Small Room - *Small room reverb - EQ*
A light, tight room good for thickening.

Large Room - *Large room reverb - EQ*
A warm, tight room.

Live Stage - *Live stage - EQ*
A dense, tight room.

Wet Plate - *Wet plate reverb - EQ*
A dense, open plate.

Dry Plate - *Dry plate reverb - EQ*
A light, open plate.

Spring Revrb - *Spring reverb - EQ*
Resonant springs.

EARLY REFLECTIONS

Reverberation is created out of both the reverberant "wash" and more discrete, initial echoes called early reflections. The hall, room, plate, and spring reverbs listed above contain both of these elements, but the three effects below create only the early reflections, allowing you to adjust these parameters with greater precision.

Adjustment of the Decay Time permits a wide range of effects, such as adding density to the sound or achieving a "live" room sound. Following an Early Reflections program with reverb (in series Routing), gives especially high-quality reverberation.

EarlyReflec1 - *Early reflections - EQ 1*
This program creates dense early reflection patterns, with a normal fade-out.

EarlyReflec2 - *Early reflections - EQ 2*
The early reflection levels in this effect are controlled by an envelope which first fades out, and then fades in again.

EarlyReflec3 - *Early reflections - EQ 3*
This effect uses a reverse envelope on the early reflections. The reverse effect (similar to a tape recorder being played backwards) can be applied to

sounds which have strong attack characteristics, such as cymbals, or to produce "new age" drones.

GATED REVERB - EQ

Gated Reverb - *Forward gated reverb*

Reverse Gate - *Reverse gated reverb*
In these effects, an early reflections reverb is gated by a modulation source. The gate hold time is adjustable.

STEREO DELAY

Stereo Delay
A stereo delay effect having two delay systems, where the delay times are synchronized to fixed ratios of each other. For swell-in/out delay effects, you can modulate the input level.

PING-PONG DELAY

PingPong Dly - *Ping-pong delay*
A stereo delay in which the feedback signal of each delay crosses over to the other so that the delayed sound alternates left-right.

DUAL MONO DELAY

Dual mono delay
Two separate, parallel delays.

MULTI-TAP DELAY - EQ 1

Multi-Tap 1 - *Multi-tap delay - EQ 1*
Two multi-repeat, parallel delays with input modulation.

MULTI-TAP DELAY - EQ 2

Multi-Tap 2 - *Multi-tap delay - EQ 2*
Two multi-repeat, parallel delays with cross panning and input modulation.

MULTI-TAP DELAY - EQ 3

Multi-Tap 3 - *Multi-tap delay - EQ 3*
Two multi-repeat, parallel delays with crossover feedback and input modulation.

STEREO CHORUS - EQ

StereoChorus - *Stereo chorus - EQ*
A stereo effect that combines two parallel chorus circuits using phase-inverted LFOs.

Quad Chorus - *Quadrature chorus - EQ*
Two parallel chorus circuits using quadrature-phased LFOs.

CROSSOVER CHORUS - EQ

XOver Chorus - *Crossover chorus - EQ*
Two parallel chorus circuits using quadrature-phased LFOs and crossover output mixture.

HARMONIC CHORUS

HarmonicChor - *Harmonic chorus*
This stereo chorus features quadrature-phased LFOs and a special frequency splitter. The splitter routes high frequencies to the chorus. Low frequencies are routed around the effect, and thus excluded from processing.

STEREO FLANGER - EQ

Flanger 1- *Stereo flanger - EQ 1*
A stereo effect combining two flanger circuits, with phase-synchronous LFOs.

Flanger 2 - *Stereo flanger - EQ 2*
A stereo effect combining two flanger circuits, with phase-inverted LFOs.

CROSSOVER FLANGER - EQ

XOver Flange - *Crossover flanger - EQ*
A flanger effect in which the feedback signal of each flanger circuit crosses over and is routed to the other flanger.

Crossover flanger uses phase-synchronous LFOs.

ENHANCER - EXCITER - EQ

Enhance/Xcit - *Enhancer - Exciter - EQ*
A stereo exciter with spatial delays.

DISTORTION - FILTER - EQ

Distortion - *Distortion - Filter - EQ*
This effect has a "dirty" sound and "wah" effect. It is effective for solos.

Overdrive - *Overdrive - Filter - EQ*
This is an effect that simulates the overdrive generally used by guitars.

STEREO PHASER

Phaser 1 - *Stereo phaser 1*
Phaser 1 uses phase-synchronous LFOs.

Phaser 2 - *Stereo phaser 2*
Phaser 2 uses phase-inverted LFOs.

ROTARY SPEAKER

Rotary Spkr - *Rotary speaker*
This effect simulates a rotating speaker, and is most commonly used with organ sounds. The "speaker" is modulated by a free running LFO; you can use a mod source to switch between the programmable slow and fast rotation speeds. The acceleration amount controls how long it takes the rotors to reach their new speed.

The footswitch can be set to turn the effect on or off, or it can be used to control the mode of the fast/slow rotor speed select (by selecting the footswitch as the rotor speed mod source).

STEREO MOD - PAN - EQ

These effects dynamically pan the inputs in the stereo output mix. The effect output is the mix between the panned outputs and the equalized effect inputs.

Stereo Mod Pan - *Stereo mod - pan - EQ*
Two parallel dynamic pan effects with phase-inverted LFOs (180°). The two inputs alternate in the stereo mix.

Quad Mod Pan - *Quadrature mod - pan - EQ*
Two parallel dynamic pan effects with quadrature-phased LFOs.

EQUALIZATION

Parametric EQ - *Stereo parametric EQ*
This is a three-band parametric equalizer. For "wah" type effects, you can modulate the midrange frequency.

COMBINATION CHORUS/DELAY

Chorus>Delay - *Chorus - Stereo delay - EQ*
This is a mono input, stereo output chorus fed into a stereo delay. The delay includes a sample/hold feature for capturing and recirculating the delay line contents.

COMBINATION FLANGER/DELAY

Flange>Delay - *Flanger -Stereo delay - EQ*
This is a mono input, stereo output flanger fed into a stereo delay. The delay includes a sample/hold feature for capturing and recirculating the delay line contents.

DUAL MONO DELAY - REVERB

Delay/Hall
A monophonic delay in parallel with a monophonic hall reverb.

Delay/Room
A monophonic delay in parallel with a monophonic room reverb.

DUAL DELAY/CHORUS

Delay/Chorus
A monophonic delay in parallel with a monophonic chorus.

DUAL DELAY/FLANGER

Delay/Flange - *Delay/Flanger*
A monophonic delay in parallel with a monophonic flanger.

DUAL MONO DELAY - OVERDRIVE - DISTORTION

Delay/Distor - *Delay/Distortion-filter*
A monophonic delay in parallel with a distorted "wah" effect.

Delay/ODrive - *Delay/Overdrive-filter*
A monophonic delay in parallel with an overdrive "wah" effect.

DUAL MONO DELAY - PHASER

Delay/Phaser
A monophonic delay in parallel with a monophonic phaser.

DUAL MONO DELAY - ROTARY

Delay/Rotary - *Delay/Rotary speaker*
A monophonic delay in parallel with a monophonic rotary speaker simulator.

STEREO PITCH SHIFTER

Pitch Shift - *Stereo pitch shifter*
A stereo pitch shifter with the left channel shifted up and the right channel shifted down. This effect makes an excellent stereo chorus when used with small amounts of shift.

MODULATABLE PITCH SHIFTER

ModPitchShft - *Modulatable Pitch Shifter-Dly*
This stereo pitch shifter allows the amount of shift to be modulated. The input may be shifted either up or down, and the shifted signal may also be delayed with respect to the original signal, with an adjustable feedback amount.

STEREO COMPRESSOR-LIMITER/GATE

Comp-Lim/Gat - *Stereo Compressor-Limiter/Gate*
The compressor provides an automatically controlled volume envelope, which can be used to smooth out the level of a signal (often done with guitar sounds), or used to give a sound more "punch" (often used for drums).

SMALL VOCODER

The Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). The first stand-alone vocoders were intended mostly for speech effects, but this is only part of the effect's capabilities.

The vocoder effects can modulate one or more Wavestation Patches or Waves to achieve new, dynamic timbres. You can even combine Vector and/or Wave Sequence sounds in this cross-timbral modulation synthesis, and then store them as a new Performance (for more information on this subject, please see Section 8.10, Using the Vocoders).

The Vocoder may be used with any combination of sounds. Since the designation of Carrier and Modulator is based on the FX Bus, you must make sure that any applicable settings on the Patch FX Bus Assignment page and Performance and Multiset FX Bus parameters are configured appro-

priately. For more information on the vocoders, please see the Reference Guide, under FX1 (2).

Sml Vocoder1 - *Small vocoder 1*
This vocoder uses low to mid-high frequency bands. It has a wider band covering the bass range, for enhanced low-end response.

Sml Vocoder2 - *Small vocoder 2*
This vocoder uses mid-low to high frequency bands. It has a wider band covering the treble range, for enhanced high-end response.

Sml Vocoder3 - *Small vocoder 3*
This vocoder uses a number of low to mid-high frequency bands of even width.

Sml Vocoder4 - *Small vocoder 4*
This vocoder uses a number of mid-low to high frequency bands of even width.

STEREO VOCODER-DELAY

The two Stereo Vocoder - Delay effects are extremely powerful algorithms, and use both effects slots. When you select one of the Stereo Vocoders for Effect 1 or 2, the other Effect changes to display Stereo Vocoder as well. This means that the FX MIX page and routing parameters work in a special way; for more information, see the description of the Stereo Vocoders in the Reference Guide, under FX 1/2.

For more information on vocoders, see the description of the Small Vocoders, above.

SterVocoder1 - *Stereo vocoder - Delay 1*
This vocoder uses wide frequency bands on the treble and bass ranges, and a number of narrower bands in the mid-range.

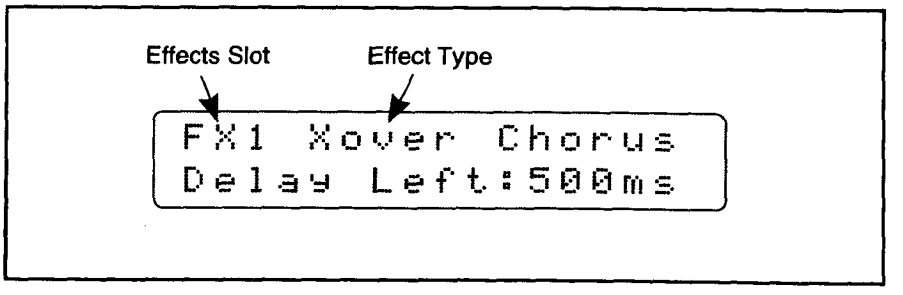
SterVocoder2 - *Stereo vocoder - Delay 2*
This Vocoder uses a number of bands of even width, across the frequency range.

8.8 Effects Editing

The Wavestation SR's effects are as sophisticated as those of a stand-alone effects processor, and each has up to 14 different programmable parameters, so that you can adjust them to your taste. To edit an effects program:

- Choose an effect on the FX SELECT page.
- Press EDIT to go to the Edit Effects level.

FX 1 page, Edit Effects level



If you were on FX1 on the FX SELECT page, you'll arrive at the FX1 page; if you were on FX2, you'll go to the FX2 page (if you were on the Routing parameter, you'd go to the FX MIX page).

The above example just shows a single parameter from Crossover Chorus, one of the Wavestation SR's 55 effects. Some parameters can even be modulated in real time, using any of a number of modulation sources, including LFOs, envelopes, MIDI controllers, note numbers, or note-on velocity, as detailed under FX MIX above.

☛ After adjusting the effect to your taste, you can move on to the other effect, and the effects mix, by using PAGE+.

For details on specific effects parameters, please refer to the Reference Guide.

8.9 Parallel Effects, Outputs 3/4, and Multisets

The Wavestation SR has four audio outputs. These are normally configured as two stereo pairs, but either or both of the pairs can be split into 2 discrete mono channels. This can come in handy in MULTI Mode, allowing you to send up to 4 Performances separately to a mixer, where they can be individually processed, EQ'd, and so on.

With the parallel effects routing, you can process Performances in a Multiset through up to four discrete effects.

In conjunction with the Parallel effects routing, The Wavestation SR can also give each of the outputs its own effect. Depending on the effects that you choose, you can have 2 independent stereo effects, 1 stereo and 2 mono effects, or 4 discrete mono effects.

NOTE: Outputs 3/4 are not affected by the Master Volume knob; this only controls the level of the stereo 1/2 outputs.

The tutorials below assume that you're familiar with Multisets. If you like, you can take a glance at Chapter 5, USING MULTISETS, before going on.

As a first step:

☛ Connect all four of the Wavestation SR's outputs to the inputs of your mixer.

Basic Parallel Effects

Let's start off by simply taking two Performances in a Multiset and processing them separately with stereo effects. For now, use your mixer to mute the SR's 3/4 outputs; we'll bring them up again later.

☛ Press MULTI to put the SR into MULTI Mode.

☛ Select a Multiset to use for this tutorial, and press EDIT to go to the EDTMULTI page.

☛ Press PAGE+ to go to the FX SELECT page.

☛ Use the +1/YES and -1/NO buttons to select Multi-Tap 1 for FX1.

☛ Cursor right to FX2, and select Distortion.

You can use other effects if you like - but these will make the results particularly obvious.

☛ Cursor right again, and select the PARALLEL routing.

☛ Press EDIT to go to the FX MIX page.

☛ Cursor right to Mix3 and set it to LEFT; cursor on to Mix4 and set it to RIGHT.

This will mix the signal from outputs 3/4 into outputs 1/2. If you don't need to process the signals independently, you can use this trick to save mixer channels.

You can modulate the Mix parameters with MIDI controllers - but for now, we don't need to.

- Keep cursoring right to Mod3, and set it to NONE; cursor on to Mod4 and do the same.

Now the effects are set up; let's go back and set up the Multiset proper.

- Press MIDI/GLOBAL and PAGE- together to exit to the FX SELECT page.
- Press PAGE- to go to the EDTMULTI page.
- Use the Up and Down cursors to scroll to your Basic Channel.
- Select Performance ROM8, #14, StarBellPiano.
- Cursor right until you see the FX Bus parameter. Set this to 50/50 (shortcut: just press the +1/YES and -1/NO buttons together).

This will send the Performance through FX1, panned to the center.

- Cursor back to the Performance name, and use the Up cursor to select the next channel.
- For the second channel, select Performance ROM7, #4, Cutting Lead.
- Cursor to this channel's FX Bus parameter, and set it to C+D (shortcut: press +1/YES and EDIT together for the max value, and then press -1/NO twice).

This will send the synth lead Performance through FX2.

Now, use your controller to play first the Basic Channel, and then the other. The bells should be processed through a multi-tap delay, and the synth lead should be distorted. Both sounds should come out of the stereo outputs 1/2.

Of course, you can process more than one sound through each effect. For instance, you may have several sounds that use a chorus effect, or a reverb, and then one that uses a special effect such as distortion or rotary speaker. In that case, just give the sounds the same FX Bus settings, and they will go through the same effects.

Parallel Effects and Outputs 3/4

Now, let's change the effects mix so that the bells go to the stereo outputs 1/2, and the synth lead goes to 3/4.

- Bring up the levels for the SR's 3/4 outputs on your mixer.
- Now, try playing the synth lead sound.

Notice that the lead sound is coming out of all four of the SR's outputs. This is because sounds assigned to FX Bus C and D *always* appear at the 3/4 outputs - the question is whether or not they are mixed with the stereo 1/2 outputs as well. (You might want to look at Figure 8-3, which shows the Parallel effects signal flow graphically.)

In the last section, you adjusted the Effects Mix parameters so that C and D were mixed into the stereo outputs. Let's go back and change that.

- From the EDTMULTI page, press PAGE+ to go to FX SELECT.

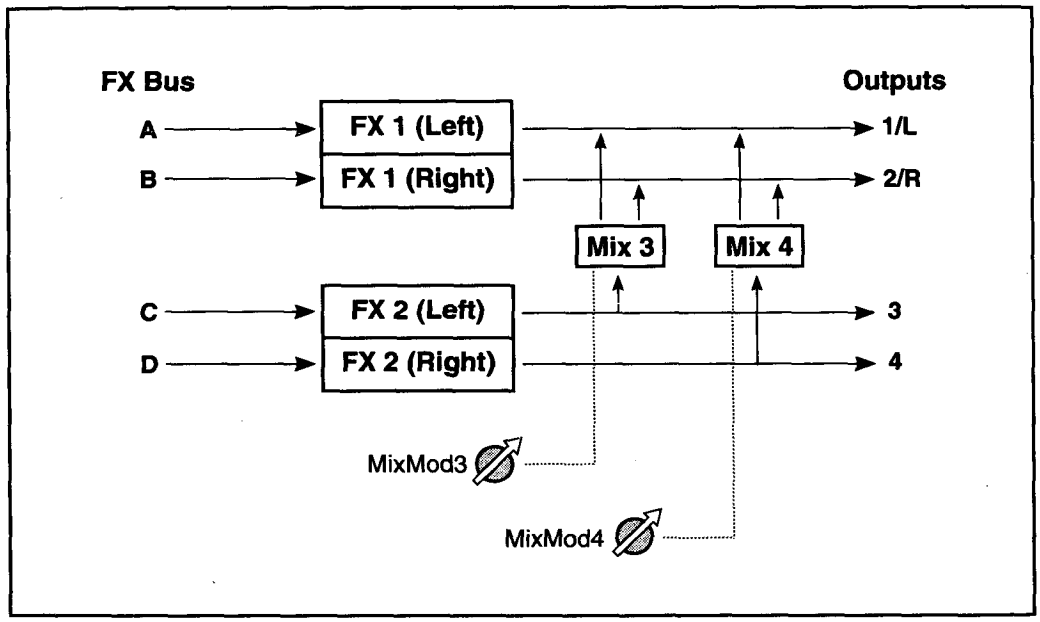
- Cursor to the Routing parameter, and press EDIT to go to FX MIX.
- Cursor right to Mix3, and set it to OFF. Cursor to Mix4, and set it to OFF as well.
- Cursor to the right again, and make sure that Mod3 and Mod4 are still set to NONE.

Now, play the lead sound again; it will only come out of outputs 3/4. Similarly, the bells will only come out of 1/2.

Dual Mono Effects and Outputs 3/4

The dual mono effects are a special set of effects optimized for use with MULTI Mode and the additional outputs. They process the left and right signals separately, so that one might go through a delay and the other a distortion. These effects include Dual Mono Delay, Delay/Reverb, Delay/Chorus, Delay/Flanger, Delay/Overdrive, Delay/Distortion, Delay/Phaser, and Delay/Rotary Speaker.

Figure 8-4: Dual Mono Effects with Parallel Routing



Let's add two more Performances to the Multiset from the above tutorial, and then route them through the dual mono effects.

- Press MIDI/GLOBAL and PAGE+ together to exit to FX SELECT.
- Go back to the EDTMULTI page by pressing PAGE+.
- Select the next channel after the one containing Cutting Lead. Change that third channel's Performance to ROM9, #7, Resonant Waves.
- Select the next channel after that, and change its Performance to ROM8, #13, Phasey Clav.

You should have a Multiset with four Performances - StarBellPiano, Cutting Lead, Resonant Waves, and Phasey Clav. Next, let's call up some of the dual mono effects.

- Go to FX SELECT by pressing PAGE+.
- Call up Delay/Distortion for FX1.

This will provide delay for the bells, and distortion for the lead sound.

- Choose Delay/Flange for FX2.

The flanger is for the clav, and the second delay for the resonant synth.

Now, the final step - assigning the Multiset channels to the proper FX Buses.

- Go back to the EDTMULTI page by pressing PAGE+.
- Select the Basic Channel by using the Up and Down cursors. This should be playing StarBellPiano.
- Cursor right to the FX Bus parameter. Set this to BUS-A, so that it goes through the left side of FX1, the delay. (Use the shortcut for minimum value - MIDI/GLOBAL and -1/NO.)
- Cursor Up to the next channel, the one playing Cutting Lead. Set its FX Bus to BUS-B; this will make it go through the right side of FX1, the distortion. (Shortcut: press EDIT and +1/YES together for the maximum value, and then press -1/NO a few times to get to BUS-B.)
- Cursor Up again to the third channel, the one playing Resonant Waves. Set its FX Bus to BUS-C (use the same shortcut as above). It will then go through the left side of FX2, the second delay.
- Cursor Up one last time to the fourth channel, the one playing Phasey Clav. Change its FX Bus to BUS-D. It will then go through the right side of FX2, the flanger.

Now, try playing the sounds from your controller, one by one. The bells will be delayed, the lead sound distorted, the resonant synth delayed, and the clav flanged. Each sound should be sent from its own output, so that you can use your mixer to add more processing, panning, EQ, etc. to each sound individually.

The dual mono effects can be used in combination with each other or with any of the stereo effects (except for the Stereo Vocoders, which use up both effects slots). You might, for instance, use a stereo chorus on several sounds, and then a dual mono effect for special processing of two others.

NOTE: Panning is also affected by the settings on the Patch A-B PAN page, which allows modulation of pan by velocity and key position. If pan position is being modulated, sounds hard-assigned to Buses A or B will move into the other channel - exactly what pan modulation is meant to do, but not good for use with the dual mono effects. For best results with the dual mono effects, you should turn any Patch pan modulation off.

Dual Mono Effects and the Stereo Outputs

You don't have to use outputs 3/4 to take advantage of the dual mono effects - they can still be used with the stereo outputs 1/2. You even get an added feature with the stereo outputs: control of panning for the output of FX2.

The Mix3 and Mix4 parameters mix the signal for outputs 3/4 into the stereo outputs 1/2. In the Parallel effects routing, they also control the panning of those signals - so the sounds don't have to be just hard left or hard right. The Mix parameters can even be modulated by MIDI controllers, for dynamic panning. For more information, see the Reference Guide, under FX MIX.

8.10 Using the Vocoders

Cross-Timbral Modulation Synthesis using the Vocoders

In this simple example, we'll use the Vocoders to combine two Patches into a hybrid sound.

- Initialize a Performance.
- Go to the EDT PERF page. Select two Patches which you would like to use in your cross-timbral modulation, and place them in the first two Parts of the Performance. It's best to use sounds with a wide frequency range, such as sawtooth-like waves or vocal "ahhs."
- On the same page, set the FX Bus for the first Part to "A," and the FX Bus for the second to B.
- Go to the FX SELECT page, and select SterVocoder1 or 2 (Stereo Vocoder - Delay 1 or 2) as Effect 1 for the Performance. These effects are so powerful that they require both effects slots, so you'll notice that Effect 2 changes to Stereo Vocoder - Delay as well.

You can use the Vocoders to create new and different timbres.

You can use the small vocoders as well, but the stereo vocoders are more impressive.

- Press the EDIT button, so that you can set up the Vocoder.
- On the Vocoder edit page, set the Modulator Bus to "A" (which you assigned Part 1 to, above) and the Carrier Bus to "B" (Part 2). This means that Part 1 is the Modulator, and Part 2 is the Carrier, so that Part 1's sound will be superimposed on Part 2's.
- Try playing the sound!

If you want to get more complex, you can use more than just a single Patch each as the Carrier and Modulator. For instance, a combination of three Patches could modulate a combination of two other Patches. To create these combinations for the Vocoder, simply set the Patches to the same FX Bus.

In addition to using several sounds to modulate each other, you can try using a single sound to modulate itself. To do this, you can either place the same sound on two Parts (similar to the example above), or simply set the Vocoder's Carrier and Modulator to use the same FX Bus.

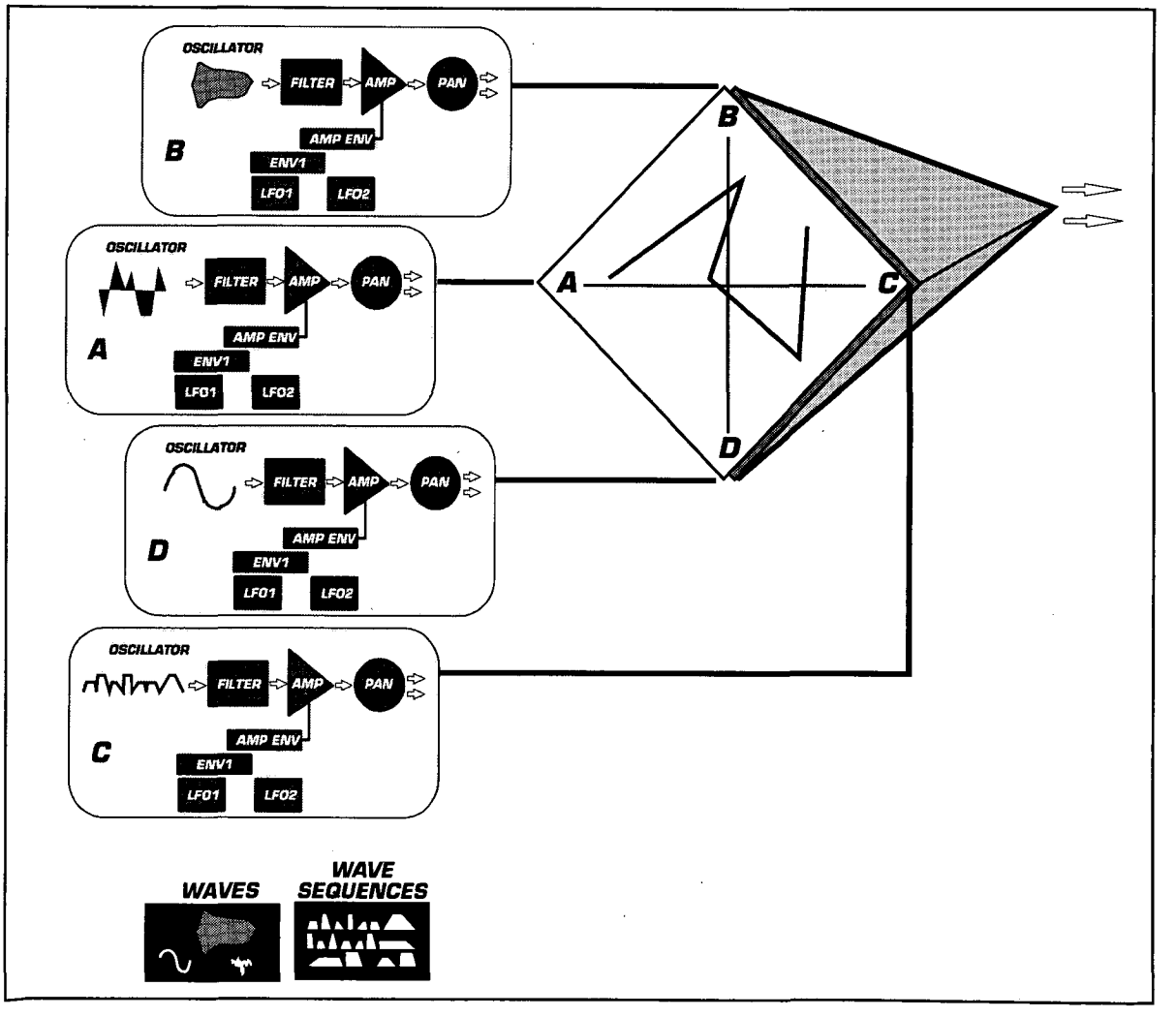
Another interesting application is to use a rhythmic, percussive Wave Sequence as the modulator, and a bright pad as the carrier. The pad will be "triggered" by the Wave Sequence's percussion; you can hear this effect in ROM5 Performance 20, Vocodadrum. This is especially effective when using a sequencer and synching Wave Sequences to MIDI Clocks, so that the Vocoder timbre creates a cool, percolating rhythm track.

9 PATCH TOUR

9.1 Overview of Patches

The Wavestation SR's sound generation system contains 32 completely digital voices, each of which contains an oscillator, filter, amplifier, two envelope generators, and two LFOs. This is similar to the classic analog synthesis model, but the Wavestation SR also makes major improvements in several key areas. Let's touch on these briefly, while referring to Figures 9-1 through 9-3.

Figure 9-1: Four-Wave Patch Signal Flow



Oscillator Structure

A Patch can use one, two, or four oscillators, each of which is actually a complete voice (called a Wave), with its own filter, amplifier, 2 envelopes, 2 LFOs, and so on. This structure choice determines the basic capabilities

of the sound. More oscillators can produce richer, more detailed sounds, but using fewer oscillators allows you to play more keys (voices) simultaneously.

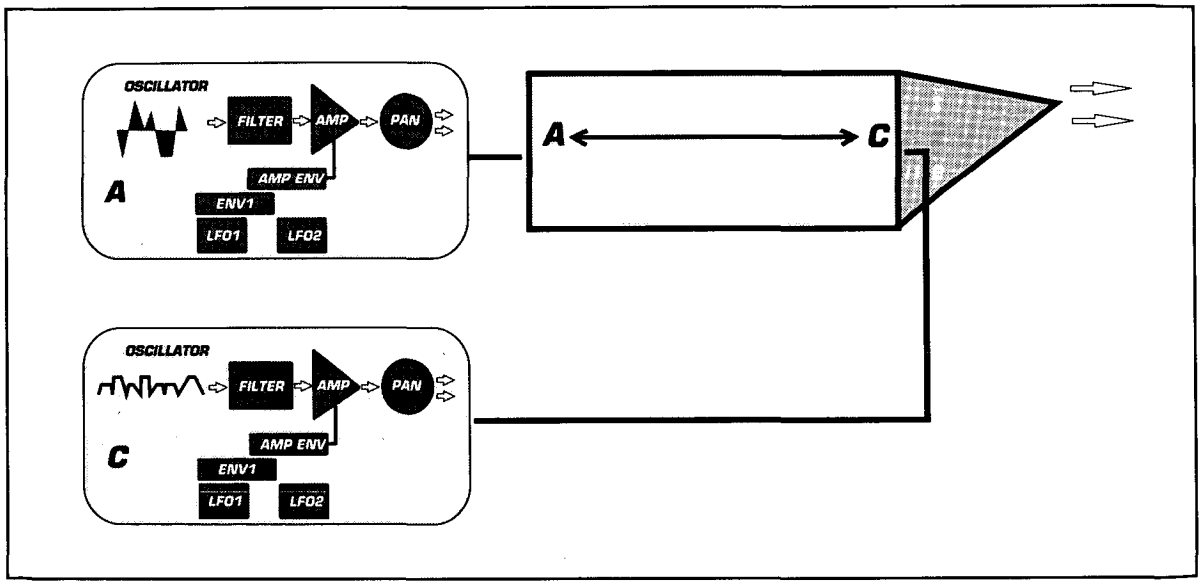
Each oscillator's basic pitch is programmable to the cent (1/100th semitone) over several octaves, enabling you to create effects ranging from delicate detunings to doubled octaves. Although the keyboard (or other controller) normally changes pitch using standard tuning, in which one keyboard octave equals one pitch octave, the keyboard slope is separately adjustable for each oscillator. This lets you implement "stretch," "shrink," and even (using negative slope values) inverse tunings.

Vector Synthesis

When the Patch structure is four oscillators, you can use Vector Synthesis to mix between them for elegant, dynamic timbre modulation (as shown in Figure 9-1). There's a quick tutorial on Vector Synthesis in Section 9.7.

When the structure is two oscillators, one-dimensional dynamic mixing is still available. For example, you can still easily fade a transient into an interesting continuous wave, or use Wave Sequences for the two oscillators (as shown in Figure 9-2).

Figure 9-2: Two-Wave Patch Signal Flow



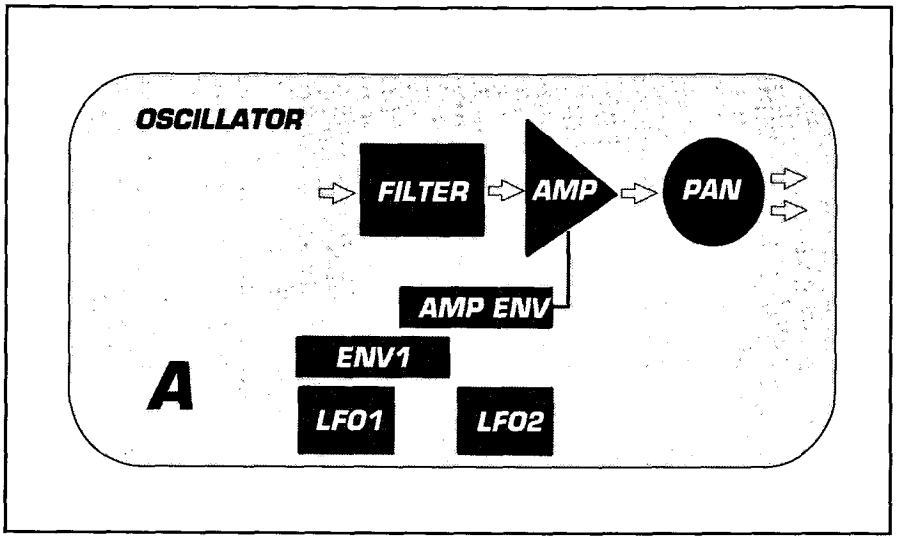
PCM Waves

Each oscillator in the Patch can play any internal PCM waveforms, plus those available from PCM cards. In general, PCM waves can either be waveforms that loop continuously, or transients which play once. Waves can also be Wave Sequences.

Wave Sequencing

You can arrange for the oscillators to play from elaborate lists of PCM wave selections, called Wave Sequences. These are treated just like normal waves, and can be processed in the same ways, including Vector Synthesis and multi-voice Patch processing. We'll look at Wave Sequencing more closely in the next chapter.

Figure 9-3: Single-Wave Patch Signal Flow



Filter

The filter controls the brightness of the sound and, in conjunction with modulators such as Envelope 1, functions as a dynamic tone control. This traditional synthesis feature has been enhanced with an "exciter," which can clarify and add presence to the sound.

Pan can be controlled in many different ways.

Pan

Voices can be positioned anywhere in the stereo field, or dynamically panned by modulators, in a number of different ways.

Pan may be modulated by keyboard position or velocity using the PAN page.

The BUS ASN (Patch Bus Assignment) page may be used to assign oscillators to any of the four outputs, allowing the joystick to control stereo or even quadraphonic panning.

The FX Bus parameter on the EDT PERF page makes it easy to set the initial pan position of each individual part.

On the FX MIX page, the Mix 3/4 parameters of Parallel routing allow continuous control of pan via the modulation matrix. Finally, the Stereo Mod-Pan effects offer complex, LFO-driven panning.

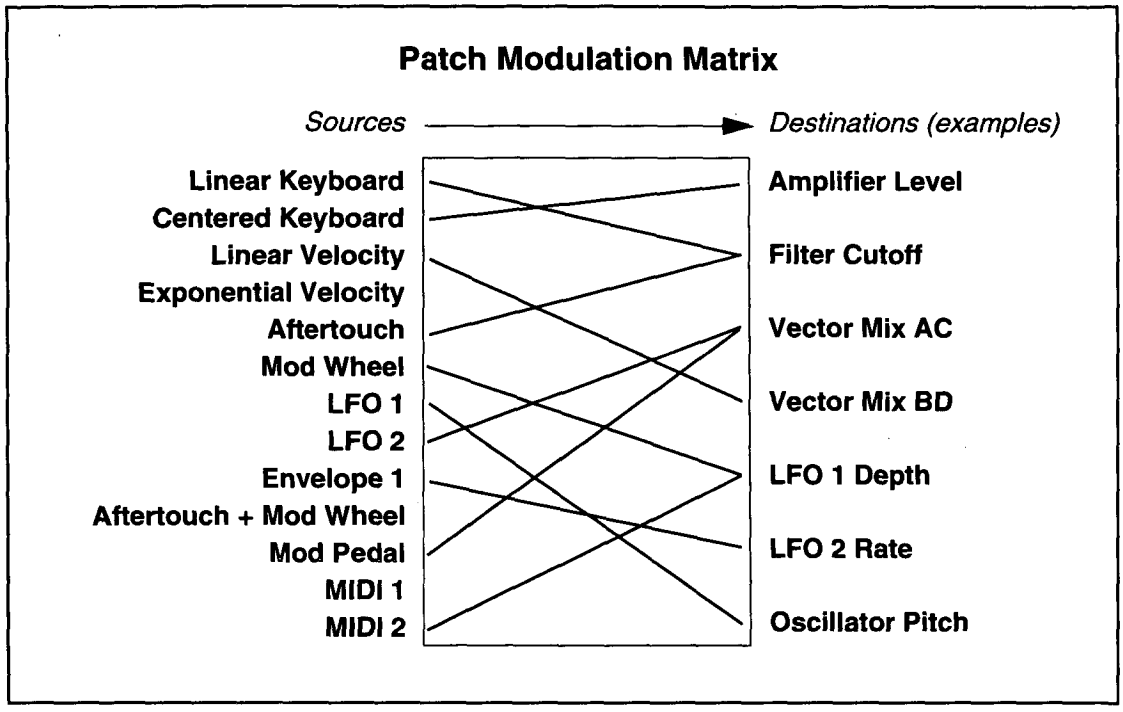
Modulation

An extensive modulation system underlies each Patch, allowing real-time performance control over a great many parameters. Most modulation destinations can be assigned two discrete sources, such as using both Envelope 1 and MIDI Aftertouch to control the filter cutoff. Several destinations have additional, fixed modulation paths, such as velocity to envelope attack time and keyboard position to filter cutoff.

Figure 9-4 shows a typical way in which the general-purpose modulation sources and destinations could be patched. There are many more possible destinations than can be shown here.

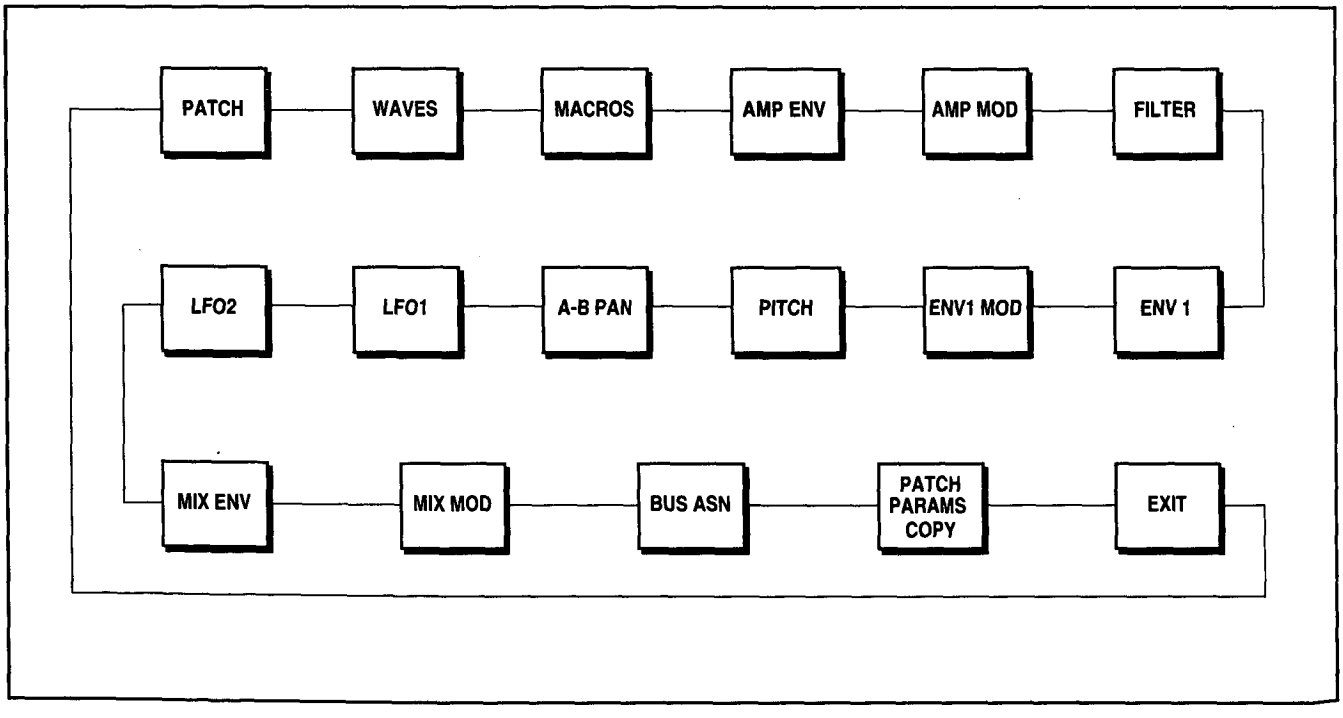
Remember that effects and Wave Sequence parameters can also be modulated, in addition to the Patch parameters!

Figure 9-4: Patch Modulation Matrix (example)



Finally, Figure 9-5 shows the all of the pages on the Edit Patch level. As always, you can move quickly from page to page by using the PAGE+ and PAGE- buttons, and from parameter to parameter within a page by using the cursors.

Figure 9-5: Edit Patch level pages



9.2 Starting to Edit a Patch

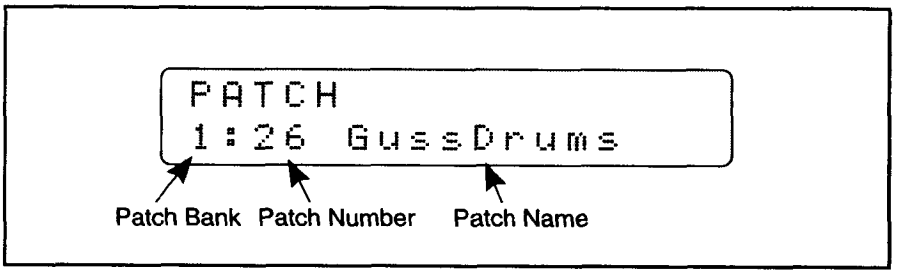
First, you should select a Patch to edit.

- Listen through the Performances until you find one you'd like to modify.
- Press EDIT to go to the EDT PERF page.

Many Performances use more than one Patch; to find the one that you wish to edit, it can be convenient to solo the Parts and listen to them one by one. This will also let you edit a Patch without being distracted by the Patches in other Parts.

- Cursor left to the Solo Part command.
- Press +1/YES to Solo the current Part. The letter "S" will flash on and off in the upper right-hand corner.
- Cursor right back to the Patch parameter.
- Use the Up and Down cursors to select the different Parts, until you find the one containing the Patch that you wish to modify.
- Press EDIT to go to the PATCH page, on the Edit Patch level.

Patch page, Edit Patch level



The Patch selected here is the one assigned to the current Performance Part. Changing the Patch selected on this screen also changes the Patch in the Part. There are 35 Patches per Bank.

This is the first page on the Patch level; try cursoring around to the other parameters. Normally you'll proceed from there by going to the WAVES or MACROS pages -- with MACROS suggested first if you are new to the instrument.

Structure

The Structure sets the number of oscillators used in the patch; this can be 1, 2, or 4 oscillators. You can change the Structure at any time. When you change to a larger structure, the data for oscillator A is copied into the new oscillators. When you change to a smaller structure, data for unused oscillators is erased.

Hard Sync

When Hard Sync is ON, oscillators B, C, and D are synced to oscillator A. This means that regardless of the length of their waveforms, they will always restart at the same time oscillator A does. This allows you to vary timbre by modulating the pitch of oscillators B, C, and D - see the PATCH page section of the Reference Guide. If the Structure is one oscillator, this parameter is not available.

Initializing a Patch

There are two basic ways to go about programming a new Patch: you can either start with a pre-existing Patch that's something close to what you want to program, or you can start from a blank slate. To create that blank slate, you can *initialize* the current Patch, replacing all its customized parameters with default values. This won't erase the Patch from memory; as with all edits (except for Wave Sequences), the new Patch is put into an edit buffer, and no changes are permanent until Write is used.

To initialize a Patch:

- On the PATCH page, cursor to the Init Patch command.
- Press +1/YES.

The instrument will ask you, "Are you sure?"

- Press +1/YES again.

Now, the Patch is initialized, and you can start from scratch.

9.3 Assigning PCM Waves

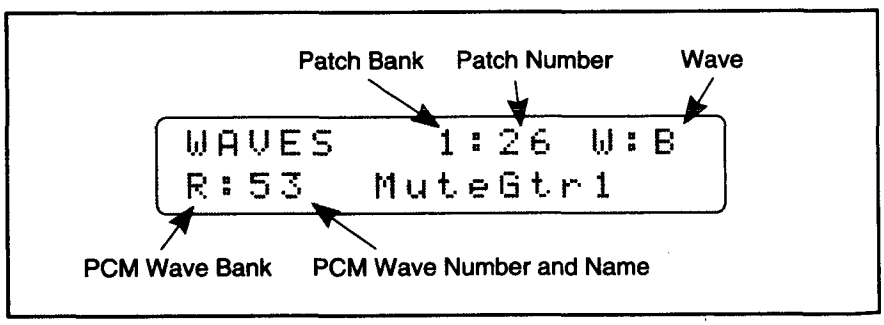
For their raw sonic material, Patches rely on digitally recorded waveforms, known as PCM Waves (PCM stands for Pulse Code Modulation, which is a common way of storing audio in digital form). Many of these are recordings of acoustic instruments, such as piano, drums, and bass; others are samples of synthesized sounds, or digital timbres created specifically for the Wavestation product line. PCM Waves can be single-cycle or few-cycle waveforms that loop continuously, transients followed by loops, or transients which play only once. Patches can also use Wave Sequences (described in the next chapter) as if they were PCM Waves.

Each patch can play up to four different PCM Waves or Wave Sequences at a time.

PCM Waves are assigned to the Patch on the aptly-named WAVES page.

- From the Edit Patch page, press PAGE+ once to go to the WAVES page.

WAVES page, Edit Patch level



- Notice the Wave parameter (labeled "W") in the upper right-hand corner of the screen.

This shows the Wave (A, B, C, or D) that you are currently editing. Each Wave may have completely different settings for all its parameters. You can change the current Wave at any time by using the Up and Down cursors.

There are 484 PCM Waves in the Wavestation SR's internal ROM, and you can access more by inserting an optional PCM Card. In addition, all of the Banks - RAM 1 through 3, ROM 4 through 11, and ROM or RAM Program

Cards - have 32 Wave Sequences, accessed as waves #0-31. These are identified by an asterisk (*) before their names.

- Cursor to the PCM Wave number, and try using the +1/YES and -1/NO buttons to select different PCM Waves for the Patch.

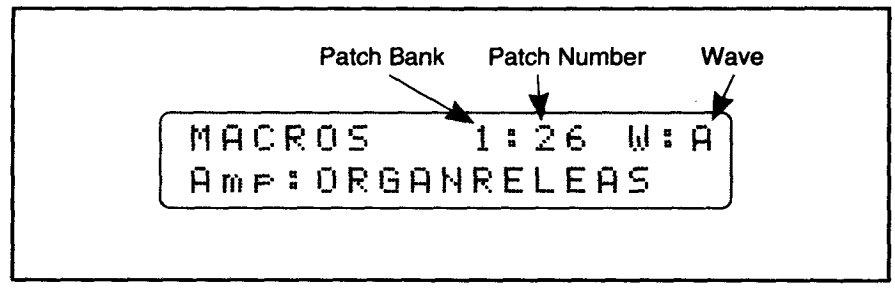
Each oscillator's initial pitch can be coarsely or finely tuned; a little detuning of one oscillator against another can enrich the sound. Also, instead of the pitch of the oscillators always tracking with the standard, 12-tones-per-octave keyboard intonation, each can have an individual tuning slope. For more information, see the WAVES page in the Reference Guide.

9.4 Selecting Macros

Macros allow you to quickly make broad changes to the main sections of a Patch, without having to adjust all the individual parameters. For example, amplifier Macros are available for all of the traditional instrumental envelopes. To get a basic contour, instead of dealing with all of the times and levels individually, you simply select "Piano," "Clav," "Strings," and so on. There are Macros for Amp, Filter, Envelope 1, Pitch, and Pan. To try out different Macros:

- From the WAVES page, press PAGE+ to go to MACROS.

MACROS page, Edit Patch level



Using Macros, it's easy to make quick, broad changes to a Patch.

There is a new possibility for the Wave parameter, which was not available on the WAVES page: All. When All is selected, any edits that you make will be applied to all of the Patch's Waves at once.

- Cursor to the different modules (Amp, Filter, etc.), select different Macros, and listen to the changes in the Patch's sound.
- For each module (Pitch, Filter, etc.) try selecting different Macros.

When the need arises, you still have quick access to the individual Macro parameters by going to the page of the same name (PITCH, FILTER, etc.). When you begin to edit the individual parameters, the Macro's title changes to USER. After editing the individual parameters, you can still select another factory Macro.

Amp

The Amp Macro is generally the first place to turn when editing a Patch. You can quickly hear what any preset sounds like with the loudness (amplitude) contours of different instruments.

Amp Macros are: DEFAULT, PIANO, ORGAN, ORGAN RELEAS(e), BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF (which can serve as a programmable mute).

Remember that this Macro can only do its work if the original PCM Wave

contains enough sound material in the first place. For example, if the sound has a slow attack, the percussive amplifier Macros won't be very effective.

Filter

The Filter Macro sets a basic tone and may include modulation. You can select from BYPASS, LOWPASS, LOWPAS/LFO, and AT SWEEP.

Envelope 1

Envelope 1 can be used as a modulator all over the Wavestation SR, and its Macros give you a number of ready-made contours. The Env1 Macros include DEFAULT, PIANO, ORGAN, ORGAN RELEAS, BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF.

Pitch

The Pitch Macros call up various useful setups for pitch modulation. Choices include DEFAULT, ENV 1 BEND, DESCENDING, ASCENDING, AT BEND (Aftertouch Bend), MIDI-BEND, and AT + MIDI-BEND.

A-B Pan

The Pan Macros control the modulation of the initial Pan position, as set with the EDT PERF page's FXBus parameter.

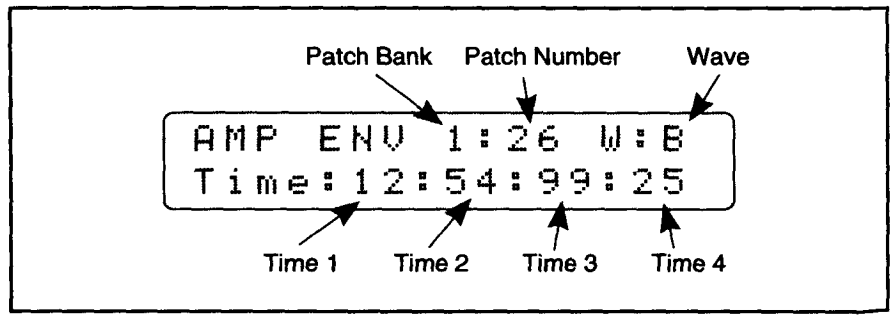
Pan Macros include: KEYBOARD, VELOCITY, KEY&VELOCITY, and OFF.

9.5 Tweaking the Amplifier

Suppose that the Amp Macro you have selected is close, but not quite right for the Patch you want; perhaps you need to speed up the envelope so that its response is quicker, for playing faster parts. You can do this on the AMP ENV(Amplitude Envelope) page.

☛ From the MACROS page, press PAGE+ once to get to AMP ENV.

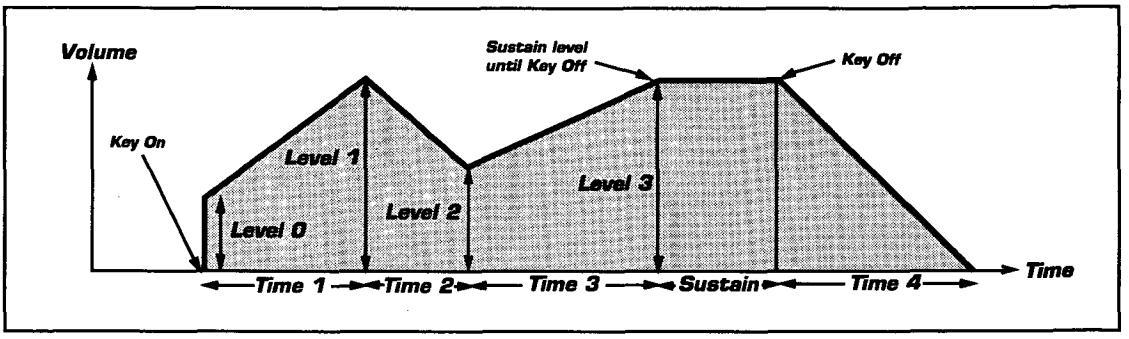
AMP ENV page, Edit Patch level



The Amp Envelope has four segments, with breakpoints labeled 0, 1, 2, 3, and 4. Points 0 - 3 have levels, while the value of point 4 is always 0. Points 1 - 4 have times: Time 1 is the duration from point 0 to point 1, and so on. Point 3 is the sustain point. Only when the key is released does the envelope proceed from point 3 to point 4.

Please see figure 9-6 for a graphical display of the envelope parameters.

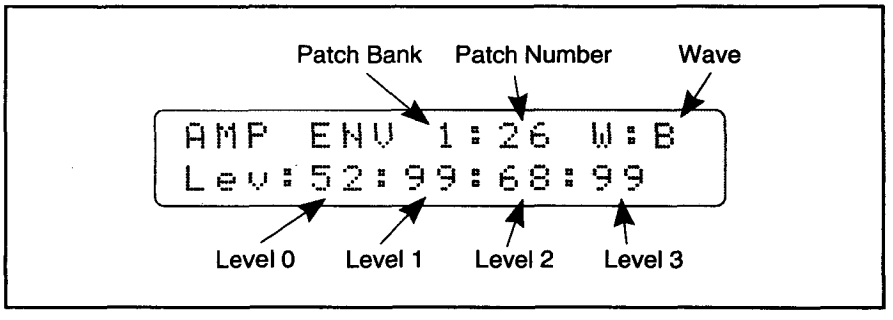
Figure 9-6: Amplitude Envelope



The four Time values are shown on the first screen. Notice that the Wave parameter is still in the upper right; each Wave has its own Amplitude Envelope. To change the envelope for all of the Patch's Waves, use the Up and Down cursors to select "All."

- Cursor to the first Time value (the attack time) and change it.
- Try changing some of the other Times.
- Cursor right from the last Time value; you'll go to the next screen of parameters, the envelope Levels.

Levels screen, Amp Env page



Here, you can adjust the levels of each envelope point.

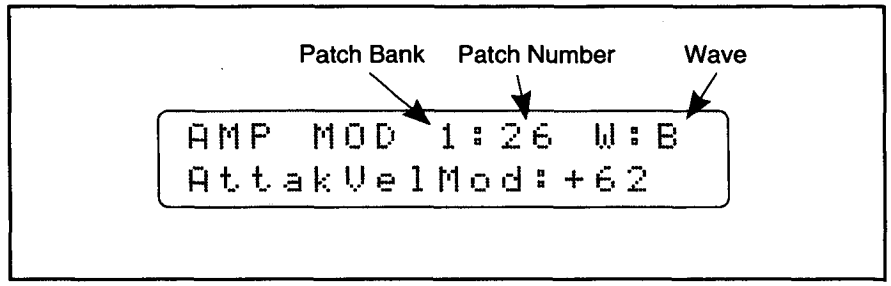
Amplifier Modulation

You can use MIDI to modulate amplitude in real time, along with the Amplitude Envelope. Typically, for instance, note velocity affects the loudness of the sound. On the Wavestation SR, velocity can also change the attack time, so that a string sound could change from a slow fade-in at low velocities to a quickly articulated part at high velocities. There are other routings available, as well.

These are set up on the AMP MOD page. To get there:

- From the AMP ENV page, press PAGE+ once.

AMP MOD page, Edit Patch level



You can modulate the Amp Envelope's attack time with velocity, and its decay/ release time with keyboard position.

AttakVelMod (Attack Velocity Modulation) controls the influence of velocity on Time 1, the attack time, of the Amplitude Envelope. With positive values, playing harder speeds up the envelope attack time, and playing more softly makes it slower (down to the original value of Time 1). Negative values mean the opposite.

VelEnvAmt (Velocity Envelope Amount) sets the velocity sensitivity of the Patch amplitude. It does this by modulating the overall level of the Amplitude Envelope. The greater the VelEnvAmt, the more sensitive the Patch.

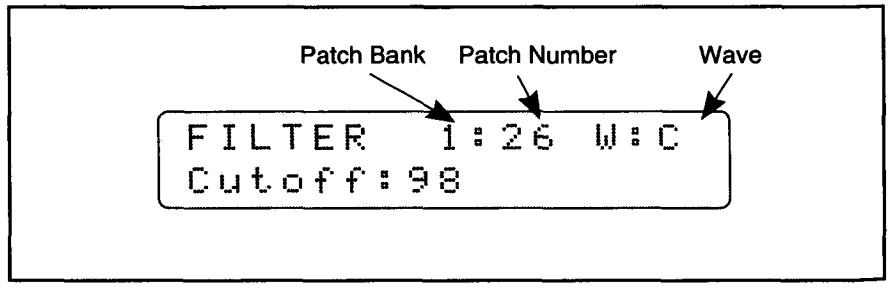
EnvKbdMod (Envelope Keyboard Modulation) allows you to modulate Times 2 and 4 of the Amplitude Envelope with keyboard position. At positive modulation amounts, higher notes have faster envelopes than lower ones - just like on acoustic instruments such as the piano. Negative values produce the opposite, so that higher notes have slower envelopes.

9.6 Tweaking the Filter

The FILTER page determines the overall tone color, or brightness, of the sound.

☛ To get to the FILTER from the AMP MOD page, press PAGE+ once.

Filter page, Edit Patch level



The Cutoff parameter sets the basic brightness, which can then be modulated by various sources.

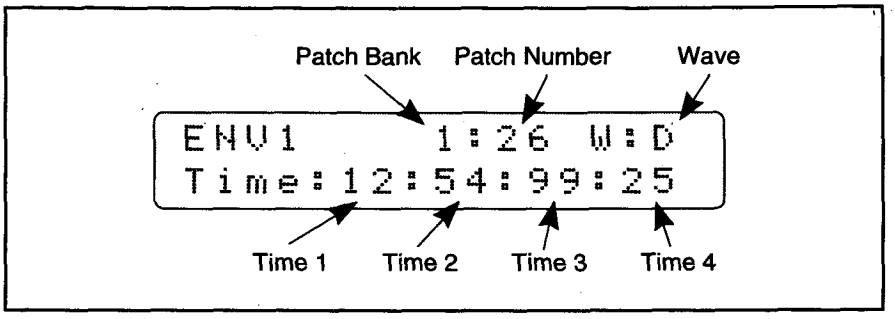
☛ Try changing the Cutoff amount. Notice how the sound changes.

The Keyboard Tracking parameter controls the consistency of the brightness across the keyboard range. It can make sounds grow brighter or more subdued as you play up and down the keyboard, to create more natural timbres. Envelope 1 is usually used to modulate the filter; you can also use another source, such as an LFO or the Mod Wheel.

In practice, you often need to balance the initial Cutoff with the modulation amounts to produce the desired tone.

☛ From the FILTER page, press PAGE+ once to get to ENV 1.

Env 1 page, Edit Patch level



Its parameters are similar to those of the Amplifier envelope, except that Envelope 1 has an adjustable release level (Level 4).You can also apply modulation on the ENV1MOD page, which is similar to the AMPMOD page described above.

9.7 Vector Synthesis

As mentioned above, there are up to four Waves in a Patch. The Mix Envelope allows you to set a different mix of these Waves for each of 5 points in time, along with the time that each of these points takes to fade into the next. In this way, the sound evolves over time as a note is held down. Note also that each Wave retains its own Filter and Amp Envelope, which occur before the Mix Envelope.

You can also modulate the mix in real time from your master controller, using a joystick, mod wheel, pedals, etc. This entire mixing process, called Vector Synthesis, is one of the special features of the Wavestation SR.

The Mix Envelope creates dynamic timbres by controlling the relative volumes of the four Waves.

Let's look at an example of a Vector Synthesis Patch.

☛ Press PERF to go to the Performance level.

☛ Select ROM8 Performance 1, Leaving the Pod.

This is a split Performance which uses two Vector Patches - we'll be looking at the one on the top half of the keyboard. If you play this sound and hold down a chord, you can clearly hear the Vector Mix evolve.

☛ Press EDIT to go to the Edit Performance level.

☛ Use the Up or Down cursor to select Part 2, Heaven's Gate.

☛ Press EDIT again, to go to the Edit Patch level.

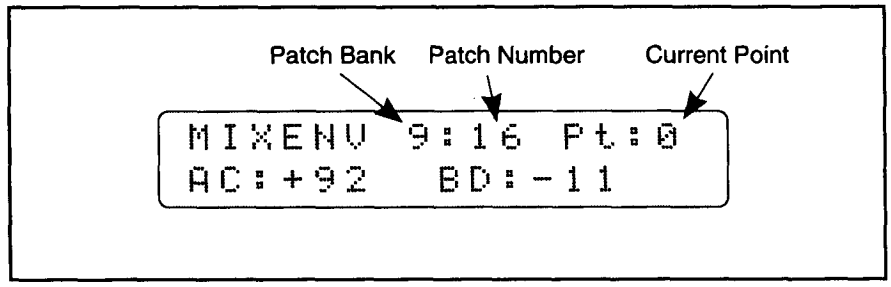
☛ Go to the WAVES page with PAGE+.

☛ Use the Up and Down cursors to browse through the Waves.

Notice that this is a four-oscillator Patch which uses two Wave Sequences - Heaven1 on Wave A and Heaven2 on Wave C.

☛ Go to the MIX ENV page by pressing PAGE- several times.

MIX ENV page, Edit Patch level



This page is organized differently than the other envelope pages, because each point has two parameters - a horizontal (AC) and a vertical (BD) position. Each position has a range of +127 to -127. The current point is displayed in the upper right-hand corner; you can change this by using the Up and Down cursors.

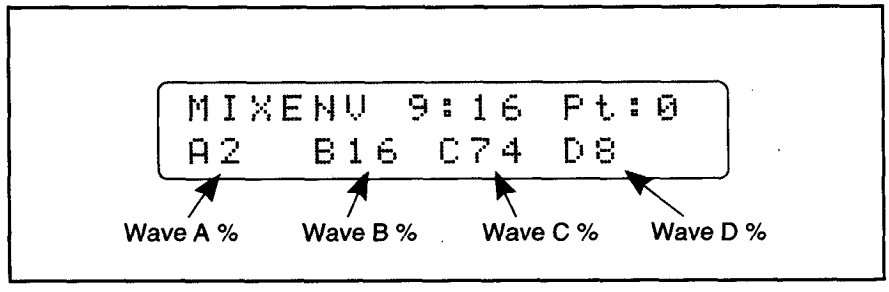
When working with a 2-oscillator structure, only the AC parameter appears. In this case, -127 produces all Wave A, +127 all Wave C, and 0 an equal mix between the two. If there is only a single Wave in the Patch, the Mix Envelope functions are not available.

In a four-oscillator structure, both AC and BD appear. These move the current point around within the 2-dimensional Vector Mix, and so the two parameters interact to create the sound (for more technical information on this, see the MIX ENV section in the Reference Guide).

The next screen gives you a different view of the Vector Mix, which you can use in conjunction with the first screen.

☛ Cursor to the right, beyond BD, to get to the Mix Percentages display.

Wave Mix Percentages screen, MixEnv page

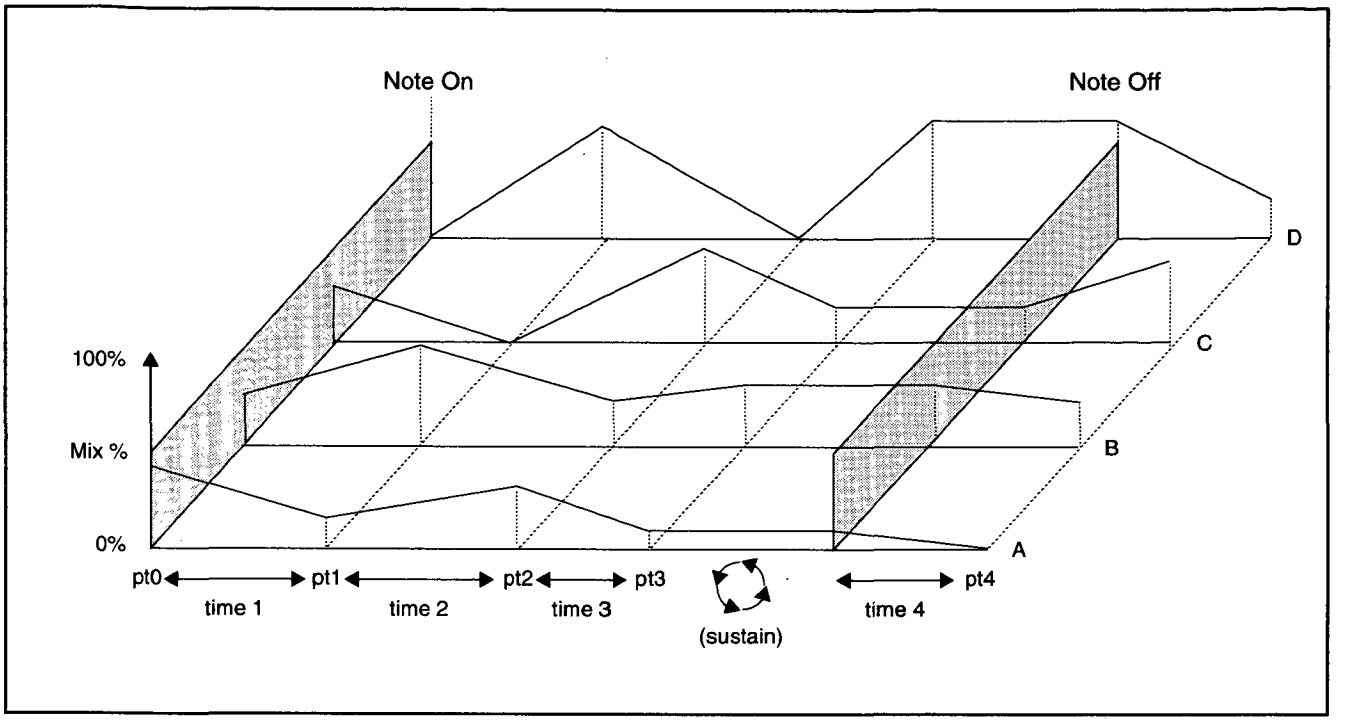


This screen shows you the relative volumes of each Wave at the current point, as set by the AC and BD parameters on the previous screen (you can't program directly on this screen). The total mix always equals 100%. You can use the Up and Down cursors to browse through the points, and see the evolution of the Vector Mix over the duration of the envelope.

For example, in this Performance, the note starts with oscillator C predominant, changes to a mix of all 4 Waves at point 1, moves to a mix of just A and C (with C predominant) at point 2, and then to a roughly equal mix of B and C at point 3. The mixture stays at point 3 as long as the note is held, and then releases to point 4, which is an equal combination of all four Waves. The result of this vector-defined mixing is a complex, dynamic timbre.

To look at the Mix Envelope in yet another way, see figure 9-7 below.

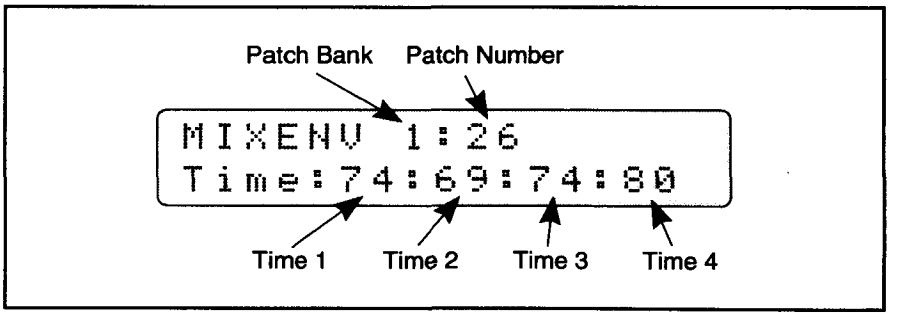
Figure 9-7: The Vector Mix



As with the other envelopes, you can adjust the time for each of the four MIX ENV segments.

☛ Cursor to the right, until you see the Mix Envelope Times screen:

Times screen, MixEnv page



These values adjust the time the Mix Envelope takes to evolve from point to point. This particular Patch's envelope is even and slow; they can be much faster, if you like.

Editing the Mix Envelope

Now that you've seen the original settings of this Vector Patch, try adjusting them yourself. For instance, try setting each of the points to play only a single Wave.

☛ Cursor back to the first screen, with the AC and BD parameters.

☛ Using the Up and Down cursors, select point zero.

☛ Change AC to -127, and BD to 0 (use the key shortcuts for minimum and middle values to make this faster).

This means that only Wave A will sound at point zero.

☛ Select point one, and change the mix there to AC 0, BD +127.

Now, only Wave B will be heard at point one.

☛ Set the mix to AC +127, BD 0 at point two, and to AC 0, BD -127 at point three.

The mix will go to Waves C and D, respectively.

☛ Finally, for point four, take the mix back to A, by setting it to AC -127, BD 0.

Now, you can listen to the edited mix, as it moves quite clearly through the vocal PCM Waves and the two Wave Sequences - the melodic, blippy Heaven2 and the string-like crossfading Heaven1. It's still kind of slow, though - so let's change that.

☛ Cursor back to the Times screen, and set the times to an accelerating envelope - Time 1 to 10, 2 to 20, 3 to 30, and 4 to 40.

The Mix Envelope can loop between two points, for a continuously changing timbre.

As you hold down a note now, you'll hear that the mix seems to be moving back and forth between the points. What you're noticing is the envelope loop feature.

☛ Cursor to the right, until you see the Loop parameter.

On this Patch, the Mix Envelope Loop is set to 1<->3, which means that the envelope progresses normally to point three, then turns around and makes its way back to point one, then back to point three again, and so on (notice that point 0, which currently features the blippy Wave Sequence, is not in the loop). There are several Looping options, including OFF - try them out and see how they work.

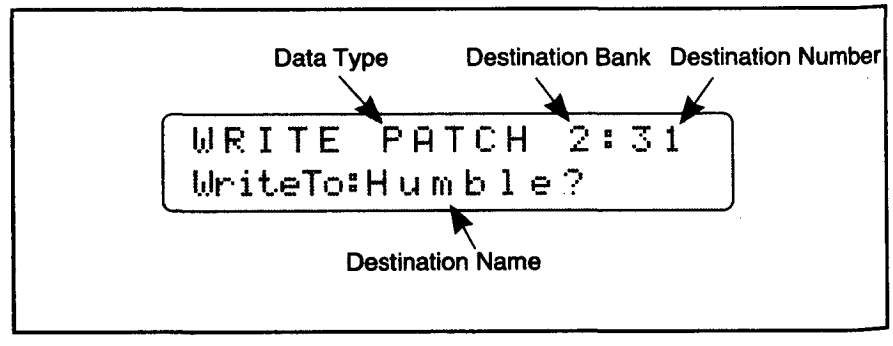
By now, you've gotten a pretty good introduction to the basics of Vector Synthesis. There are other facets to the mix; for example, the MIX MOD page allows you to route two additional modulation sources to each axis of the mix (A-C and B-D), for even further dynamic control of the vector timbre. If you're interested in finding out more, you can look up the Reference Guide entries under MIX ENV and MIX MOD. As always, experimentation is the key.

9.8 Writing a Patch

Once you've come up with something you like, you should write it to memory. Patches are written in the same way as Performances and Multisets; for a more complete description of the Write page, see Section 7.7, Writing a Performance.

☛ Press the WRITE button to go to the Write level.

WRITE PATCH page, Write level



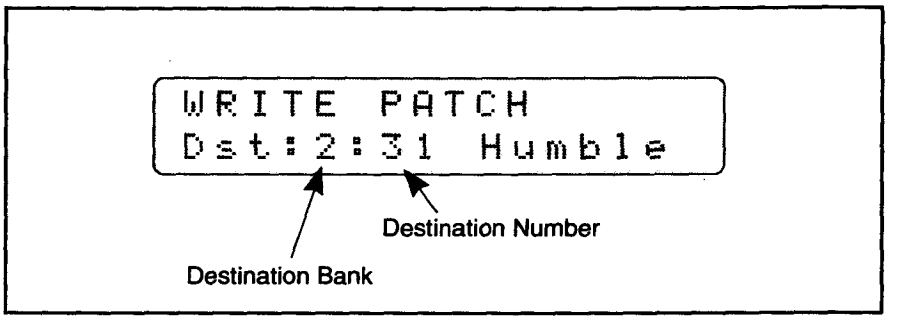
To save the changes to the current Patch:

☛ Press +1/YES. The changes will be written, and the screen will return to the PATCH page.

If you want to write the Patch to a new location:

☛ Cursor right to the Destination parameter.

WRITE PATCH page, Destination parameter



☛ Use +1/YES and -1/NO to select the Bank and Number of the Patch to write over.

☛ After selecting the destination, cursor left back to the WriteTo...? command.

Note that the bottom line displays the name of the Patch which will be overwritten, as opposed to that of the current Patch; that way, you know what you're erasing, and can write to a different number if necessary.

☛ Press +1/YES. The Patch will be written to the new location, and the screen will return to the PATCH page.

Comparing Edited and Saved versions

Once you're on the WRITE page, pressing the WRITE/COMPARE button again toggles between the edited and saved versions of the Performance. The first press will display the message, "Playing Saved," and you will hear the unedited version; pressing again will display, "Playing Edited," and the edits will return. You can do this comparison as many times as you like.

10 WAVE SEQUENCE TOUR

10.1 Introduction to Wave Sequencing

Wave Sequencing is the Wavestation family's principal innovation; it is the root of many of the SR's sounds, from flowing, delicate pads to feedback guitars. It's a very powerful and different approach to synthesis, but it's really pretty easy to understand.

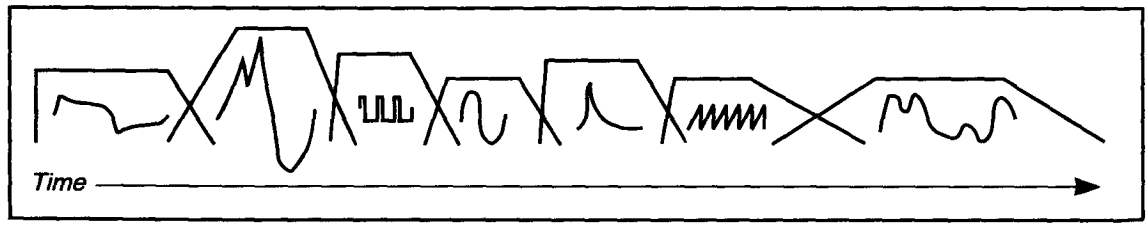
Imagine a MIDI setup of several different synthesizers and samplers, each with their own characteristic sounds. Now suppose that you have created a multi-timbral sequence which changes programs on the instruments so quickly that holding down a single note could play a series of, say, 50 different sounds. It seems that such a system, if you could pull it off, would be capable of some astonishing sounds.

Well, this kind of power is exactly what the Wavestation SR's Wave Sequencing provides, although instead of requiring a MIDI setup full of synthesizers and samplers, all the selection and mixing occurs seamlessly, digitally, within one highly-integrated instrument.

In the same way that most drum machines have songs which are just lists of patterns played consecutively, a wave sequence is like a song made of waves. The result is one continuously evolving waveshape that yields very sophisticated textures.

For example, this diagram shows a seven-step wave sequence, with each step having a different sound (wave), level, and crossfade time.

Figure 10-1: A Wave Sequence with Seven Steps

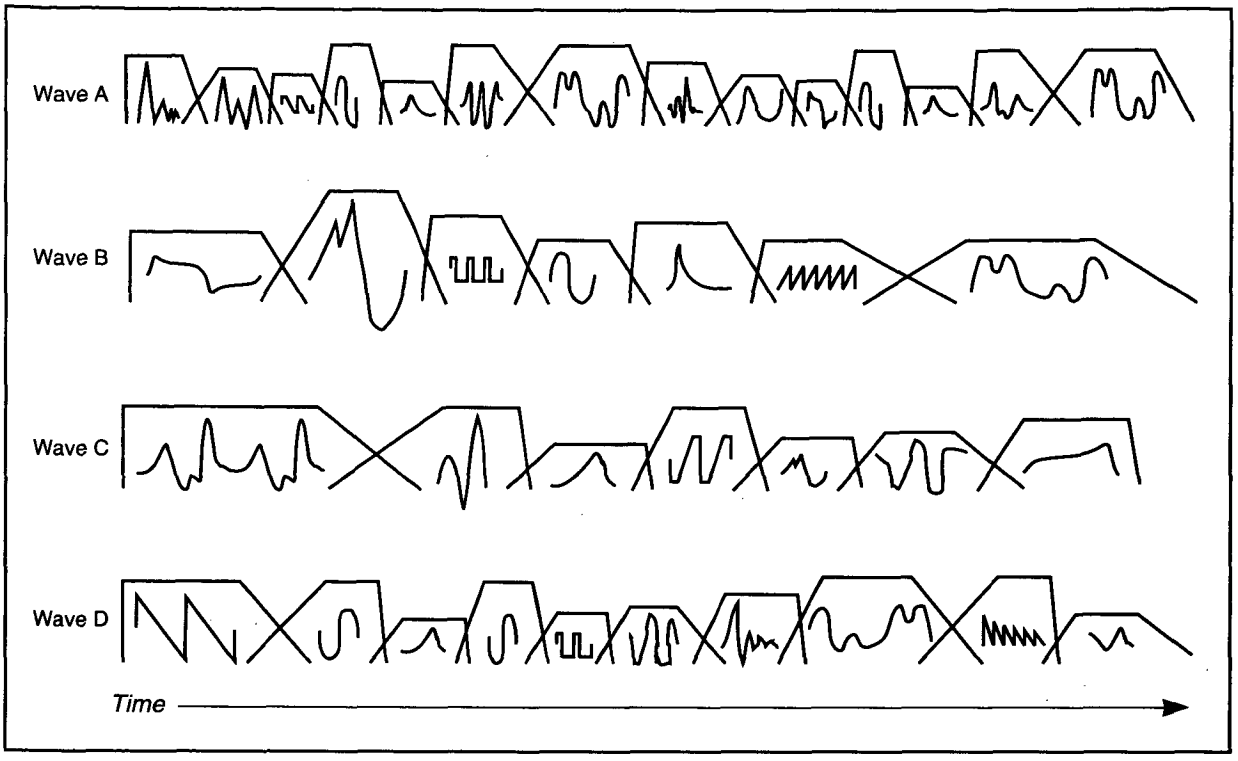


Note that this rough drawing is not a waveform, but a picture of the overall amplitude envelope of the wave sequence. Generally, a Wave Sequence crossfades between the wave steps.

In a Patch, each oscillator can have its own Wave Sequence. Thus, even with only one Patch, up to four of these wave "songs" can play simultaneously during a single note.

The diagram below shows four tracks of Wave Sequencing. Here, almost forty different timbres are mixed together within the brief duration of one note.

Figure 10-2: Four Wave Sequences (In one note)



Each memory bank contains 32 Wave Sequences, which are referred to as Waves #0 - 31. One Wave Sequence can have up to 255 steps, and each bank can contain a total of 500 steps. What is more, special care has been taken to make Wave Sequences expressive. You can set loops over a sequence so that a range of steps plays 1- 126 times, or plays continuously. The start point of the Wave Sequence, and the progression from step to step, can be modulated. Additionally, Wave Sequences are treated just like discrete waves, so you can still apply Vector Synthesis (two-dimensional mixing) to the four-track Wave Sequence.

By layering Patches in Performance mode, you can play up to 32 different Wave Sequences simultaneously (the actual number depends on how much crossfading you have defined.) On top of this, add multi-voice synthesis functions such as envelope and LFO modulation for each sequence - and finally, the whole realm of modulatable effects processing.

Wave Sequencing - a new form of synthesis.

Orchestrating such a density of timbre is similar to such advanced synthesis/composition techniques as *music concrete*, resynthesis, and "granular" synthesis, which until now have been more or less confined to computer music research centers. In a few hours you can be whipping out sound collages that until fairly recently would have taken a battery of tape artists or computer programmers several weeks to create. Seen in this light, the Wavestation SR actually offers a major, expensive studio art form in a performer's package.

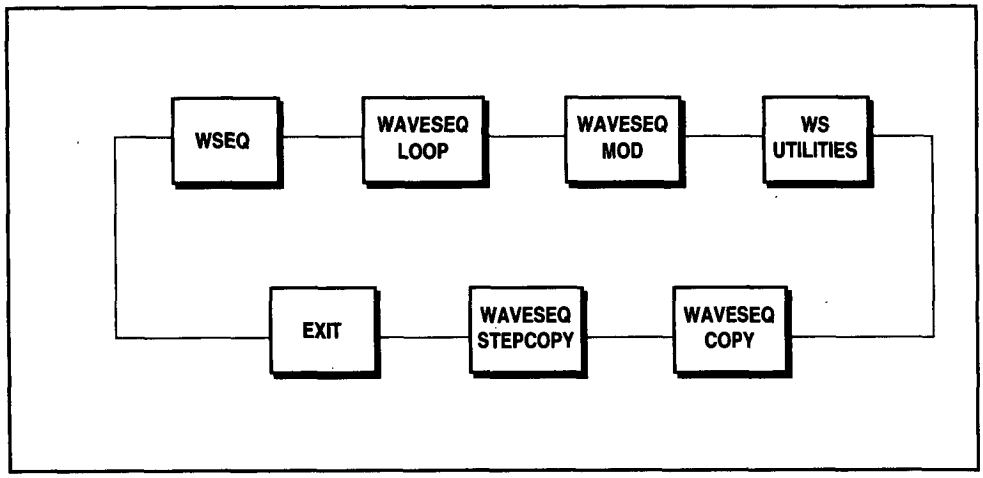
By combining the precision of wavetable oscillators, the accuracy of sampled sounds, the dynamics of Vector Synthesis and Wave Sequencing, and a dual effects processor, as well as proven expressive modulation paths rooted in its voltage-controlled heritage, the Wavestation SR has everything you need to create astounding sounds.

This manual can only scratch the surface of Wave Sequencing. As always, the best approach is to just get in there and start editing the factory Wave

Sequences and Wave assignments.

So you can start doing just that, let's move on to Wave Sequence editing! Figure 10-3 shows how the Wave Sequencing pages are organized.

Figure 10-3: Wave Sequence Level pages



10.2 Editing Wave Sequences

To get a feel for Wave Sequences, let's look at how they're used in one of the factory Performances.

- Press the PERF button.
- Select ROM11 Performance 12, Cosmic Zone.

Try playing this Performance. Hold a chord, and notice how the timbre sweeps and changes over time. You're hearing the sound of its Wave Sequence, DeepWav. To get a closer look at that Wave Sequence, we need to go down into the Patch.

- Press EDIT, to go to the Edit Performance level.

Notice that this Performance has two Parts, both of which use the same Patch - Deep Waves.

- Cursor to the Patch name, and press EDIT to go to the Edit Patch level.

Notice that Deep Waves has only a single-oscillator structure.

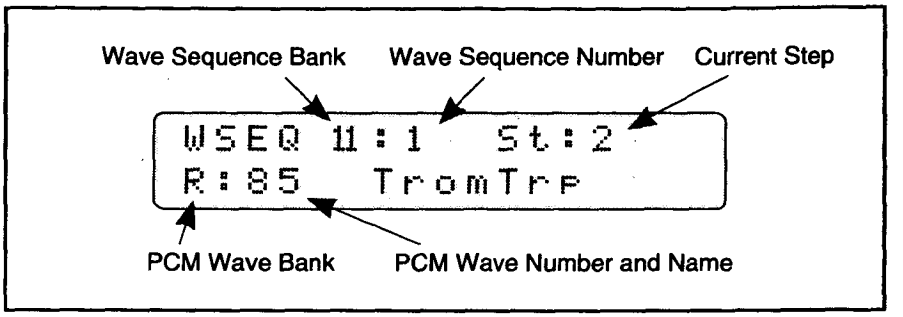
- Use PAGE+ to go to the WAVES page.

The Patch uses ROM 11 Wave Sequence 1, DeepWav. All Waves numbered between 0 and 31 are Wave Sequences; you can also tell them apart by the asterisk (*) before their names.

- With the cursor under the Wave Sequence name, press EDIT again to go to the Edit Wave Sequence level.

NOTE: In order to get to the Wave Sequence pages, you must first have selected a Wave Sequence as the current Wave number.

WSEQ page, Edit Wave Sequence level



Here is where you select the waves for each step of the selected Wave Sequence. A Wave Sequence may have up to 255 steps; the number of the current step is shown in the upper right hand corner, and can be changed by using the Up and Down cursors.

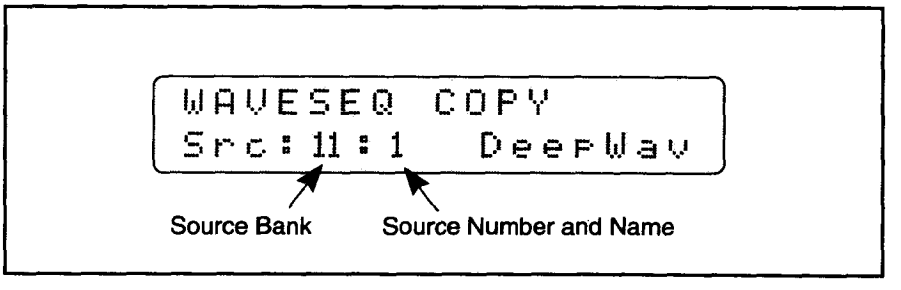
☛ Browse through the Wave Sequence steps with the Up and Down cursors, noticing all the different PCM Waves which are being played. Don't try to change anything yet.

10.3 Copying a Wave Sequence

NOTE: Edits to Wave Sequences are always automatically and immediately saved, so it is not necessary to manually Write them. Since this is the case, it's a good idea to back up any important Wave Sequence before editing it. Also, since you can't Write to ROM, you must copy a ROM Wave Sequence to RAM before editing it. The one we've been looking at is in ROM, so let's do that now.

☛ Use PAGE- to go to the WAVESEQ COPY page.

WAVESEQ COPY page, Edit Wave Sequence level



The first screen shows the Source (Src) Wave Sequence, which is the one to be copied from. This is initially set to the current Wave Sequence, which is the one that we want.

☛ Cursor to the next screen, which shows the Destination (Dst) - the Wave Sequence to be copied to.

☛ Use the +1/YES and -1/NO buttons to select Bank 2, Wave Sequence 31 - this location has been left empty especially for your use.

☛ Cursor to the Copy Wave Seq command, and press +1/YES.

The copy will be carried out, and the message, COPY FINISHED, will appear. After the copy, the Wavestation SR moves automatically back to the WSEQ page, so that you can begin your editing. The Wave Sequence number will have automatically changed to the new, RAM location.

10.4 Changing the PCM Waves

Now, try changing a few of the PCM Waves played back by the Wave Sequence.

☛ Use the Up and Down cursors to move among the steps, and the +1/YES and -1/NO buttons to change the Waves.

If you decide that you want more steps in the Wave Sequence, you can add them.

☛ Cursor right to the Insert Step command.

This command will add a step to the Wave Sequence before the current step. The default wave number for the new step is one greater than that of the step *before* the current step - except for insertions to the first step, in which the inserted PCM wave's number will be one *less* than that of the old first step. This feature makes it easy to insert waves that have consecutive numbers, and is a useful shortcut for working with the sets of "time-sliced" ROM waves that are included in the Wavestation SR, such as the Sax series, waves 364-379.

For instance, to insert a string of time-sliced PCM waves, you might begin by inserting the last wave of the time-slice as the first step in the Wave Sequence. Then, you would simply insert repeatedly, until the entire string has been entered.

☛ Press +1/YES a couple of times, to add a few steps.

Now, you can go back and assign them new Waves.

Perhaps you added more than you needed - or just have a step that you want to get rid of. In that case, you can use the delete feature.

☛ Select the step that you want to delete.

☛ Cursor to the Delete Step command.

☛ Press +1/YES to delete the current step.

10.5 Step Duration and Crossfade

Each step plays for a specified, programmable length of time; this is the step's Duration. A step may also fade out as the next fades in; the time that this takes to happen is called the Crossfade time (see figure 10-4).

☛ Cursor to the Dur (Duration) and Xfad (Crossfade) parameters.

Times screen, WSEQ page

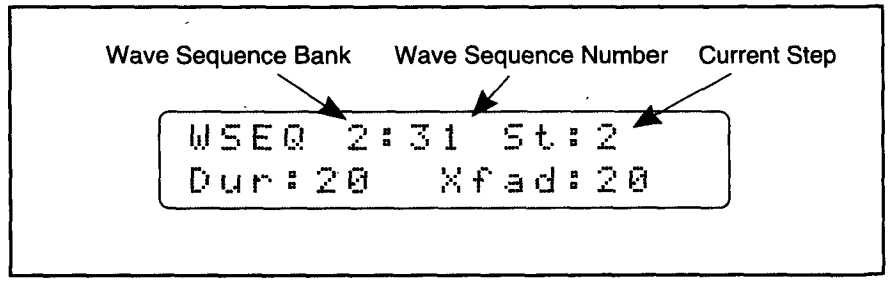
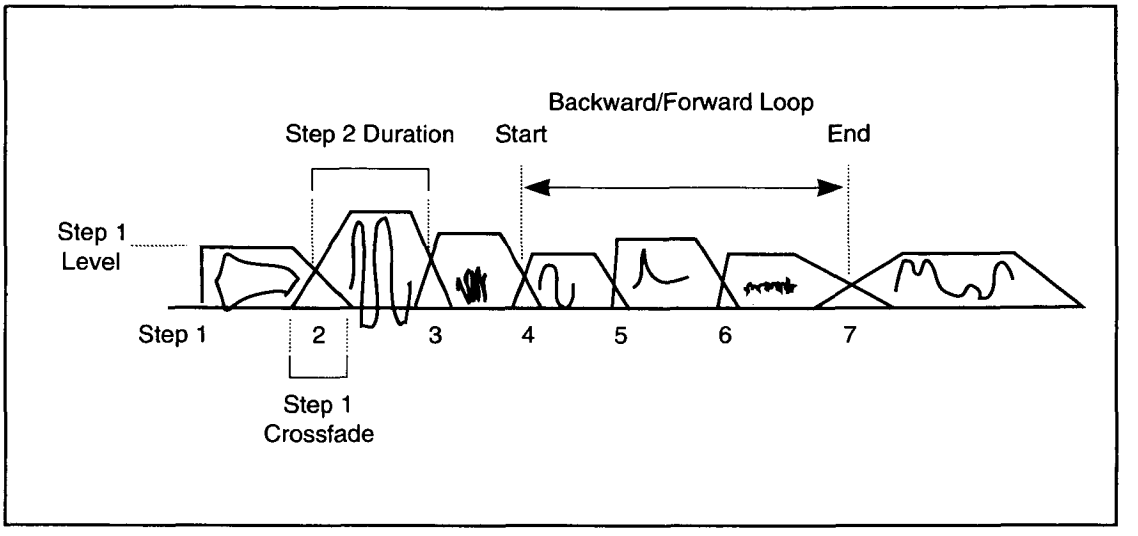


Figure 10-4: Wave Sequence Diagram

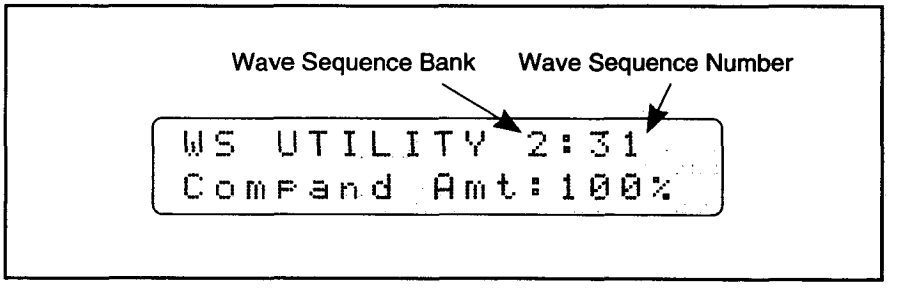


☛ Browse through the Durations and Crossfade times of the steps, using the Up and Down cursors.

Notice that all the Durations and Crossfade times are set to 20 (they don't have to be all set the same - that's just the way they are in this particular Wave Sequence). Each unit of Wave Sequence time is equal to about 24 milliseconds - so that means that each step of this Wave Sequence is lasting around half of a second. Let's make it move a little faster.

☛ Press PAGE+ until you get to the WS UTILTY page.

WS UTILITY page, Edit Wave Sequence level



The Compand function lets you adjust Wave Sequence Durations and Crossfades as a group.

This page allows you to compress or expand (Compand) the Wave Sequence Durations and Crossfade times, by a percentage of their current value. There is also a Wave Sequence initialize feature.

☛ Using the -1/NO button, set the Compand Amt to 50%. This will cut all the times in half.

☛ Cursor once to the right; you'll see the command, "Compand by 50%?" (the percentage changes to reflect the settings made on the previous page).

☛ Press +1/YES to carry out the Compand.

Now, listen to the Wave Sequence. The steps should go by twice as fast as before.

☛ Go back to the WSEQ page, using PAGE-, to look at the new Duration and Crossfade values.

Other Wave Sequence Parameters

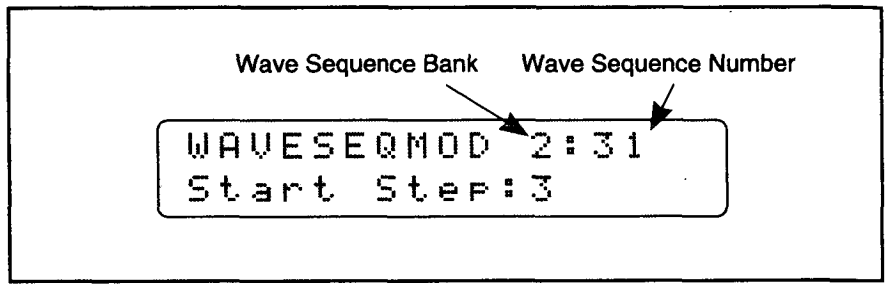
In addition to selecting PCM Waves and Duration and Crossfade times, each step can be set to its own volume level and semitone and fine tuning. For more information on these aspects of Wave Sequencing, see the Reference Guide under WSEQ.

10.6 Wave Sequence Modulation

You can use a modulator to directly control the progression from step to step, or to determine the step on which the Wave Sequence starts. This is set up on the WAVESEQMOD page.

☛ From the WSEQ page, press PAGE+ twice.

WAVESEQMOD page, Edit Wave Sequence level



You can control the playback of a Wave Sequence using the standard Patch modulation sources.

Wave Sequences don't have to start playback on step number one; the Start Step parameter allows you to begin from anywhere within the Sequence. This can be particularly useful when used in conjunction with start step modulation. For instance, you could create a Wave Sequence using a selection of PCM Waves ordered from harshest to mellowest. If you set the start step to one of the later waves, and then used velocity to modulate the start step back towards the top, then playing harder would bring out the more aggressive waves, while a lighter touch would produce only gentle timbres. Remember that these aren't just differences in filter cutoff - these can be entirely distinct waves, with completely different harmonic characteristics.

Another trick is to create a Wave Sequence of a number of waves with different, interesting attack transients, and then set Velocity as the Mod source. By playing at different velocities, you select which wave sounds first, changing the attack transient on every note if you so desire. This is a little like using the Key/Velocity Zones page to set up a velocity switch - but you can use modulation to select from up to 127 waves in a single Wave Sequence.

You can also use modulators such as the Mod Wheel to sweep through and select different Wave Sequence steps in real time. For more information, see the WAVESEQ MOD section in the Reference Guide.

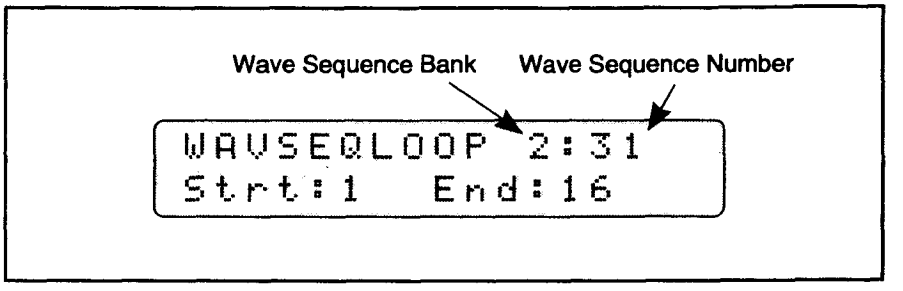
10.7 Looping a Wave Sequence

Try playing the Cosmic Zone Performance again. If you hold down a note for a while, you'll notice that the timbre keeps evolving indefinitely. This is because the Wave Sequence is being looped, similar to the Mix Envelope Loop seen in the last chapter.

To edit the Wave Sequence Loop:

- From the WSEQ page, press PAGE+ once to go to the WAVSEQLOOP page.

WAVSEQLOOP page, Edit Wave Sequence level



This first screen allows you to set the steps on which the loop will start and end (this is separate from the Wave Sequence start step). Cursoring further to the right brings you to controls for the direction of the loop (forwards or backwards and forwards), and the number of times that the loop will repeat (OFF, 1 to 126, or infinite).

10.8 Rhythmic Wave Sequences

The original idea for Wave Sequences was that of a smooth, gradual transition from one timbre to another. Quickly, however, another application was discovered: the rhythmic Wave Sequence, using abrupt changes in timbre. Some examples of these are The Wave Song (ROM11, #0) and MIDI Clock Song (ROM8, #10).

The main difference between rhythmic and smooth Wave Sequences is in the step crossfade times. Typically, smooth Wave Sequences use crossfade times of greater than 10 (often much greater); Rhythmic Wave Sequences, on the other hand, use crossfades of only 0-2.

Many of the factory Performances use rhythmic Wave Sequences to trigger drum sounds; you can also create interesting rhythms out of timbral shifts alone, by juxtaposing PCM Waves of different brightness, volume, and harmonic character.

Some rhythmic Wave Sequence programming tips:

- You can use steps with a volume level of 0 to produce rests.
- Crossfades of 0 generally give the best attack for transients when creating rhythmic sequences, but sometimes you may want to use a crossfade of 1 or 2 to smooth things out a little.

Syncing Wave Sequences to MIDI

If you're using a rhythmic Wave Sequence with a MIDI sequencer, it can be convenient to synchronize the Wave Sequence to the sequencer's tempo. This is done by using the Wave Sequence Sync feature, found on both the GLOBAL and MIDI pages.

- Press MIDI/GLOBAL to go to the MIDI page.
- Cursor left until you see the WaveSeqSync (Wave Sequence Sync) parameter.
- Set this parameter to MIDI.

- Make sure that your sequencer is set up to send MIDI Clocks - sometimes, this must be explicitly turned on. Also, note that MIDI Time Code is not the same as MIDI Clocks, and cannot be used for syncing Wave Sequences.

NOTE: For best results when using a sequencer and syncing Wave Sequences to MIDI clocks, quantize all notes playing Wave Sequences to a few milliseconds before the beat. This will ensure that your sequencer will send out the notes before the clock message, so that the Wave Sequence rhythms will be right on the beat.

MIDI Clocks and Step Duration

When Wave Sequence Sync is set to MIDI, each step sounds for the number of MIDI clocks equal to the step's Duration parameter. A step duration of 24, for instance, equals one quarter note; a duration of 12 equals an eighth note; a duration of 6 equals a sixteenth note, and so on. Many of the Rhythmic Wave Sequences in ROM are already set up with these MIDI Clock - compatible durations.

This table shows the Step Duration required to achieve a given rhythmic value when syncing to MIDI Clocks.

Note Value	Step Duration
quarter-note	24
quarter-note triplet	16
eighth-note	12
eighth-note triplet	8
sixteenth-note	6
sixteenth-note triplet	4
thirty-second-note	3
thirty-second-note triplet	2

NOTE: Make sure to switch Wave Sequence Sync back to INT when you're done. Only the first steps of the Wave Sequences will play if you've left the Wave Sequence Sync set to MIDI and there are no MIDI clocks coming in.

10.9 The End...?

Wrapping up Wave Sequences completes this tour of the Wavestation SR, but by now you have the tools to strike out on your own. With the dynamic timbres of Wave Sequencing combined with those of Vector Synthesis, the capability to layer up to eight Vector Patches in a Performance, and real-time control of effects...there are a lot of sounds waiting to be created. See what you can discover.

11 APPLICATIONS

11.1 Wind Controllers

The capabilities of the Wavestation SR are well-suited to work with MIDI wind controllers. Setting up the instrument as a whole for use with a wind controller takes several small adjustments to its MIDI configuration, and converting an individual Performance for breath control is a matter of a few simple steps, first on the EDT PERF page, and then on several of the Patch Macros pages.

Setting up MIDI

- Set your wind controller to send Breath Controller.
- The Wavestation SR should be in PERF Mode - using MIDI Mono mode is unnecessary.
- On the MIDI page, set the Basic Channel to match the channel of your controller.
- On the MIDI REMAP page, set the assignable MIDI 1 Controller to receive Controller 2, which is the Breath Controller. This means that breath control can be used as a modulator anywhere in the Wavestation SR by calling up MIDI 1 as a mod source.

The Wavestation SR uses a special table for incoming Breath Control, designed for maximum responsiveness when used with MIDI wind controllers.

- Go to the MIDI RECEIVE page, and make sure that Controllers are set to ON. This will ensure that the Wavestation SR is receiving Breath Controller messages.

Modifying a Performance for a Wind Controller

- Find a Performance which sounds interesting to you.
- Press EDIT to go to the EDTPERF page, and select the first Part; set the Mode to UNI LEGATO, and the Key Priority to LAST. Some of the factory Performances, such as ROM 11, #4, Mini Lead, are already set up this way. Repeat this procedure for each Part in the Performance, and then save the Performance by going to the Write Performance page (under the WRITE button).

If the Performance is from one of the ROM Banks, you'll have to save it to a different location in RAM1, 2, or 3, or on a Program Card.

- Select the first Part again, and then go to that Part's Patch level by pressing the EDIT button. Go to the AMP ENV page and set the current Wave (at the top right of the screen, abbreviated "W") to All, or A if it is a one-oscillator Patch. Cursor left once to the Amp Macro and change it to DEFAULT, which is an envelope with an abrupt attack and a short release.
- Cursor left again to the AMP ENV Lev parameters. Adjust the levels so that the page reads, "0:50:50:50."

- Go to the AMP MOD page of the first Part's Patch (from the Edit Amp page, press PAGE+). Check that the Wave parameter is still set to All, or A if it is a one-oscillator Patch. Cursor to Velocity Envelope Amount (VelEnvAmt), and set it to 0 - velocity is usually irrelevant to a wind controller. Next, go to the Source 1 parameter, and set it to MIDI 1 with an amount of +127. For now, we only want to use one modulation source, so set Source 2 to an amount of 0.

  This means that the Patch's volume will be controlled by the breath output of your instrument.

- Go to the FILTER page of the same Patch (from the Amp Mod page, press PAGE+). The way in which you convert the filter to breath control will depend on your own taste and the nature of the Patch; you may want breath to have very little effect on the timbre, or you may wish for it to have complete control.

  As a starting point, make sure that the Wave parameter is set to All, or A if it is a one-oscillator Patch. Envelope 1 (ENV 1) is usually one of the modulation Sources; replace this with MIDI 1. This should give you a suitable amount of breath control on the filter; if you like, you can come back later and tweak it to perfection.

- Save the edited Patch by going to the Write Patch page (under the WRITE button). If the Patch is from one of the ROM Banks, you'll have to save it to a different location in RAM1, 2, or 3, or on a Program Card. Keep in mind that any other Performances which use this Patch will also be changed.

- Repeat the above five steps for each Patch in the Performance, and you're ready to play!

Changing Performances via MIDI

The Wavestation SR's 550 Performances (600 with an optional Card) are far too many to be called up with conventional MIDI Program Changes alone. The Wavestation family are therefore among the first to use the new MIDI Bank Select message, Controller #32. Basically, Performances are grouped into MIDI Banks, and calling one up from a different MIDI Bank than the current one requires a Bank Select message in addition to the Program Change. For more information on MIDI Bank Select, please see Section 4.8, MIDI Bank Select and Program Change.

Since many older controllers do not offer an easy way of sending the recently implemented MIDI Bank Select message, you may find it convenient to use the Performance Select Map. This feature allows you to assign any incoming MIDI Program Change number to any Wavestation SR Performance, without using Bank Select. For more information on the Performance Select Map, please see Section 6.4.

Advanced Wind Controller Tips

The Wavestation allows you to change Performances without disrupting the reverb effect. To do this, the Performances you are changing between must use the same reverb algorithm (Small Hall, for instance) in the same effects slot (such as FX 2) of the same configuration (e.g., Serial). You can also do this when changing from a Parallel to a Serial effects configuration (or vice versa), as long as the reverb is in the FX 1 slot.

Although the above example only shows how to assign breath control to alter volume and filter cutoff, the Wavestation SR's sophisticated modulation matrix allows you to do much more than that. Breath control can be

routed to any number of destinations, including pan (through the FX mix), pitch, LFO depth and/or rate, and Wave Sequence step, as well as effects parameters.

The Dry/Wet Mix of the Reverbs, for example, may be modulated. Try setting that parameter to Wet, and then using MIDI 1 (which you assigned to breath control in the above example) as the modulator, with an amount of -5 or so. This means that the harder you blow, the less reverb there is; as you play softer, the reverb increases. Another expressive use of effects modulation is to route breath control to the Hot Spot in the Distortion or Overdrive effects.

11.2 Guitar Controllers

Several features of the Wavestation SR are specifically designed for use with MIDI guitar controllers. Setting it up to be played from a guitar controller takes only a few small adjustments.

The simplest way to use the Wavestation SR with a MIDI Guitar is to play the same Performance with each string, so that as you play chords or lines that jump from string to string, the sound remains consistent. Some guitar controllers also have the ability to send out different program changes for each string, allowing you to play different sounds for bass and lead lines, or to achieve special effects. Even if your controller can't send different program changes for each string by itself, you can still get a similar effect by using the Wavestation SR's Multisets. These three methods are discussed below.

Setting up MIDI

The basic MIDI setup is the same for all the guitar controller methods described below.

- Set up your MIDI Guitar controller to transmit in MIDI MONO mode, as described in its manual.

This should cause it to transmit each string's notes on a different MIDI channel. Next, set up the Wavestation SR to respond to each string independently by putting it in MIDI MONO mode.

- Put the Wavestation SR into MULTI Mode by pressing the MULTI button.
- Press the MIDI button to go to the MIDI page, and set the Basic Channel to match that of your guitar controller.

This determines the first of the six channels to which the Wavestation SR will respond; for instance, if the Basic Channel is 2, the six MONO channels will be 2, 3, 4, 5, 6, and 7.

To allow for six mono channels, set the Basic Channel to 11 or less.

- Cursor to the MULTI Mode parameter, and set it to MONO.
- Cursor right to the Num Mono Channels (Number of Mono Channels) parameter; set this to 6 - one for each string.

Changing Performances via MIDI

The Wavestation SR's 550 Performances (600 with an optional Card) are far too many to be called up with conventional MIDI Program Change alone. The Wavestation family are therefore among the first to use the new MIDI Bank Select message, Controller #32. Basically, Performances are

grouped into MIDI Banks, and calling one up from a different MIDI Bank than the current one requires a Bank Select message in addition to the Program Change. For more information on MIDI Bank Select, please see Section 4.8, MIDI Bank Select and Program Change.

Since many older controllers do not offer an easy way of sending the recently implemented MIDI Bank Select message, you may find it convenient to use the Performance Select Map. This feature allows you to assign any incoming MIDI Program Change number to any Wavestation SR Performance, without using Bank Select. For more information on the Performance Select Map, please see Section 6.4.

Playing the same Performance from each string

For this method, you'll use a Multiset as a template, but you won't actually play the Performances or Effects stored in the Multiset. Instead, you'll set up your guitar controller to send out the same program change for each string (for some controllers, this may be the only choice). Additionally, you'll make it so that the Multiset Effects are changed by those same Program Change messages, so that when you call up a Performance to be played, you'll also call up its effects. This makes the Wavestation SR act almost as if it were in the MIDI Mode POLY, except that each of your strings controls its own monophonic Performance, allowing for more natural guitar voice-leading.

- Set up your guitar controller to send out the same Program Change message for each string, consulting your manual if necessary.
- Go to the Wavestation SR's MIDI REMAP page (on the MIDI level); set Multi w/Prog to OFF, and Multi FX w/Prog to ON. This lets you change the Multiset Effects with MIDI Program Changes.
- Press the MULTI button, and then EDIT, to go to the EDTMULTI page. PAGE+ will take you to the FX SELECT page; cursor to the FX CntrlChan (FX Control Channel) parameter. Set this to one of the channels which you are sending on - the Basic Channel is a good choice. This determines the MIDI channel on which Program Changes will change the Multiset Effects.

Now, you're set up and ready to play!

Playing different Performances from each string, using Program Changes

In the previous example, you configured your guitar controller to send identical Program Change messages for each of its six strings. The Wavestation SR, however, can play different Performances - and receive separate Program Changes - on up to 16 MIDI channels, more than enough to allow each string its own, separate sound. If your MIDI guitar is so capable, you can use its master controller functions to determine which Wavestation SR Performances are played by each string. For more information on multitimbral operation of the Wavestation SR, please see chapter 5, Using Multisets, of this Player's Guide, and the entries under MIDI RECEIVE and MULTIMODE SETUP in the Reference Guide.

The MIDI configuration of the Wavestation SR is very similar to that of the previous method, except that you may wish to set the Multiset Effects Control Channel to a seventh MIDI channel, so that effects changes may be controlled separately from Performance changes. For more information on the Change Multi FX w/Prog feature, please see the MIDI REMAP section of the Reference Guide.

- Set up your guitar controller to send out the desired Program Change messages for each string, consulting your manual if necessary.
- Go to the Wavestation SR's MIDI REMAP page (on the MIDI level); set Multi w/Prog to OFF, and Multi FX w/Prog to ON. This lets you change the Multiset Effects with MIDI Program Changes.
- Press the MULTI button, and then EDIT, to go to the EDTMULTI page. PAGE+ will take you to the EFFECTS page; cursor to the FX CntrlChan (FX Control Channel) parameter. Set this to one of the channels which you are sending on - the Basic Channel is a good choice, although you may wish to use another channel specifically for this purpose. This determines the MIDI channel on which Program Changes will change the Multiset Effects.

That's it! You're ready to go.

Playing different Performances from each string, using Multisets

Even if your guitar controller can't send out separate Program Changes for each string, you can achieve a similar effect by using the Wavestation SR's Multimode Setups. Each of the 32 Multisets can store separate Performances to be played by each MIDI channel, in addition to effects. You can also set up the Wavestation SR to use Program Change messages to switch between Multisets. For more information on Multisets, please see chapter 5, Using Multisets, of this Player's Guide, and the entries under MIDI RECEIVE and MULTIMODE SETUP in the Reference Guide.

- Set up your guitar controller to transmit Program Change messages in a simple fashion, so that its program 1 sends out Program Change #1, program 2 sends out Program Change #2, and so on.
- Go to the Wavestation SR's MIDI REMAP page (on the MIDI level); set Multi w/Prog to ON, and Multi FX w/Prog to OFF. This will cause Program Changes on the Basic Channel to change the current Multiset. For more information on this feature, please see the MIDI REMAP section of the Reference Guide.
- Go to the PERFMAP Page (also on the MIDI Level), and make sure that the Map is set to OFF. This will ensure that MIDI Program Change #1 calls up Multiset #1, Program Change #2 calls up Multiset #2, and so on.
- Press MULTI and then EDIT to go to the EDIT MULTI page, and assign the desired Performances to each channel.
- Go to the FX SELECT page by pressing PAGE+, and set up your desired effects.
- Before sending a program change from your controller, save the edited Multiset by going to the WRITE page (under the WRITE button). It's also a good idea to give the Multiset a descriptive name, such as the title of the song in which it will be used.
- Repeat the above three steps to create any other desired Multisets.

After creating the rest of your Multisets, you're ready to play!

11.3 Saving Data with MIDI SysEx Recorders

It is possible to back up the entire contents of the Wavestation SR (Performances, Patches, Wave Sequences, Global data, User Scales, Multisets, and the Performance Map) by using an external device to record its MIDI SysEx data dumps. We'll look at how to do this using a Korg T-series keyboard, and also give some general hints for use with any MIDI SysEx data recorder.

NOTE: The current MIDI Basic Channel is stored in the SysEx data when it is sent from the Wavestation SR. For the Wavestation SR to receive the SysEx file, it *must* be set to the same Basic Channel as was used when the data was sent.

When saving SysEx data from the Wavestation SR, it's important to know the sizes of each of the data types. The Wavestation SR's SysEx ALL dump takes up more than 200,000 bytes, a very large amount of data - more than many SysEx records can handle in a single pass. Because of this, it's usually better to save the Wavestation SR's data in several separate files.

Here are the data sizes (in Bytes) for each Wavestation SR SysEx data dump:

Data	Size in Bytes
Bank	65512
All Patches, 1 Bank	29828
All Performances, 1 Bank	18108
All Wave Sequences, 1 Bank	17576
Global	147
Scales	297
Multisets	13085
Performance Map	1563

The user's manual for your MIDI SysEx recorder should tell you how many bytes it can handle at one time.

T-Series Keyboards

Each T-series SysEx file can hold a maximum of 65534 bytes, which is enough for a single Wavestation SR Bank's Performances, Patches, and Wavesequences. The three RAM Banks can thus be stored on a single T-series disk, leaving room for a fourth file containing either the setup data (Global, Scales, Multisets, and the Performance Map) or the data from a CARD, if you have one inserted.

To SAVE SysEx data from a Wavestation SR to a T-series keyboard, do the following:

- First, format a T-series disk to store the SysEx data. Make sure to use the "PROG/COMBI/SEQ 4 Files" option, so that you can store all four files on the same disk; disks which are formatted to contain PCM data can only contain a single SysEx file.

- Plug the MIDI Out of the Wavestation SR into the MIDI In of the T-series keyboard.
- On the T-series, find DATA FILE under DISK (page up 3). Use VALUE to select File-A. Cursor down from "Load MIDI data," so that the screen says, "Awaiting MIDI data."
- On the Wavestation SR, go to the SYSEX DATA XMIT page (press MIDI/GLOBAL, and then press PAGE+ four times).
- Select the type of data that you want to send. For File-A, for instance, you would probably want BANK.
- Next, select the Bank to send. Start with RAM1.
- Cursor right to the Transmit Data? command, and press +1/YES to send the data.

The Wavestation SR screen should say, "XMITTING SYSEX;" the T-series screen should say, "Receiving MIDI data." When the SysEx dump is finished, the T's screen will show you the total size of the file(s) received. The SR Bank type actually transmits three separate dumps (one each for Performances, Patches, and Wave Sequences).

- After the transmission is finished, press SAVE on the T-series keyboard.
- Select a new file (i.e., FILE-B) and continue until all the desired SysEx data dumps have been saved.

NOTE: The Global, Multiset, Scale, and Performance Map dumps are relatively small, and you can send them to the T-series keyboard one after another without saving in between.

To LOAD the SysEx data from the T-series keyboard back into the Wavestation, do the following:

- Connect the MIDI Out of the T-series keyboard to the MIDI In of the Wavestation SR.
- Make sure that the Wavestation SR's Memory Protect Internal is set to OFF, and that its MIDI Basic Channel is the same as when the dump was made.
- Insert the disk containing the SysEx files into the T-series keyboard, go to the DATA FILE page, select the desired File, and press LOAD. After the "are you sure?" message, the data is loaded from the disk into the T's buffer, and then immediately sent to the Wavestation.

The Wavestation SR screen should say, "RECEIVING MIDI SYSEX," followed by a "SYSEX TRANSFER WAS SUCCESSFUL" message, one for *each* SysEx file that was "stacked" in the T's data file dump. A single file transfer can take up to 30 seconds from start to finish, so be patient! After the last "successful" message, your data has been loaded, and you're ready to go.

12 TROUBLESHOOTING

12.1 Wavestation SR Makes No Sound

- Perhaps someone has edited the current Performance into silence - try selecting a few from the ROM bank.
- As a basic check of the Wavestation SR audio, play back one of the demos on the DEMO SEQUENCE Page.

If you can hear the demo sequence, then your problem is probably in your MIDI system, and you should proceed to MIDI Troubleshooting, below.

If you *cannot* hear the demo sequence, then the problem is probably in your audio system, and you should proceed to Audio Troubleshooting, below.

Audio Troubleshooting

- Check the Wavestation SR's MASTER VOLUME knob, and your master controller's volume pedal (if used). The polarity of a Volume Pedal is also important; if this is inverted, the volume will be at zero when the pedal is at maximum. If this seems to be the case, consult your controller's manual for the procedure to correct the pedal's polarity.
- If you still do not obtain audio output, it is easy to check whether the problem is in the Wavestation SR or your sound system by plugging headphones directly into the front panel PHONES jack. If you can hear sound through the headphones, check the connections to your sound system.
- If you don't hear any sound through the headphones, do the MIDI check explained below.

MIDI Troubleshooting I

- Check that the MIDI Indicator LED, located on the front panel, blinks when you play on your controller.

Blinking indicates that the Wavestation SR is both receiving and recognizing MIDI data. Data may be received at the MIDI In port but not recognized if it is not on the correct MIDI channel, or if it is filtered out by settings on the MIDI RECEIVE page (see below). When you play your controller or sequencer, you should see this light blinking.

- If the MIDI Indicator LED is not blinking, check to see that your MIDI cable connections are properly made (MIDI Out from your controller or sequencer to MIDI In on the Wavestation SR).
- If you are using a MIDI patch bay, or the "thru" function of a sequencer, try directly connecting the MIDI Out of your controller to the MIDI In of the Wavestation SR.

If the physical connections seem to be OK, but the MIDI LED still is not blinking, make sure that the Wavestation SR is set to receive the channel on which your controller or sequencer is sending. First, find out what

channel is being sent by going to the MIDI Status page, which is a more sophisticated version of the MIDI LED.

- Go to the MIDI STATUS Page, on the MIDI Level.

When data is received on a particular channel (whether or not that channel is being recognized), the channel's number will appear briefly. If your controller is sending on channel 3, for instance, you will see a "3" appear every time you press down a key.

- Play on your controller, and note the channel number(s) which appear.

Next, look at the front panel PERF and MULTI buttons. The lights on these buttons indicate the current mode of the Wavestation SR: PERF Mode if the PERF button is lit, and MULTI Mode if the MULTI button is lit. There are two variations on each of these modes, including PERF/OMNI, PERF/POLY, MULTI/NORMAL, and MULTI/MONO. Settings on the MIDI page determine which variation is being used, so we'll look there next.

If the PERF light is lit:

- Press the MIDI button to get back to the MIDI page.
- Cursor right to the Perf Mode parameter.
- If the Perf Mode is set to OMNI, the Wavestation SR will respond to MIDI information on any channel. If the STATUS page showed any activity, then you should be hearing something. If you aren't, check again to see that the audio setup is OK.
- If the Perf Mode is set to POLY, then the Wavestation SR will ignore all MIDI data except that which it receives on its Basic Channel. Probably, your controller's channel doesn't match up with that of the Wavestation SR. Adjust either the Wavestation SR's Basic Channel or your controller's send channel so that they are the same.

  If you're using a sequencer's thru function, it's possible that the sequencer (and not the controller) is determining the channel being sent to the Wavestation SR. In that case, consult your sequencer's manual to readjust the thru channel.

If the MULTI light is lit:

- Go to the EDT MULT page by pressing MULTI and then EDIT.
- Check the Lev (level) of the desired channels, to make sure that it's not so low that they are not heard.
- Check to see whether "OFF" is flashing next to the numbers of the desired channels. If it is, make sure that they are set to Play:ON, and that the Num of Multi or Mono channels is set correctly, as described next.
- Press the MIDI button to get back to the MIDI page.
- Cursor right to the Multi Mode parameter.
- Cursor right to check the Num Multi Chans (Number of Multi Channels) or Num Mono Chans (Number of Mono Channels) parameter (which one appears depends on which MIDI Multi Mode you are using). This sets the total number of channels to be used. These begin with the current Basic Channel, up to the number of mono channels requested, to the limit of 16. For example, if the Basic Channel is set to 2, and the Number of Multi/Mono Chans to 6, then the Wavesta-

tion SR would receive MIDI on channels 2 through 7. Check that these parameters are set appropriately.

- Note that the sum of the Number of Multi/Mono Channels and Basic Channel settings should be kept to 17 or less. If the Basic Channel is 12, for instance, and the Number of Multi/Mono Channels is 6, only channels 12, 13, 14, 15, and 16 will be used; the sixth mono channel would require MIDI Channel 17, which was last seen running off to Atlantis between a unicorn and a gryphon.

MIDI Troubleshooting II

There are a few MIDI parameters which can cause silence regardless of the current MIDI mode.

- In a MIDI network, a controller can send unintended low Volume control messages. If you think this is the case, try raising the same controller, or reset the Wavestation SR by cycling power off, then on.
- Check that the Play Mode on the EDIT PERF page is set to BOTH or LOCAL for each Part. If any are set to MIDI (OFF), they will not sound.

For more information on the Wavestation SR and MIDI, see Section 6, MIDI and GLOBAL FEATURES.

12.2 Tuning does not seem to be correct

There are many places where the Wavestation SR's tuning can be adjusted, but you should probably start off at the GLOBAL page Master Tune and Transpose parameters.

- Press the MIDI/GLOBAL button to go to the level of the same name.
- Press PAGE– until you get to the GLOBAL page. You'll see the Master Tune parameter; try setting this to 0, if it's not there already. This parameter is shown in cents, which are 1/100 of a semitone.
- Cursor right to the Transpose parameter; this should also normally be set to 0. Each number equals one semitone, so that -1 is down a half step, +12 is up an octave, and so on.

Another possible source of detuning is the interruption of MIDI Pitch Wheel information, leaving the Wavestation SR "hung" away from A-440 tuning. To clear this problem:

- Make sure all incoming MIDI cables are solidly connected, and adjust the Wavestation SR back into range by re-centering the external controller's pitch wheel.

If these things look OK, you can proceed to the EDIT PERF page.

- Press PERF and then EDIT to go to the EDIT PERF page.
- Cursor to the Transpose parameter for the first Part. Each Part may be independently transposed by as much as two octaves up or down; check that this parameter is set to 0, or a multiple of 12.
- On the same page, cursor to each Part's Scale parameter; try setting this to EqTemp1, if it is not there already.

Several Edit Patch level settings can also affect tuning. The WAVES page allows you to adjust both the fine and semitone tuning of each Wave; like other transpose functions, check to see that the Semi parameter is set to 0

or a multiple of 12. The Tune Slope parameter, on the same page, is used to change the way that keyboard position affects pitch; while this can be an effective trick, you might try setting it to its default of +1.00.

The Edit Patch level's PITCH page contains several parameters relating to pitch (gee, what a surprise!). Pitch may be controlled by two standard modulation sources, and also may be affected by the Pitch Ramp. Try setting all of the amounts to 0.

12.3 Either odd or even MIDI notes are not played

- Check that the Note On/Off parameter on the MIDI RECEIVE page is set to ALL.

This feature is designed to allow you to link two Wavestation SRs (or an SR and a Wavestation keyboard or Wavestation A/D) together. Setting one instrument to EVEN and the other to ODD causes each to ignore half of the MIDI notes, so that they each play only from a single whole-tone scale; this effectively doubles the available polyphony. Unless you have two modules operating in this manner, Note On/Off should be set to ALL.

12.4 Notes cut off unexpectedly

- Check the All Notes Off parameter on the MIDI RECEIVE page, and try setting it to IGNORE.

Some controllers send this MIDI message whenever there are no keys held down, and this can occasionally cause notes to cut off; ignoring the message will solve this problem.

12.5 Only one step of a Wave Sequence is being played

There are several possible causes for this situation.

- Check the Wave Seq Sync parameter on the MIDI page. Unless you are specifically using MIDI clocks to control the playback of the Wave Sequence, this should be set to INT. If you *are* intending to use MIDI clocks for sync, make sure that your clock source - probably a sequencer or drum machine - is indeed sending MIDI clocks, and that its MIDI Out is connected to the Wavestation SR's MIDI In. MIDI Time Code is not the same as MIDI Clocks, and will not work for this purpose.
- Check that an "S" isn't blinking in front of the current step number on the WAVESEQ page; this indicates that the current step is soloed. If it is, cursor to the Un-Solo Step parameter to turn solo off.

If solo is on, only the currently selected Wave Sequence Step is played.

- Go to the WAVESEQMOD page. Unless the Src is set to Linear Keyboard, Centered Keyboard, Linear Velocity, or Exponential Velocity, the amount should not be set to 0 (any other positive or negative number is OK).

If the source is not one of the four listed above, and the Mod Amount is set to a very small amount (such as 0), then only the start step of the sequence will be played.

12.6 ROM Wave Sequences cannot be edited

Each time you make any change to a Wave Sequence, the change is saved. Since you cannot write to ROM, you cannot directly edit a ROM Wave Sequence. If you first copy the Wave Sequence to a RAM bank, you can then edit it as much as you like.

- Write the ROM Wave Sequence into a location in RAM1, 2, or 3, or CARD. It may now be edited.

12.7 Rhythmic Wave Sequence does not seem to sync to MIDI

- Check that Wave Seq Sync parameter on the MIDI page is set to MIDI.

If this is set to INT, MIDI clocks will not affect Wave Sequences. Also note that MIDI Time Code is not the same as MIDI Clocks, and will not work for syncing Wave Sequences.

- Make sure that your sequencer is set to transmit MIDI Clocks. Some sequencers don't have this programmed as the default.
- Check that the step durations are in multiples of 6 (6, 12, 24, etc.) or, for a triplet feel, multiples of 4 (4, 8, 12, 16) for all Wave Sequences in the current Performance.

A duration of 24 equals one quarter note; 12 equals an eighth note; 6 equals a sixteenth note, and so on.

- Check that rhythm is not partially due to the Wave Sequence being run through a delay effect. If this is the case, you should adjust the delay time to match the tempo of the MIDI clocks.
- For best results when using a sequencer and syncing Wave Sequences to MIDI clocks, quantize all notes playing Wave Sequences to a few milliseconds before the beat. This will ensure that your sequencer will send out the notes before the clock message, so that the Wave Sequence rhythms will be right on the beat.

12.8 Not all Performance Parts are heard in a Multiset

(Also: When the Effects Mix of a Performance is changed, not all Parts are heard)

If you have changed the FX Mix of a Performance, or if you are using it in a Multiset and have not explicitly copied the effects from the original Performance, waves assigned to the C and/or D buses may not be heard.

- Check the Mix 3/4 parameters on the FX MIX page, and make sure that these are not set to OFF. If they are, change them to another setting.

If any of your Parts are assigned to the C, D, or C+D FX Buses (or if the Part is assigned to Patch, and the Patch FX Bus Assign has Waves which are routed to only C and/or D), and you are using only the stereo outputs, then it is necessary to use the Mix 3/4 parameters on the FX MIX page to route those Parts to the stereo outs. ROM11, #0, Wave Song, is an example of such a Performance.

12.9 Performance Effects seem to have changed

If Effects have been set to OFF on the GLOBAL page, no effects will be heard.

- Go to the GLOBAL page, and make sure that the Effects are set to ON.

When you play a Performance in MULTI Mode, it is processed through the effects for the current Multiset, as opposed to its own effects. You can copy the effects from the original Performance into the Multiset, but remember that this changes the effects for *all* of the Multiset's Performances.

- Check to see if the MULTI LED is on. If it is, the instrument is in MULTI Mode, and the Performance is using the effects of the current Multiset (which may be accessed through the MULTI button on this page).
- On the EFFECTS ALL COPY page, copy the effects from the desired Performance into the Multiset.

12.10 Performance Effects cannot be edited

There are two sets of effects in the Wavestation SR: those that belong to Performances, and those that belong to Multisets. The mode of the instrument - PERF or MULTI - determines, among other things, which set of effects is in use. If the Wavestation SR is in PERF Mode, the Performance effects are heard; if it is in MULTI Mode, the Multiset effects are heard.

Only the effects currently in use may be edited. Thus, if you are in MULTI Mode, the Performance effects cannot be edited.

- Press the PERF button to switch to PERF Mode.

Also, if Effects have been set to OFF on the GLOBAL page, the effects will not be heard, and cannot be edited.

- Go to the GLOBAL page, and make sure that the Effects are set to ON.

12.11 Wavestation SR Messages

ARE YOU SURE?

Generally, any action that alters memorized data needs will bring up the question, "Are You Sure?" Press YES to carry out the action, and any other key to cancel the action.

CAN'T COPY STEREO VOCODER PARAMS

Since the Stereo Vocoder-Delay 1/2 effects take up both effects slots, it doesn't make sense to copy them to a single slot. To copy these effects to a Performance or Multiset, use the COPY EFFECTS ALL page instead. To get to this page, go back up to the EFFECTS page, and press COPY.

CAN'T EDIT ROM WSEQ:COPY TO RAM

You must copy ROM Wave Sequences to RAM before editing them.

CAN'T INSERT - NO MORE STEP MEMORY
CAN'T COPY WSEQ - NO MORE STEPS

These may appear when you are inserting or copying Wave Sequence Steps. The total Wave Sequence memory per bank is 500 steps (a single sequence can have up to 255 steps).

You can get more steps by clearing unused sequences, using the Init Wave Seq command on the WS UTILITY page.

CAN'T INSERT - OVER 255 STEPS
CAN'T COPY WSEQ - OVER 255 STEPS

These may appear when you are inserting or copying Wave Sequence Steps. Each sequence can have a maximum of 255 steps; the insert or copy would make the current Wave Sequence exceed that number.

CAN'T INSERT - TIME EXCEEDS MAX
CAN'T COPY WSEQ - TIME EXCEEDS MAX

The maximum total duration of a Wave Sequence is 32267 duration units. The insert or copy would exceed that amount.

CAN'T WRITE TO ROM PROG CARD

You tried to write to a ROM card.

CARD BATTERY IS LOW - REPLACE

As long as the card remains inserted in the Wavestation SR, no data will be lost. While the card stays inserted, you can replace the battery, following the instructions provided with the card, without losing any data.

If you do not have a battery on hand, take whatever steps you can to back-up your custom patches into internal RAM or via MIDI SysEx dump. If these are unavailable, you can always write-out crucial data by hand on the data forms provided.

CARD FORMAT FAILED

Formatting the RAM card didn't work. Make sure that it's firmly seated in the slot, and then try again.

CARD IS NOT FORMATTED

Cards must be formatted before they can be used by the Wavestation SR. For more information, see the CARD FORMAT page in the Reference Guide.

CARD PROTECTION SWITCH IS ON

Card protection is set on the card itself. Flip the switch on the front of the card before attempting to write to it (and to preserve the battery's life, remember to flip it back after you're done!).

EFFECTS DISABLED - CANNOT EDIT

When the Effects have been set to OFF on the GLOBAL page, they may not be edited. To edit the effects, go to the GLOBAL page and set the Effects to ON.

GLOBAL CARD PROTECT IS ON

You tried to write to a RAM Card while GLOBAL Memory Protect Card was on. To un-protect the memory, go to the GLOBAL page.

GLOBAL INTERNAL PROTECT IS ON

You tried to write to RAM 1, 2, or 3 while GLOBAL Memory Protect Internal was on. To un-protect the memory, go to the GLOBAL page.

INTERNAL BATTERY IS LOW - REPLACE

If you see this indicator, immediately take whatever steps you can to back-up your custom patches by RAM card or MIDI, and then bring the instrument to a qualified repair center.

KORG CARD FORMAT MISMATCH

The KORG PROG DATA card inserted is not formatted for the Wavestation SR, Wavestation keyboard, or Wavestation A/D. If it is a RAM card, you can format it (see UTILITIES). Specifically, you cannot use M1/M3r/T-series Program cards without re-formatting them (and thus erasing all of the M1/M3r/T-series data).

NO CARD INSERTED

A Card must be inserted for the operation to work.

PART IS EMPTY

You have tried to edit a Part which has no Patch assigned to it. Assign a Patch, or move to a different Part.

SYSEX CHECKSUM ERROR

A data error occurred during SysEx reception.

This message will remain on the screen until you press one of the front-panel buttons. SysEx dumps contain a large amount of data, and it is possible for small parts of it to become garbled. Normally, simply re-transmitting the data is all that is needed. If this does not work, try using another MIDI cable. It is also possible that the stored data itself has become corrupted...which is why it's always good to keep *several* backups of all important data.

SYSEX TIMEOUT ERROR

SysEx data transfer paused for more than three seconds in the middle of a transmission.

This message will remain on the screen until you press +1/YES. Normally, simply re-transmitting the data is all that is needed. If this does not work, make sure that your MIDI cable has not been disconnected.

SYSEX TRANSFER WAS SUCCESSFUL

Confirms successful data transfer.

SYSEX WRITE PROTECT ERROR

Memory must be unprotected to receive SysEx dumps of Performances, Patches, or Wave Sequences. If you are dumping to a RAM bank, make sure that the GLOBAL page Memory Protect Internal is OFF; if you are dumping to a RAM Card, make sure that Memory Protect Card is OFF, and that the Protect switch on the Card itself is set to OFF.

13 APPENDIX

13.1 Specifications And Options*

System:	Advanced Vector Synthesis.
	24-bit digital processing, 19-bit DAC.
Wave Memory:	484 sampled and single-cycle waveforms.
Program Memory:	8 ROM Banks, 3 RAM Banks, and 1 Card Bank
Tone generator:	20 bit resolution
	32 voices including individual filters, amps, LFOs, and envelopes.
Macros:	Voicing templates for Pitch, Filter, Amp, Pan, Env1, and Keyboard/Velocity Zoning.
Effects:	55 effects programs. Up to 6 simultaneous digital effects, with dynamic modulation.
Performances:	550 internal, 50 in card.
Patches:	385 internal, 35 in card.
Wave Sequences:	352 internal, 32 in card.
Wave Sequence Steps:	5500 internal, 500 in card.
Multisets:	32 configurations of multi-timbral, 16-channel MIDI reception.
Performance Controllers:	Master Volume.
Card slots:	PCM data, PROG data.
MIDI:	IN, OUT, THRU.
	Extensive Multi-timbral capability.
Display:	2 x 16 character back-lit LCD.
Outputs:	1/L, 2/R, 3, 4, headphone
Power consumption:	17 W
Dimensions:	435 (w) x 45 (h) x 262 (d) mm
Weight:	3.6 kg
Options:	RAM card (MCR-03), ROM card (WPC-**), PCM card set (PSC-**S)
	*Specifications, operations, and appearance are subject to change without notice.

13.2 Performance Data Forms

Performance Bank, Number, Name:

Part#	1	2	3	4	5	6	7	8
PATCH								
Bank								
Number								
Name								
ZONES								
Key Low								
Key High								
Velocity Low								
Velocity High								
DETAILS								
Level								
FX Bus								
Delay								
Transpose								
Detune								
Sustain								
Part Play								
Scale								
Voice Mode								
Key Priority								

EFFECTS	Effect 1		Effect 2		Routing
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4

Performance Bank, Number, Name:

Part#	1	2	3	4	5	6	7	8
PATCH								
Bank								
Number								
Name								
ZONES								
Key Low								
Key High								
Velocity Low								
Velocity High								
DETAILS								
Level								
FX Bus								
Delay								
Transpose								
Detune								
Sustain								
Part Play								
Scale								
Voice Mode								
Key Priority								

EFFECTS	Effect 1		Effect 2		Routing
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4

13.3 Effects Data Forms

KORG Wavestation SR Effects Data EFFECT			
Number	Parameter Name	Value	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

KORG Wavestation SR Effects Data EFFECT			
Number	Parameter Name	Value	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

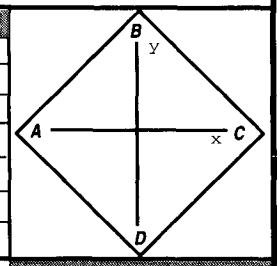
13.4 Patch Data Forms

KORG Wavestation SR Patch Data

GENERAL	Bank									MACROS
#/Name										Pitch
Waves	ALL	A	B	C	D					Filter
Structure	4	2	1							Amp
Hard Sync	OFF	ON								Pan

WAVES						FX-BUS				PITCH	
Osc	Bank/#/Name	Lev	Semi	Fine	Slope	A	B	C	D	Pitch Wheel Range	
A										Pitch Ramp Amt	
B										Ramp Time	Vel Amt
C										Source 1	Amount
D										Source 2	Amount

MIX ENVELOPE					
Point	0	1	2	3	4
Mix A/B/C/D %					
Times	X				
Loop	Repeats				



MIX MOD

AC Source 1	Amount	BD Source 1	Amount
AC Source 2	Amount	BD Source 2	Amount

FILTER	BUS A-B PAN
Initial Cutoff	Velocity Amount
Keyboard Tracking	Keyboard Amount
Exciter Amount	Notes
Source 1 Amount	
Source 2 Amount	

AMP ENVELOPE						
Point	0	1	2	3	4	Notes
Levels					0	
Times	X					

AMP MOD

Velocity Env Amount	
Source 1	Amount
Source 2	Amount
Attack Velocity Mod	
Envelope Keyboard Mod	

ENVELOPE 1						
Point	0	1	2	3	4	Notes
Levels						
Times	X					

Velocity Amount	
ENV1 MOD	
Velocity Env. Amount	
Attack Velocity Mod	
Env Kybd Mod	

LFO1		LFO2	
Rate	Initial Amount	Rate	Initial Amount
Shape	Sync	Shape	Sync
Delay	Fade-in	Delay	Fade-in
Depth Mod Source	Amount	Depth Mod Source	Amount
Rate Mod Source	Amount	Rate Mod Source	Amount

For individual wave parameter blocks, please see next page.

PATCH: **WAVE:**

FILTER		BUS A-B PAN
Initial Cutoff		Velocity Amount
Keyboard Tracking		Keyboard Amount
Exciter Amount		Notes
Source 1	Amount	
Source 2	Amount	

AMP ENVELOPE						
Point	0	1	2	3	4	Notes
Levels					0	
Times	X					

AMP MOD	
Velocity Env Amount	
Source 1	Amount
Source 2	Amount
Attack Velocity Mod	
Envelope Keyboard Mod	

ENVELOPE 1						
Point	0	1	2	3	4	Notes
Levels						
Times	X					

Velocity Amount
ENV1 MOD
Velocity Env. Amount
Attack Velocity Mod
Env Kybd Mod

LFO1		LFO2	
Rate	Initial Amount	Rate	Initial Amount
Shape	Sync	Shape	Sync
Delay	Fade-in	Delay	Fade-in
Depth Mod Source	Amount	Depth Mod Source	Amount
Rate Mod Source	Amount	Rate Mod Source	Amount

PATCH: **WAVE:**

FILTER		BUS A-B PAN
Initial Cutoff		Velocity Amount
Keyboard Tracking		Keyboard Amount
Exciter Amount		Notes
Source 1	Amount	
Source 2	Amount	

AMP ENVELOPE						
Point	0	1	2	3	4	Notes
Levels					0	
Times	X					

AMP MOD	
Velocity Env Amount	
Source 1	Amount
Source 2	Amount
Attack Velocity Mod	
Envelope Keyboard Mod	

ENVELOPE 1						
Point	0	1	2	3	4	Notes
Levels						
Times	X					

Velocity Amount
ENV1 MOD
Velocity Env. Amount
Attack Velocity Mod
Env Kybd Mod

LFO1		LFO2	
Rate	Initial Amount	Rate	Initial Amount
Shape	Sync	Shape	Sync
Delay	Fade-in	Delay	Fade-in
Depth Mod Source	Amount	Depth Mod Source	Amount
Rate Mod Source	Amount	Rate Mod Source	Amount

13.5 Wave Sequence Data Form

KORG Wavestation SR Wave Sequence Data

WAVE SEQUENCE

Loop Dir Start End Repeats

Mod Source Mod Amt Start Step

Step	Bank/#/Name	Semi	Fine	Lev	Dur	Xfade	Notes

13.6 RAM Bank Data Form

Bank:_____

Performances
0.
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.
26.
27.
28.
29.
30.
31.
32.
33.
34.
35.
36.
37.
38.
39.
40.
41.
42.
43.
44.
45.
46.
47.
48.
49.

Patches
0.
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.
26.
27.
28.
29.
30.
31.
32.
33.
34.

Wave Sequences
0.
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.
26.
27.
28.
29.
30.
31.

Make copies of this chart, and use them to keep track of the Performances, Patches, and Wave Sequences in the RAM or CARD Banks that you create.

13.7 MIDI Implementation Chart

Korg Wavestation SR Synthesizer

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	1 – 16	1 – 16	Memorized
	Changed	1 – 16	1 – 16	
Mode	Default	1, 3, 4	1, 3, 4	Memorized
	Messages	X	X	
	Altered	********	********	
Note Number		X	0 – 127	
	True Voice	X	0 – 127	
Velocity	Note On	X	O (9N, v=1~127)	
	Note Off	X	X	
After Touch	Key	X	O	
	Channel	X	O	
Pitch Bend		X	O	
Control Change	0 Bank (msb)	O	X	
	01 Mod Wheel	X	O	
	04 Foot Control	X	O	
	06 Data	O	O	
	07 Volume	O	O	
	10 Pan (msb)	X	O	Note 1
	12 FX Control	X	O	
	16 Joy-X (AC)	X	O	
	17 Joy-Y (BD)	X	O	
	32 Bank (lsb)	O	O	
	38 Data (lsb)	O	O	
	42 Pan (lsb)	O	O	Note 2
	64 Damper	X	O	
	100 RPN (lsb)	O	O	
	101 RPN (msb)	O	O	Assignable
	1–95 Controls	X	O	
Program Change		0 – 99	0 – 127	Can be
	True #	0 – 99	0 – 99	Remapped
System Exclusive		O	O	
Common	Song Position	X	X	
	Song Select	X	X	
	Tune	X	X	
System Real Time	Clock	X	O	
	Commands	X	X	
Aux Messages	Local On/Off	X	X	
	All Notes Off	X	O	Notes 3, 4
	Active Sense	O	O	
	Reset	X	X	
Notes	1. Pans between Buses A (0) and B (127). Modulated values are not displayed. 2. Used to select special FX Bus values 3. Ignored in OMNI Mode. 4. Also Reset All Controllers message.			

X = Yes, O = No.

INDEX

This index includes citations from both the Player's and Reference Guides. Page numbers from the Player's Guide are marked by *Play;* those from the Reference Guide are marked by *Ref.*

NOTICE

KORG products are manufactured under strict specifications and voltages required by each country. These products are warranted by the KORG distributor only in each country. Any KORG product not sold with a warranty card or carrying a serial number disqualifies the product sold from the manufacturer's/distributor's warranty and liability. This requirement is for your own protection and safety.

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Printed in Japan
1994 0610 GH CR