

WAVESTATION

ADVANCED VECTOR SYNTHESIS • WAVE SEQUENCING

Player's Guide

by Stanley Jungleib

KORG

®

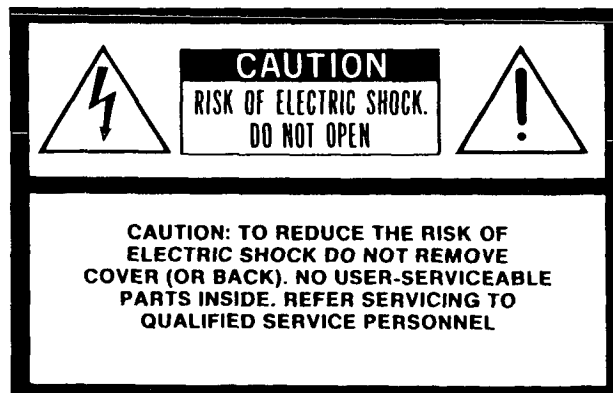
av AV Synthesis System

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. To reduce the risk of injury, close supervision is necessary when a product is used near children.
3. 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.
4. This product should be used only with a cart or stand that is recommended by the manufacturer.
5. 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 level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
6. The product should be located so that its location or position does not interfere with its proper ventilation.
7. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.
8. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
9. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
10. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
11. 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.
12. 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 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.



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.

GROUNDING INSTRUCTIONS

This product must be grounded. If it should malfunction or break down, 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 does not fit the outlet, have a proper outlet installed by a qualified electrician.

<p>VAROITUS</p> <p>Paristo voi rajahtaa, jos se on virheellisesti asennettu.</p> <p>Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Havita käytetty paristo valmistajan ohjeiden mukaisesti.</p>	<p>ADVARSEL!</p> <p>Lithiumbatteri — Eksplosionsfare ved fejlagtig handling.</p> <p>Udskiftning må kun ske med batteri af samme fabrikat og type.</p> <p>Levér det brugte batteri tilbage til leverandøren.</p>
<p>ADVARSEL</p> <p>Lithiumbatteri — Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.</p> <p>Brukt batteri returneres apparatleverandøren.</p>	<p>VARNING</p> <p>Explosionsfara vid felaktigt batteribyte.</p> <p>Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.</p> <p>Kassera anvant batteri enligt fabrikantens instruktion.</p>

Thank you for purchasing the KORG Wavestation. To ensure years of trouble-free operation, please read this manual and the accompanying reference guide carefully, and keep them handy.

PRECAUTIONS

■ ENVIRONMENT

Avoid exposing this unit to the following conditions:

- Direct sunlight.
- High temperature or humidity.
- Dust or sand.
- Excessive vibration.

Using your unit near fluorescent lights or CRTs (in TVs, etc.) may generate noise or cause erroneous operation, so please be careful.

■ POWER SUPPLY

Use this unit only with the rated AC voltage. If you intend to use this unit in areas where the voltage is different from the rated AC voltage, consult your KORG dealer about a suitable voltage transformer.

Do not plug this instrument into the same outlet used for devices which generate noise or which have a large power consumption, such as motors or dimmers.

■ INTERFERENCE WITH OTHER APPLIANCES

This unit uses microprocessor circuitry that may cause interference with nearby radio or TV receivers. If problems occur, use at a greater distance from the radio or TV.

■ HANDLE GENTLY

Although this unit is designed and constructed to KORG's high standards, the use of excessive force may damage its keys and knobs.

■ CLEANING

Use only a soft, dry cloth to clean the exterior of this unit. Never use benzene, volatile cleaners or solvents, polish or cleaning compounds.

OWNER'S MANUAL

Every attempt at accuracy has been made. However, specifications and operations are subject to change without notice. In case of difficulty, please contact your authorized KORG dealer.

THE BACKUP BATTERY

The Wavestation contains a lithium battery that preserves its memory settings when the power is switched off. When (in a few years) the display indicates "Battery Low", please contact your dealer or a KORG service center for replacement.

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KORG Wavestation Player's Guide

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1 WAVESTATION OVERVIEW

1.1 INSTANT GRATIFICATION

For those who have some experience with synthesizers, here are the briefest possible instructions. (For complete instructions, please see Chapter 4.)

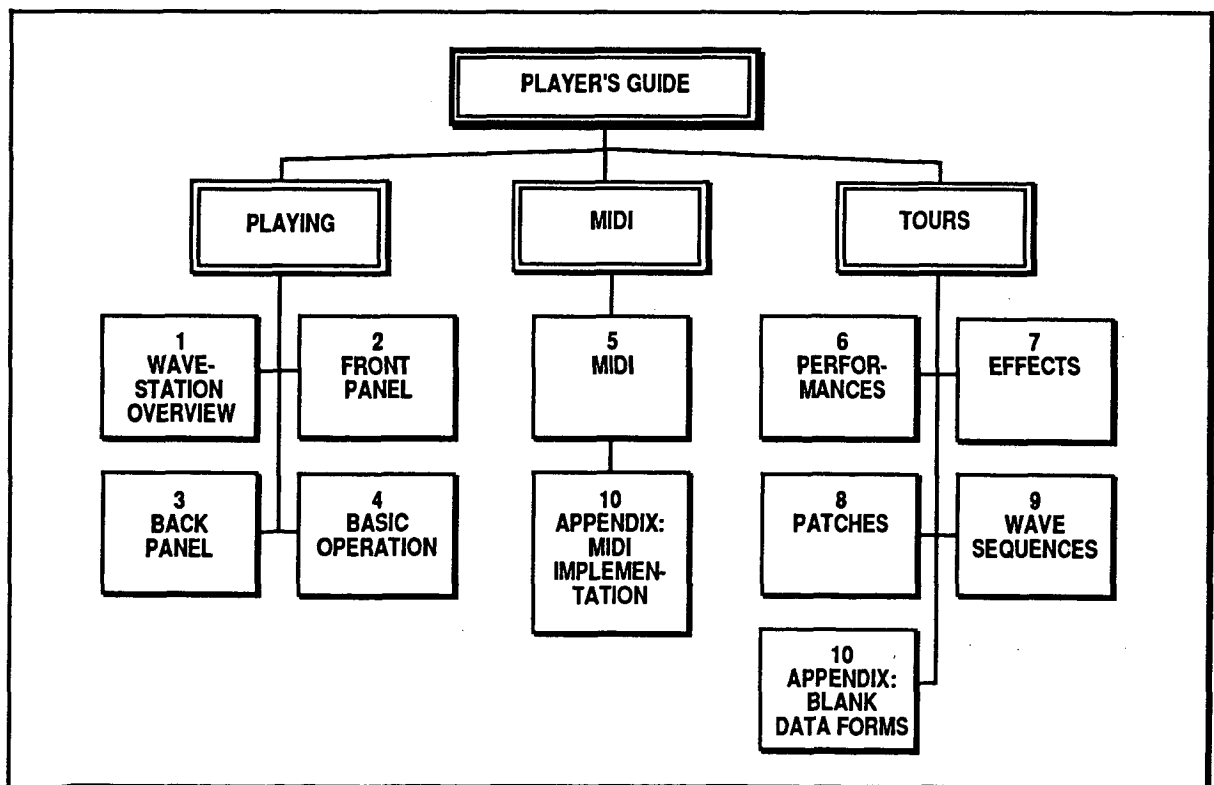
- ☛ Connect the Wavestation and switch everything on.
- ☛ Play the Wavestation and select new Performances by turning the dial.
- ☛ To switch memory banks, press the BANK soft key (the first switch under the display).

To edit:

- ☛ Select the desired page using the soft keys.
- ☛ Select the desired parameter field using the cursors.
- ☛ Set the desired value for the parameter using the dial (or keypad).

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

Figure 1-1 Player's Guide Overview



1.2 ABOUT THIS MANUAL

Figure 1-1 (on the previous page) shows how this Player's Guide is organized. This guide enables you to quickly set up and use the KORG Wavestation. It explains all the basic operations you might need to perform when you use the Wavestation in a variety of musical settings.

This guide does not cover programming custom sounds in depth. However, the Tour chapters (6 through 9) do introduce the Wavestation'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.

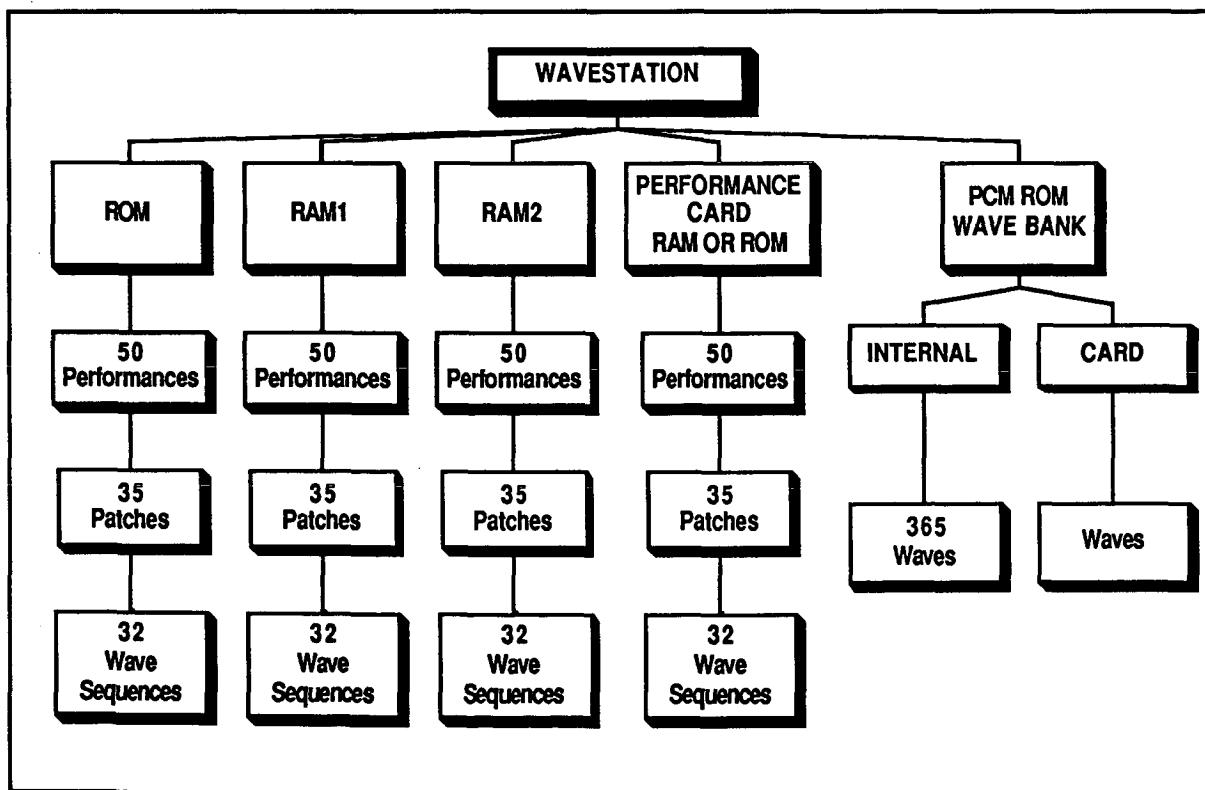
After familiarizing yourself with the Wavestation using this guide, or if you require more information about any displayed page, please see the accompanying Wavestation Reference Guide.

1.3 WHAT IS A BANK?

The Wavestation has internal memory banks ROM, RAM1, RAM2, and, if used, a plug-in CARD bank.

For a closer look at the banks, please see Figure 1-2.

Figure 1-2 Wavestation Memory Banks



The ROM bank contains fixed factory sounds and their source material; it can't be changed.

RAM1 and RAM2 are your work areas for custom sounds, although initially they are set with more factory sounds. The RAM banks are backed up with a long-life lithium battery. (If the internal battery voltage drops, a warning appears.)

Each bank contains 50 Performances, 35 Patches, and 32 Wave Sequences. In addition, there is a ROM wave memory of 365 Waves.

Cards, of course, 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 waves.

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

1.4 WHAT IS A PERFORMANCE?

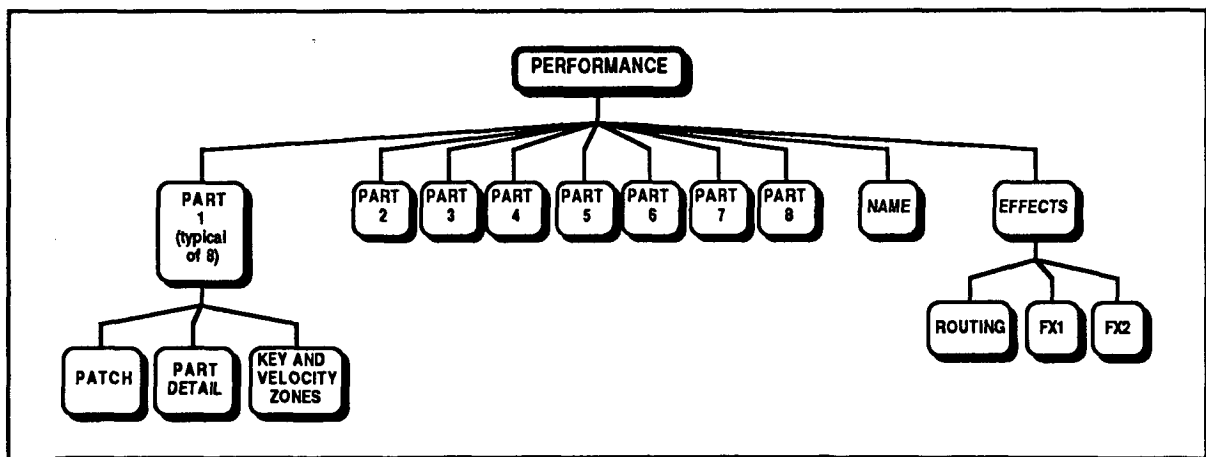
The simplest answer is that Performances are the highest level of sound control in the Wavestation. Performances have no sounds in themselves, but organize and add effects to Patches, which do create sounds.

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 150 Performances available - 200 if a Performance Card is in use.

Please see Figure 1-3.

Figure 1-3 Performance Structure



Performances consist of eight Parts. Each Part is a Patch together with some adjusting parameters (PERFORMANCE PART DETAILS) and a playback range (KEY AND VELOCITY ZONES).

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, split to various areas of the keyboard, or switched-in with different velocities.

Effects

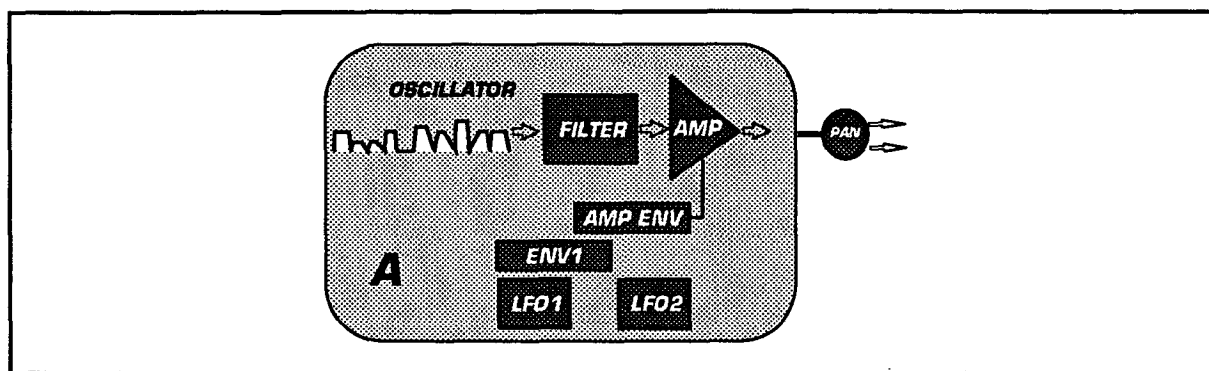
Each Performance also memorizes an effects and output routing configuration, two effects program selections for the twin effects processors, as well as all of the parameters contained in the two selected effects programs.

To learn more about the Effects, please see Chapter 7.

1.5 WHAT IS A PATCH?

Patches are specific setups for the synthesizer voices, which produce roughly the equivalent of an 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 1-4 A Voice Patch



Each Bank holds 35 Patches, for a total of 140 (with a ROM or RAM card inserted).

To hear an individual Patch you can:

- Select a Performance which has only one Part and edit that Patch selection.
- Select a SOLO function for any Part.

For more about Patches, please see Chapter 8 and the Reference Guide.

1.6 WHAT IS A WAVE?

For their raw sonic material, Patches rely on specific PCM waves played by their oscillators. PCM stands for Pulse Code Modulation, which is a common way of storing audio in digital form.

There are 365 internal wave choices available, and more can be accessed via optional PCM Cards. Each wave has a unique timbre. Waves can in fact either be single-cycle or few-cycle waveforms that loop continuously, sampled transients followed by loops, or sampled transients which play only once.

For more about waves, please see Chapter 8.

1.7 WHAT IS A WAVE SEQUENCE?

A Wave Sequence is simply a list which programs 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 is the first instrument to offer Wave Sequencing.

Each Bank holds 32 Wave Sequences, for a total of 128. The total Wave Sequence Step memory per bank is 500 steps, for a total of 2000. One Wave Sequence can have up to 255 steps.

For more about Wave Sequences, please see Chapter 9.

2 FRONT PANEL

2.1 GENERAL

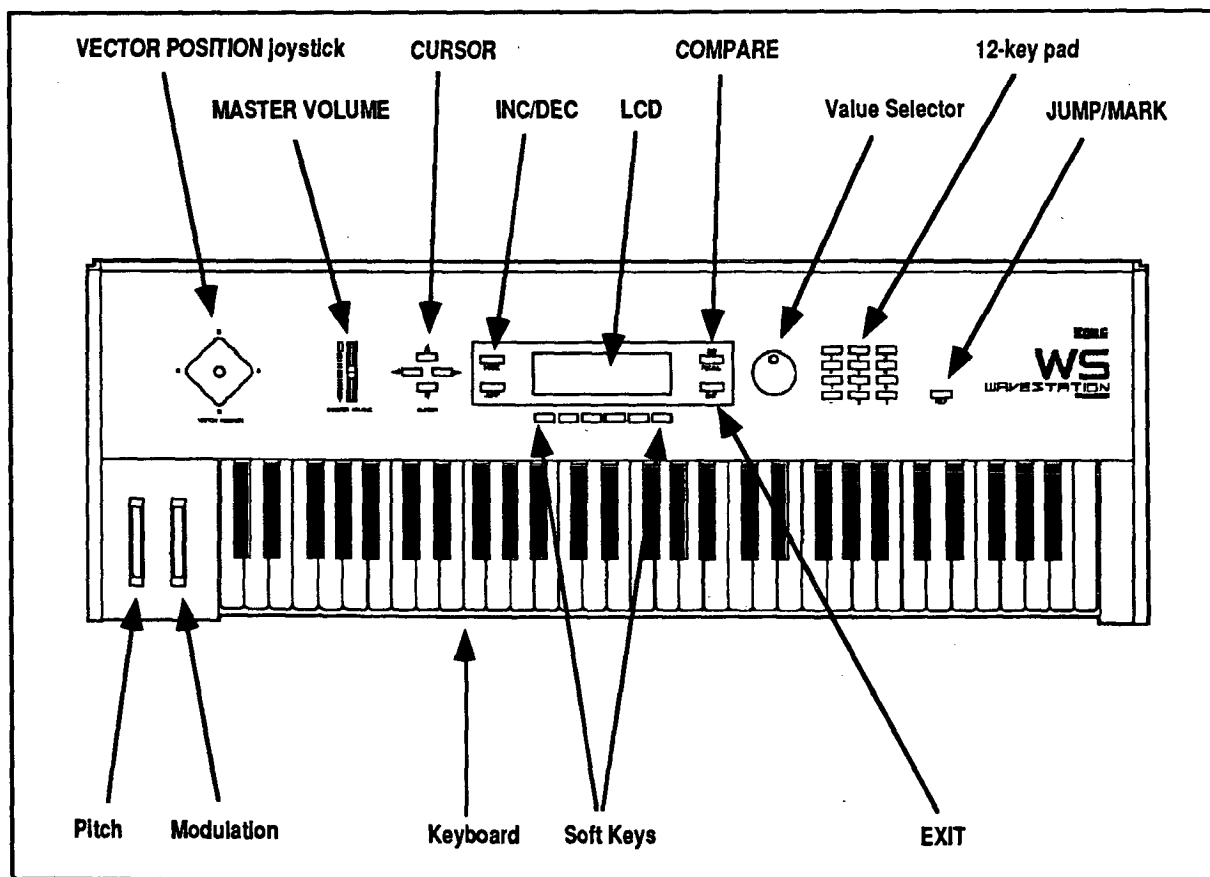
This chapter identifies and describes all controls and indicators on the front panel.

There are three main types of player's controls:

- performer's controls, which you normally use while playing
- display controls, which choose the display pages and parameter value fields
- parameter adjusters, which change the values of parameters

After you use the menu system to arrive at the desired *page* and the cursors to select the desired *parameter* on that page, use the parameter adjusters to adjust the parameter *value*.

Figure 2-1 Front Panel



2.2 PERFORMER'S CONTROLS

Keyboard

The 61-note keyboard is velocity- and aftertouch-sensitive. The Wavestation can play up to 32 keys simultaneously, depending on the current Performance.

Aftertouch *pressure* sensing is monophonic. In other words, the heaviest touch applied to any key affects all voices equally.

Pitch wheel

This control raises or lowers pitch. Springs automatically center it.

The range of the PITCH wheel defaults to a global value. However, each Patch can override this with its own range setting.

Modulation wheel

Pushing the MODULATION wheel upwards increases the depth of modulation. The actual modulation effect may combine vibrato, tremolo, chorusing, panning, and other expressive effects, as programmed by a variety of Patch and Effects parameters.

VECTOR POSITION joystick

The joystick is used for mixing the four oscillators A/B/C/D. While programming, the joystick allows you to pick mixer envelope points that correspond to a mixture of specific timbres. For example, when centered, the oscillators are mixed equally.

In performance, the joystick allows you to temporarily override the programmed mixture with a spontaneous mix position.

MASTER VOLUME slider

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

2.3 DISPLAY CONTROLS

Liquid Crystal Display (LCD)

This 8-line by 40-character (64 x 240 pixels) back-lit LCD makes the Wavestation a pleasure to use. Operation is generally simple, because the display guides you through each task.

The display shows the function of the programmable soft keys, and shows important concepts graphically. Data is presented in sets of related parameters called *pages*. A page generally contains a title, a list of parameters and other data, and a line of labels for the soft keys. (An occasional downward-pointing arrow in the upper right hand corner reminds you when a parameter list can be scrolled downwards.)

Soft Keys

These switches sit directly under the display. Their labels and functions change according to the specific page. Soft keys are always referred to by their current label.

Generally, the soft keys move you around within the Wavestation's editing hierarchy. There is a great difference between this approach and previous interfaces. Instead of having to learn what controls you need for a situation, you guide yourself to the correct control by selecting functions of interest. Along the way, the menu system prevents confusion by displaying only relevant choices.

CURSOR Left/Right/Up/Down switches

On any given page, use the four cursor switches to direct the cursor to the desired parameter for editing. When a parameter value field is selected, it appears in reverse video (white on black).

COMPARE switch

To prevent the accidental loss of desired edits, an edited Performance, Patch, Multi-mode Setup, or User Scale is always held in its own memory area (called a *buffer*.) When you edit, the COMPARE LED lights. Press COMPARE off, and you hear the unedited version.

EXIT switch

This switch always returns you to the previous menu level. It can also be thought of as a "CANCEL" function for the current page.

JUMP/MARK switch

This switch lets you set "bookmarks" on up to six display pages and move directly between them, thus bypassing the standard menu system. This can be especially useful for repetitive tasks or frequently-used adjustments.

Single-clicking calls the JUMP page. Double-clicking calls the MARK page.

2.4 DATA ENTRY CONTROLS

Value Selector dial

The current display page programs the function of the infinite-turn dial. On the PERFORMANCE SELECT page, the dial scrolls through the Performances in the current Bank. On most pages, the dial is the easiest way to adjust parameter values. You select the parameter assigned to the dial by using the cursor switches. Values can be numbers, but they are just as often options described by words.

The dial causes relative change from the current setting. It has no absolute position.

INC/DEC VALUE switches

For fine adjustments, you may prefer to use these switches. They make it easy to step through all of the possible values, one by one.

12-key pad

The keypad contains the numbers 0-9, a negative sign (-), and ENTER. The keypad can be used for direct entry of numerical values, as well as for selecting some descriptive values.

After keying the desired digits, you must press ENTER (so that the Wavestation "knows" the number has been entered).

To key in a negative number, press the negative sign (-) first, type in the desired digits, and then press ENTER.

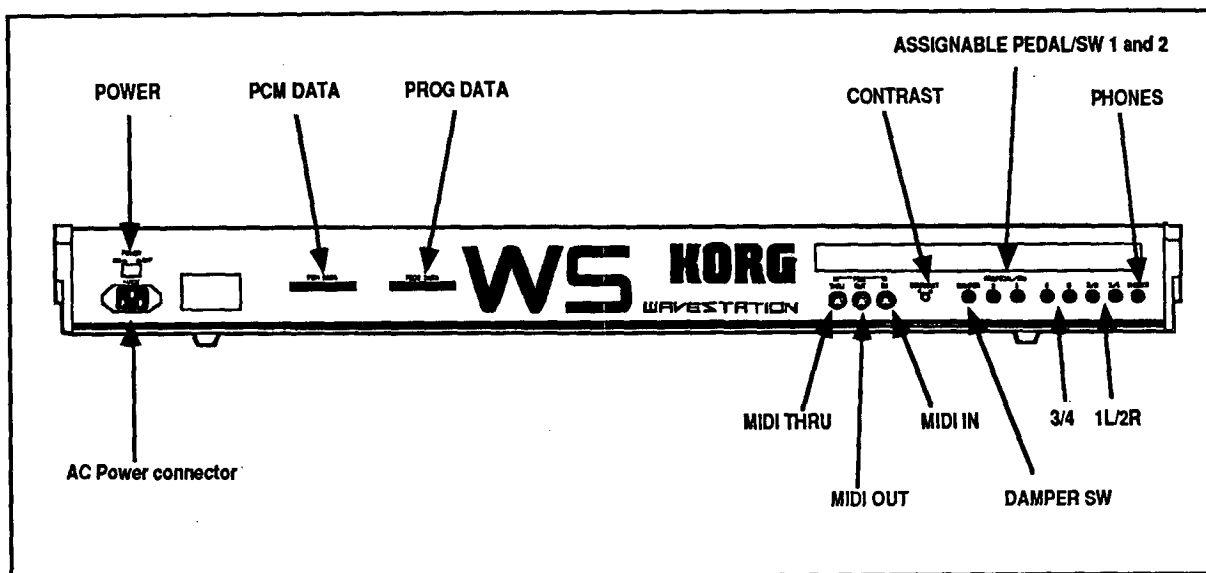
To cancel an edit, simply select another field with the cursor switches before pressing ENTER.

3 BACK PANEL

3.1 GENERAL

This chapter identifies and describes components on the back panel.

Figure 3-1 Back Panel



3.2 INPUTS

AC Power connector

A detachable cord is provided.

If in doubt about your line voltage, please contact your dealer.

MIDI IN jack

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

DAMPER jack

Connect a footswitch here to control the "piano sustain" function. This is actually a programmable footswitch input, which may be assigned (on the FOOT page) to SUSTAIN (the default), PERF ADVANCE, EFFECTS SWITCH, or OFF.

The Wavestation accepts footswitches which are either normally open or normally closed (polarity is set on the FOOT page). KORG Damper Pedal DS-1 or Footswitch PS-2 are suitable.

ASSIGNABLE PEDAL/SW 1 and 2 jacks

These are two general-purpose jacks for either a footpedal or footswitch, whose effects are programmable on the FOOT PEDAL ASSIGN page. Available functions are VOLUME, MODULATION, SUSTAIN, PERF ADVANCE, EFFECTS SWITCH, and OFF.

For control functions, KORG expression pedal EXP-2 is recommended.

3.3 OUTPUTS

MIDI OUT jack

This sends control data such as notes, aftertouch, wheel or joystick modulation, Performance selections, and System Exclusive data to external sound modules for controlling another instrument, recording by a sequencer, or interface to a computer librarian/editor.

MIDI THRU jack

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

1L/2R jacks

For normal stereo use, use these phone jack outputs.

The Wavestation's flexible audio output system lets you customize the routing of any Patch to the normal stereo bus outputs 1/2 or the auxiliary outputs 3/4.

3/4 jacks

These auxiliary outputs are usually set up to allow specific Patches to be externally mixed, equalized, or processed. (To learn how to route the outputs, read about the Multi Digital Effects (MDE) processor in Chapter 7).

PHONES jack

A copy of 1/L and 2/R. This standard quarter-inch phone jack accommodates stereo headphones of any impedance. KORG Model KH-1000 is suitable.

3.4 CONTROLS

CONTRAST trimmer

Adjust this for the most comfortable viewing of the front panel LCD. Clockwise, darkens; counter-clockwise, lightens.

POWER switch

The power switch is located on the back panel.

3.5 CARD SLOTS

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

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 Card slot, and vice versa.

PROG DATA slot

RAM or ROM cards in this slot hold Performances, Patch data, and Wave Sequences. For a RAM card, KORG Model MCR-03 is suitable.

PCM DATA slot

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

4 BASIC OPERATION

4.1 GENERAL

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

4.2 PREPARATION

Power

- ☛ Check that the Wavestation power switch is set to OFF.

Volume Settings

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

Audio Connection

- ☛ Connect the Wavestation's audio outputs to your sound system.
For monophonic operation, use jack 1/L only.
For stereo, use 1/L and 2/R. Stereo playback is highly recommended.
Or, use headphones.

Your audio system is as crucial to your sound as violin or guitar bodies are to those instruments. A weak or distorted sound system can rob the Wavestation of its inherent fidelity.

Footswitches

- ☛ For the important "piano sustain pedal" function, connect a footswitch to the back panel DAMPER jack.
- ☛ Connect other footswitches or pedals to the ASSIGNABLE PEDAL/SW 1 and 2 inputs.

To see what the FOOT PEDAL ASSIGN page can do for your foot controllers, please see the Reference Guide.

MIDI

- ☛ To receive MIDI, connect a cable from another device's MIDI OUT or THRU port to the Wavestation's IN port.

Note that the effect of MIDI input is subject to the Wavestation's Mode and Channel settings. These are adjusted on the Wavestation's MIDI page.

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When shipped, the Wavestation is in Omni mode, which means that it receives data on all 16 MIDI channels.

- To control other MIDI devices from the Wavestation, connect a cable from the Wavestation's OUT port to the IN port of the receiver.

NOTE: For information on basic MIDI operation please see Chapter 5.

4.3 POWER-ON

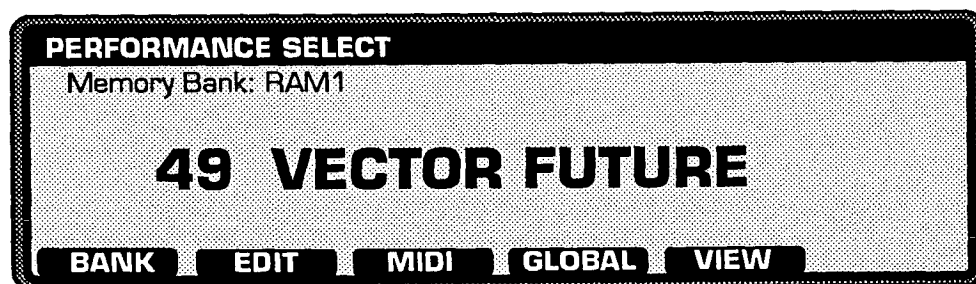
To prevent speaker damage caused by turn-on transients, use the following power-on sequence.

Start-up Instructions

- Connect the AC power cord from Wavestation back panel to the specified power outlet.
- Switch power on to the Wavestation and other sound-generating devices first. On the Wavestation, the KORG logo appears briefly in the display.
- Switch on low-level devices such as mixers and signals processors.
- Finally, switch on the power amplifier(s).
- For power-off, reverse this sequence.

Normal Indications

Normally, after a moment the Wavestation displays the PERFORMANCE SELECT page, which is the "topmost" or main menu:



The large current Performance number and name actually displayed on your instrument will of course be different from this example. When you power up the Wavestation, it will remember the Performance that you had selected before last turning it off.

Volume Adjustment

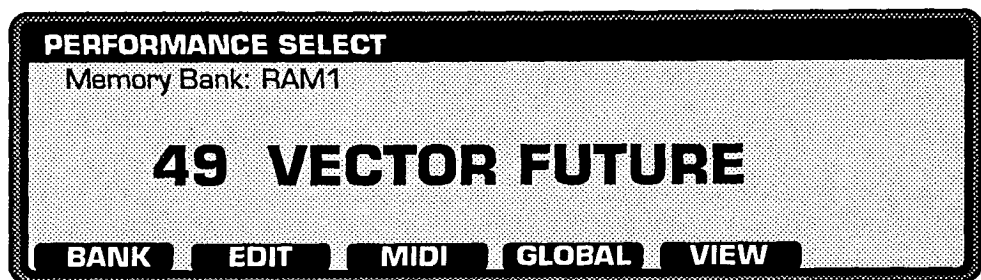
- While playing the Wavestation keyboard, gradually raise its MASTER VOLUME slider, and then adjust your sound system volume to the desired level.

Pre-Play Check

- ☛ Check that desired Program and/or PCM Cards are in place.
- ☛ To prevented undesired modulation, check that the Modulation wheel is fully lowered.
- ☛ If using a volume pedal, check its initial setting.
- ☛ Check the footswitch operation(s).

4.4 PERFORMANCE SELECT PAGE

When power is switched on, the Wavestation is ready to play. You see the PERFORMANCE SELECT page:



The PERFORMANCE SELECT page is the “top” page in the Wavestation’s menu system. This page allows you to select all of the Performances at your disposal.

It displays the name of the current memory Bank as its first field.

The current Performance is shown in large letters for easy reading at a distance.

- ☛ To get here from any other page, just press the EXIT switch repeatedly. Since this page is at the top level, you will eventually return here.

4.5 SELECTING BANKS

The current Bank name appears in the upper-left corner of the page.

- ☛ To select a different memory bank, press BANK.

In other words, press the soft key under the BANK label on the last line of the display. (The soft keys are always referred to by their current assignment.)

BANK cycles through the bank choices. This is a performance feature which allows you to quickly switch between banks.

4.6 SELECTING PERFORMANCES

- ☛ Selecting Performances couldn’t be simpler: just turn the selector dial, press INC/DEC, or use the keypad.

The dial or INC/DEC access each Performance sequentially (0, 1, 2, . . . , 49).

- ☛ For random access (34, 17, 42, . . . 5) you can use the keypad. Type in the desired Performance number and press ENTER.

Whenever you enter numbers from the keypad, you will see the number on the screen immediately, but the Wavestation will not make change until you press ENTER.

Note that you can't enter a Performance number larger than 49, since all performances are numbered 49 or less. This is true for all values: you can't exceed their limits.

If desired, you can program one of the assignable footswitches to advance the Performance number. See the Reference Guide [FOOT PEDAL ASSIGN].

4.7 PLAYING

- When auditioning Performances, be sure to try all of the physical modulation controllers available to you: not just keyboard velocity, but aftertouch, the wheels, joystick, and the damper (sustain) footswitch.
- To prevent unwanted modulation, periodically check that the MODULATION wheel is fully lowered.

4.8 IF YOUR WAVESTATION IS SILENT...

Check the MASTER VOLUME slider and volume pedal (if used).

Perhaps someone has edited the current Performance into silence. Try selecting different Performances -- particularly ones in the ROM bank.

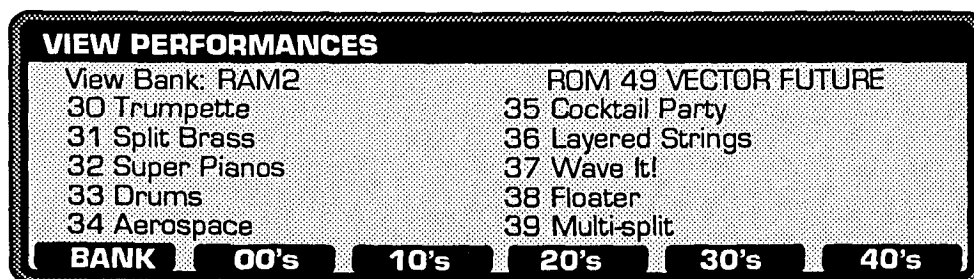
If you still do not obtain audio output, it is easy to check whether the problem is the Wavestation or your sound system by plugging headphones directly into the back panel PHONES jack. If you can hear sound through the headphones, check the connections to your sound system.

If you are using an external MIDI controller, and the Wavestation seems to be silent, try playing on the Wavestation's own keyboard. If this produces sound, check to see that all your MIDI cable connections and channel assignments are correct. For more information on the Wavestation and MIDI, see section 5 below.

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 by cycling power off, then on.

4.9 VIEWING PERFORMANCE SETS

The VIEW page lists available Performances in groups of ten. To get to this page, press the VIEW soft key on the PERFORMANCE SELECT page.



- For the desired set, press the corresponding soft key. The current Performance is shown at the upper right and can be changed.

4.10 USING CARDS

NOTE: When switching off the Wavestation power, check that the memory protect switch *on the card* is switched to on (protect). Otherwise, without Wavestation power, the card's internal battery will drain. If during operation a RAM card's battery goes too low, a warning appears.

All RAM cards must be formatted before being used in the Wavestation. To format a card, enter the UTILITIES page (accessible through the GLOBAL page), insert the card into the slot, and press the FORMAT soft key. Be careful not to format a card with important data on it - formatting will erase all of its data.

The UTILITIES page also allows you to quickly copy to and from Program cards. To back up an entire RAM bank onto an inserted, formatted card, enter RAM 1/2 as the From: parameter, and enter CARD as the To: parameter. Select Data to Transfer: ALL, and press the MOVE softkey. To move an entire card bank into RAM, select CARD as the From: parameter, and RAM 1/2 as the To: parameter, and then proceed as above.

You can use fresh Program RAM cards just like the internal banks RAM1 or RAM2. However, after a while, you will probably create some Performances that combine different types of resources. For example, you might have a CARD Performance that uses a RAM1 Patch, or a RAM2 Patch that uses a CARD Wave. You will 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 some CARD resources which aren't there, it doesn't play that resource.)

4.11 GLOBAL SETTINGS

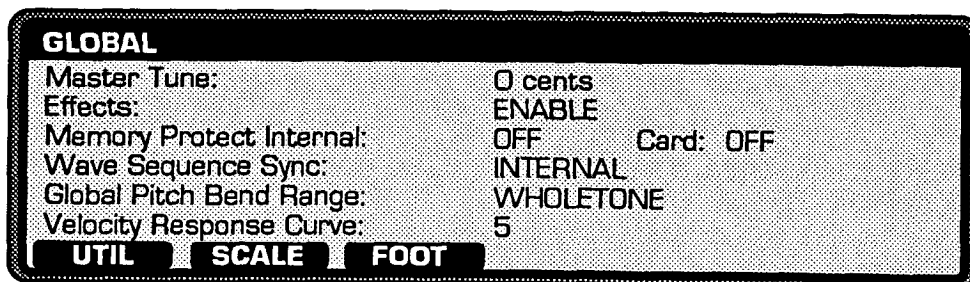
The Global parameters help to adapt the instrument to the playing environment. Thus, it is important to at least be aware of the powers that lurk on the GLOBAL page. In this section we are going to cover Master Tune only. For the other global parameters, please see the Reference Guide.

Paths

Selecting the GLOBAL page provides the first example of the shorthand we will adopt from now on for identifying each page. The *path* describes how to get there using the soft keys. All paths are described beginning from the PERFORMANCE SELECT page. For example:

Path: GLOBAL

tells you that, from the top menu, pressing the GLOBAL soft key selects the GLOBAL page.



4.12 MASTER TUNING

Found at the top of the GLOBAL page, this parameter raises or lowers the basic pitch of the instrument. For example, you may want to fine-tune the Wavestation to a piano.

☛ While playing, adjust the dial to raise or lower the basic pitch.

0 cents is the default setting. 100 cents equals one semitone .

+99 is maximum. In this case the Wavestation is almost a semitone sharp.

-99 is minimum. In this case the Wavestation is almost a semitone flat.

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

Not Enough Tuning Range?

If there is not enough range to get you into tune, then something else is wrong. It is not the PITCH wheel, because that returns itself to its center.

If you are playing the Wavestation from MIDI and all Performances are off by the same interval, go to the MIDI page and check that the Key Offset parameter is set to 0, or a multiple of 12.

Failing that, the current Performance (or Patches) are probably transposed to an incorrect semitone, or the Pitch Ramp (Under Patch Macros-Pitch) has been set to a high value.

Another, less likely, source of detuning is where, in a MIDI setup, PITCH wheel information is received sporadically -- leaving the instrument "hung" away from A-440 tuning. To clear this problem, make sure all incoming cables are solidly connected, and adjust the Wavestation back into range by re-centering the external controller's wheel.

Finally, realize that a Part can be detuned by use of USER Scales, or a Patch can be detuned (accidentally or intentionally) by an oscillator Slope parameter that is not equal to +1.00. The Slope parameter is found on the WAVES page.

5 USING MIDI

5.1 GENERAL

In addition to selecting Performances and making some Global adjustments, you may wish to use the Wavestation as a sound source slaved to another keyboard, sequencer, or alternate controller. You may also want the Wavestation to control other sound modules. This chapter covers basic MIDI operations such as these.

Beyond basic operation, the Wavestation's robust MIDI implementation meets modern demands for use as both an expressive Multi-Timbral sound module or as a sophisticated "mother" keyboard.

For example, the Wavestation can handle 16 channels of input in addition to its own keyboard. Up to 16 multi-timbral setups (MultiSets) can be defined, each including 16 Performances. The MultiSets also include control over the Multi-Digital Effects (MDE) processor. You can even program an independent channel for effects modulation.

The Wavestation is also capable of Multi-timbral output: each Performance Part can send MIDI on its own, individual channel. Each Part may also send out a different Program Change, to enable you to quickly configure a group of slave modules. This MIDI output is filtered through the Part's key and velocity zones, Delay time, and Transposition, allowing you to exercise outstanding control over even complex MIDI systems.

Advanced MIDI applications such as these are covered in the Reference Guide (under MIDI TRANSMIT, MIDI RECEIVE, and MULTI-MODE SETUP).

5.2 FACTORY DEFAULTS

When shipped, the Wavestation is set to MIDI Omni mode. This means that it recognizes data received on any of the 16 MIDI channels. So, it is ready to play in a basic set-up with a master keyboard controller and several sound modules layered together.

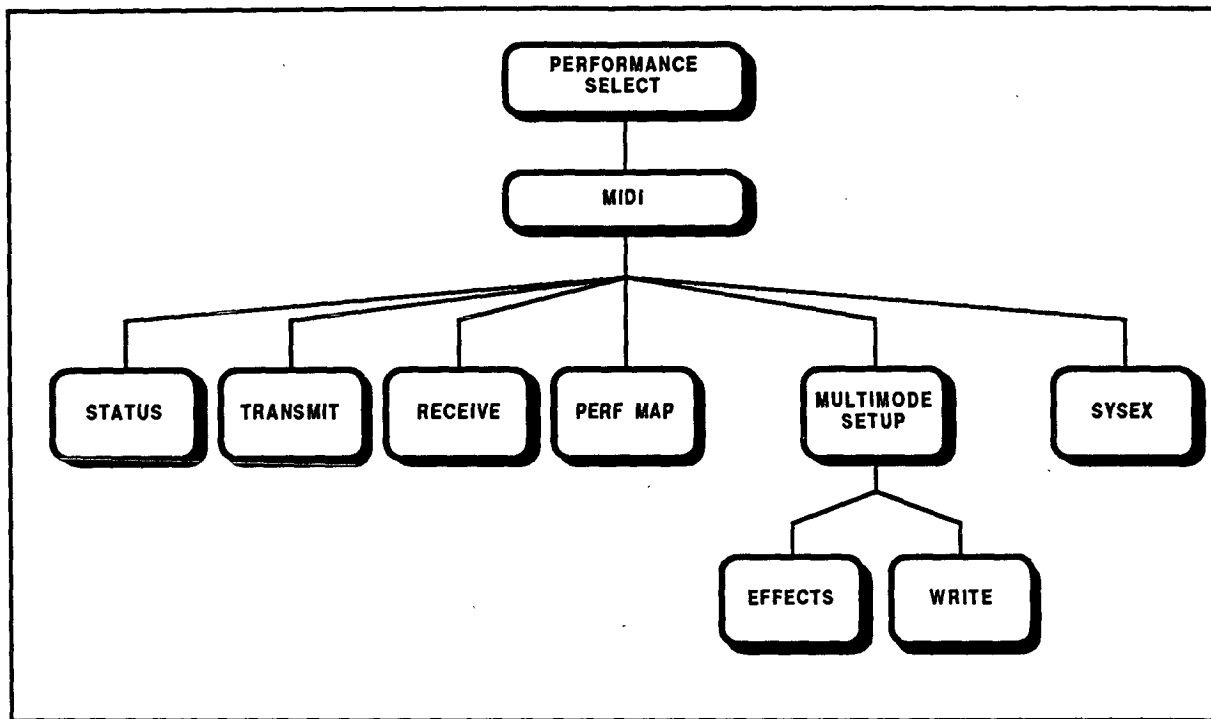
All data, such as the full MIDI note range, preset selections, and wheels, are recognized by default in the factory Performances. Monophonic and polyphonic aftertouch are recognized but may or may not have an obvious effect, depending on the specific Patches which are programmed into the current Performance. Channel aftertouch is transmitted.

To use the Wavestation in a sequencer environment where it needs to receive on a specific channel, you will need to set it to Poly mode and select the desired channel. Instructions follow.

In the previous chapter, you may have noticed a Wave Sequence Sync parameter on the GLOBAL page. This feature can be used to synchronize wave sequence steps to MIDI clocks. When this is set to MIDI, each step sounds for the number of MIDI clocks equal to the step's Duration parameter.

Figure 5-1 shows the organization of the MIDI menus and their references. For example, from the PERFORMANCE SELECT page, press MIDI to get to the main MIDI page. Then press any of the soft keys shown for their corresponding functions.

Figure 5-1 MIDI Menus



5.3 SELECTING MIDI FUNCTIONS

Path: MIDI

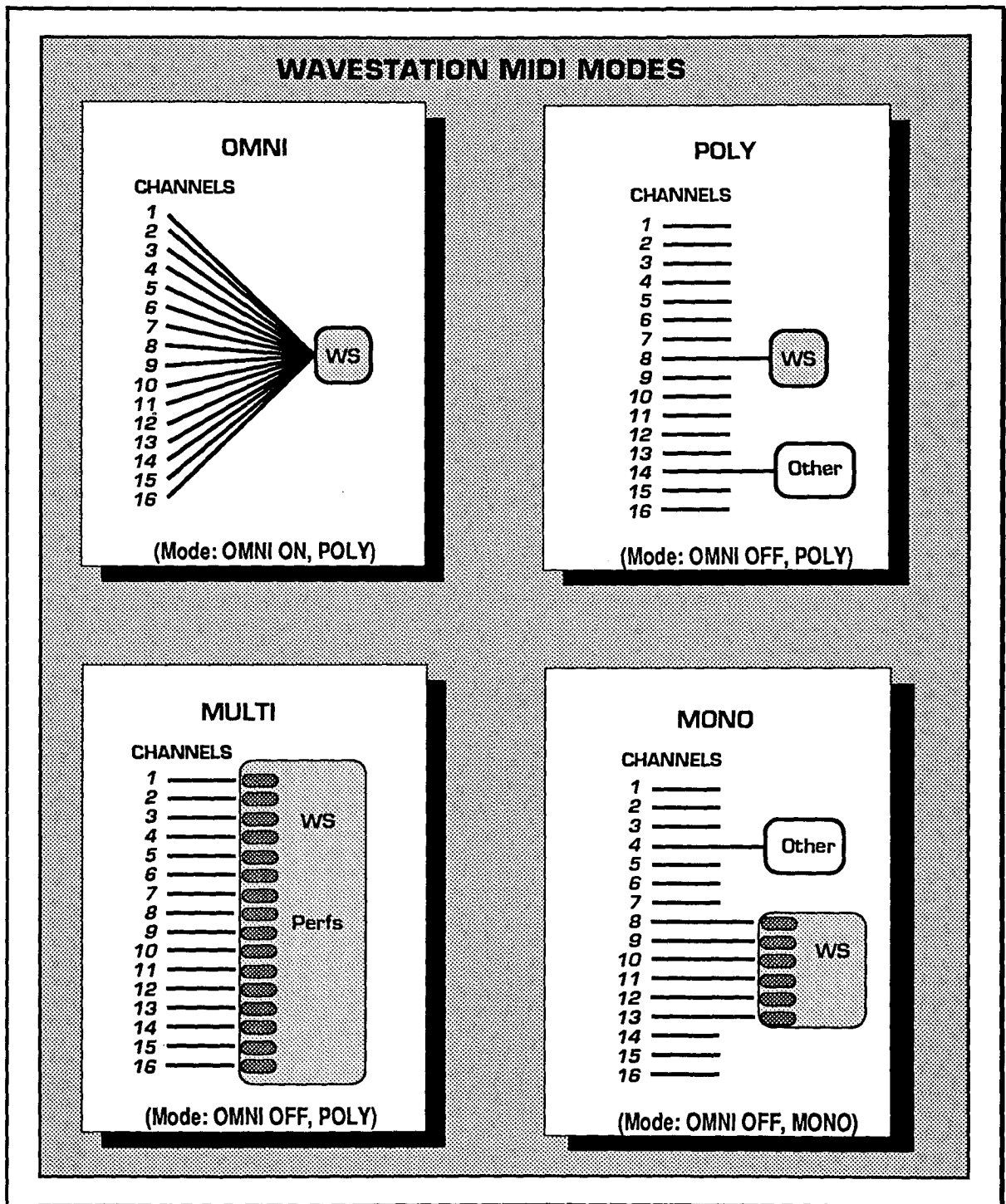
MIDI	
Mode:	OMNI
Basic Channel:	1 [6 MONO Channels]
Key offset amount:	0
Parameters:	RECOGNIZE
MIDI Controller 1:	MODULATION WHEEL
MIDI Controller 2:	BREATH CONTROLLER
STATUS TRANS RECV PERFMAP MULTISET SYSEX	

As you can see, this is where the main MIDI functions are set or chosen.

All of the MIDI parameter settings on the MIDI page and its sub-menus are non-volatile, so they remain in the Wavestation even if you turn the power off.

Figure 5-2 shows the Wavestation's 4 different MIDI modes - OMNI, POLY, MULTI, and MONO.

Figure 5-2 MIDI Modes



NOTE: In MULTI and MONO modes, the local keyboard and incoming MIDI have separate controllers. In OMNI and POLY modes, the local keyboard and MIDI share the same controllers.

5.4 SETTING THE MIDI MODE

For your specific setup, you may want to switch the Wavestation to Poly mode so that it responds to only one channel.

- Cursor to the first field on the MIDI page.
- Use the dial to select the desired mode.

OMNI means that the Wavestation receives on all channels.

POLY receives on the Basic Channel (as set under the next heading).

MULTI means that the Wavestation receives on all 16 channels, routing channel data to up to 16 different Performances according to the current Multi Mode Setup. In MULTI, you can still play a 17th Performance from the Wavestation keyboard. Please see the Reference Guide [MIDI RECEIVE].

MONO is used most often by guitar controllers. It means that the incoming instrument is spread out over typically six consecutive channels, to which certain global parameters may apply. In this case a "# MONO Channels" parameter also appears and can be set.

5.5 ADJUSTING THE BASIC CHANNEL

- Cursor to the second field on the MIDI page.

This channel number only has meaning for POLY or MONO mode.

In OMNI mode the channel number is ignored, while in MULTI mode, those programmed channels override the basic channel.

5.6 KEY OFFSET AMOUNT

Normally, you'll leave this parameter at 0, meaning Middle C (C4) corresponds to MIDI note #60.

But if you are using a different controller, you can move the whole instrument up or down by as much as two octaves (+/- 24 notes). This adjustment only affects incoming and outgoing MIDI – it has no effect on the Wavestation's "local" keyboard.

5.7 PARAMETERS

Normally you'll leave this OFF. If you are not specifically using this feature, leave it OFF to disable sending unnecessary data.

Setting it to TRANSMIT sends parameter changes as you make them during editing. Some people send this kind of data to a sequencer, which can play it back (RECOGNIZE) for live effects such as filter sweeps or variable effects depth, or create an editing log.

Specific parameter codes are covered in the Reference Guide, under SYSEX Data.

5.8 MIDI CONTROLLER 1 AND 2 ASSIGNMENT

In addition to its normal response to MIDI Controllers (which is outlined in the MIDI Implementation Chart at the back of this manual), Wavestation modulation can be controlled by two additional MIDI controllers. These are designated Controller 1 and 2. The two Controller assignment parameters on the MIDI page let you set which MIDI controllers are recognized as Wavestation Controller 1 and 2.

• If desired, set these two fields to your favorite MIDI controllers.

The value range is 1 - 95. However, the following complete controller names are used for some numbers:

	OFF (DISABLE)
1	Modulation Wheel or lever
2	Breath Controller
4	Foot Controller
5	Portamento Time
7	Main Volume
8	Balance
10	Pan
11	Expression Controller

While intended for use with continuous controllers (numbered 0 through 63), switch controllers (64 - 95) can also be used. In this case, OFF equals value 0 and ON equals value 127.

64	Damper Pedal
65	Portamento
66	Sostenuto Pedal
67	Soft Pedal
69	Hold 2
91	External Effects
92	Tremolo
93	Chorus
94	Celeste
95	Phaser

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.

5.9 MIDI BANK SELECT and PROGRAM CHANGE

MIDI has been enhanced with a Bank Select message, which the Wavestation is one of the first instruments to implement. When you change Performances, both a Program Change and a Bank Select message (MIDI Controller #32) are transmitted.

RAM1 and RAM2 correspond to Controller #32, value 0. ROM and CARD correspond to Controller #32, value of 1. This means that, unless you are using the Performance Select Map, MIDI program changes operate as follows:

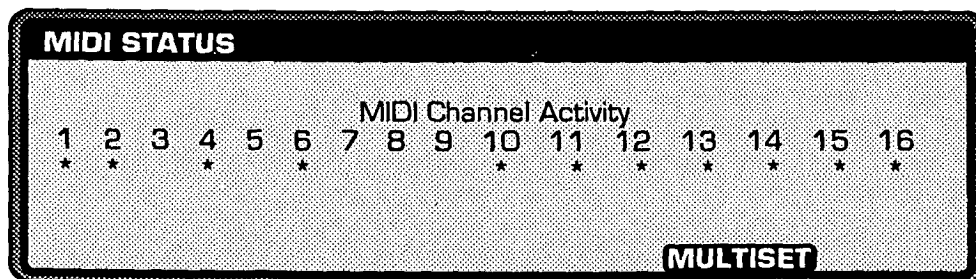
<u>MIDI</u>	<u>BANK/PROG</u>	<u>Wavestation</u>	<u>Performance</u>
	0/0	RAM1	0
	...	RAM1	...
	0/49	RAM1	49
	0/50	RAM2	0
	...	RAM2	...
	0/99	RAM2	49
	1/0	ROM	0
	...	ROM	...
	1/49	ROM	49
	1/50	CARD	0
	...	CARD	...
	1/99	CARD	49

In other words, MIDI program changes 0 - 99 select Performances in RAM1 and RAM2. If you are using an external controller to select ROM and CARD Performances, you would need to first send a Bank 1 message (Controller #32, value 1) – OR use the Performance Select Map as described below. The Wavestation itself always sends these messages along with Program Changes, so if you are recording 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.

5.10 MIDI STATUS DISPLAY

Path: MIDI - STATUS



The Wavestation includes a feature that is very handy when you are troubleshooting your MIDI setup. The STATUS display shows graphically when and in what channel data is being received at the MIDI IN jack. When data is received in each channel, the asterisk under its number appears. If data is not being received, you know that the problem must lie in the MIDI controller or, more likely, a cable or its routing.

NOTE: If data is being received, but not *recognized*, please check the MIDI RECEIVE page (discussed in the Reference Guide).

5.11 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, however, this 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. The Wavestation, of course, is able to send out different program changes on 8 channels simultaneously (See MIDI TRANSMIT). If your master keyboard 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).

A more elegant method is to leave the programs in the same location, but to 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 Select Map allows you to do just this. All 127 possible MIDI Program Change commands may be mapped to any of the Wavestation's 150 Performances (200, if a ROM or RAM Card is inserted).

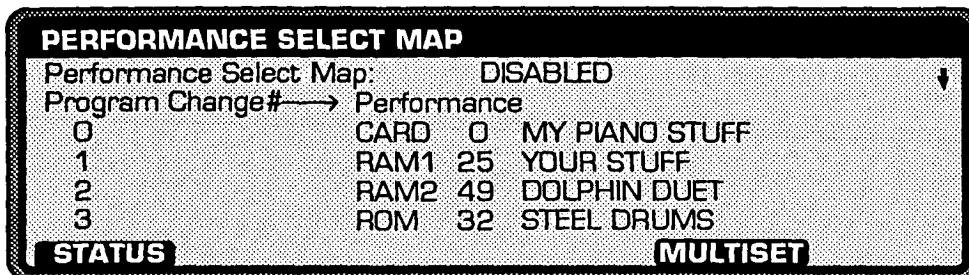
For example, you can easily construct a map that does this:

Received MIDI Prog Change#	Bank	Performance
0	CARD	49 ULTIMO
1	RAM1	1 MY BASIC SOUND
2	RAM1	1 MY BASIC SOUND
3	ROM	34 ZARGFEST
...		
127	ROM	30 VOLKANIK

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

Accessing the Performance Select Map

Path: MIDI - PERFMAP



Performance Select Map

This parameter switches the Performance Select Map on and off.

DISABLED is normal and the default. This means that the map is not used, so Performances are selected as explained under section 5.9.

ENABLE means that the custom map is used.

Editing the Performance Select Map

- ☛ Scroll down the list to select the line of the desired MIDI program change number.
- ☛ Cursor across to select the desired BANK (ROM, RAM1, RAM2, CARD).
- ☛ Cursor right one more field to select the desired Performance within the bank.

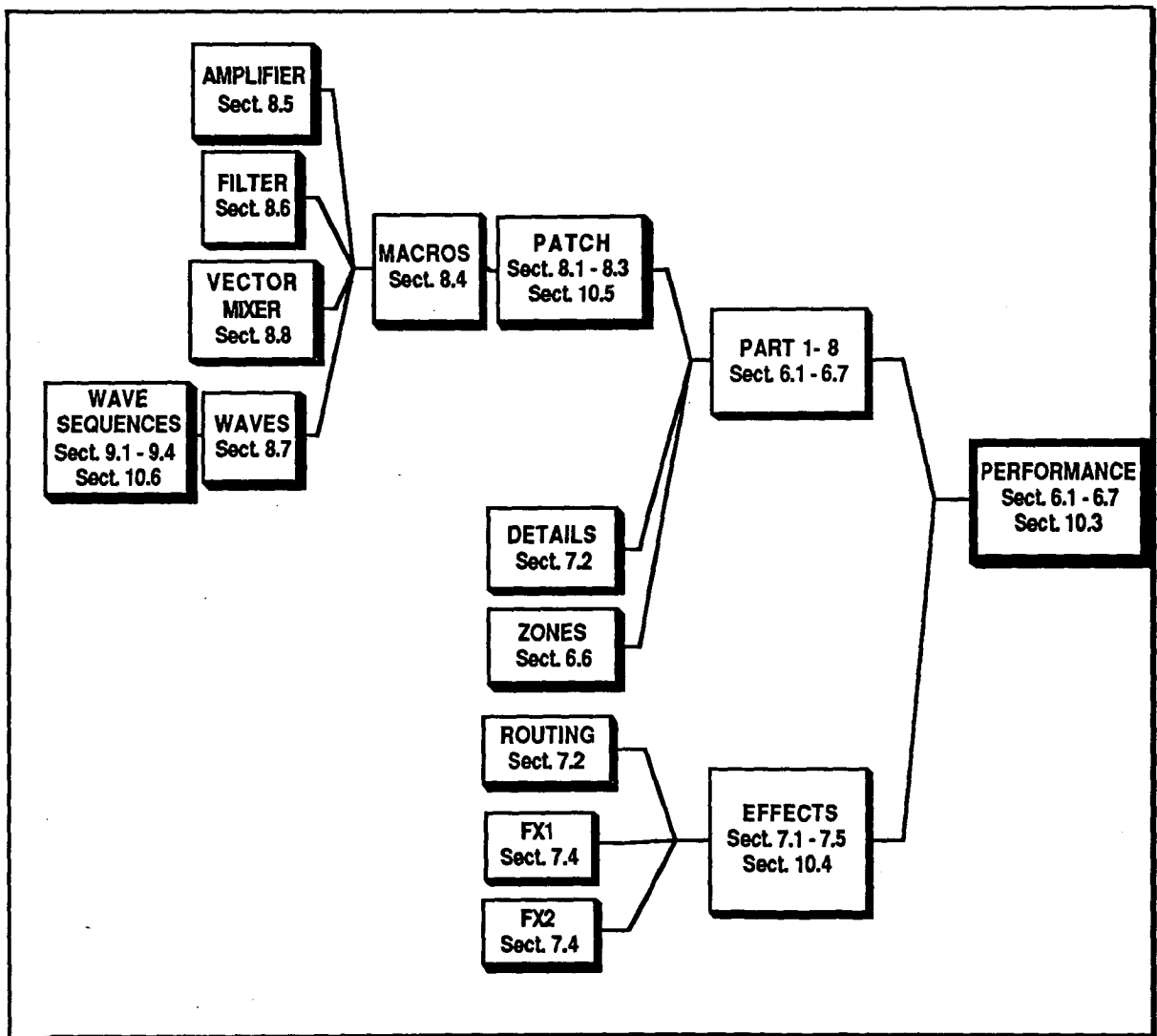
6 PERFORMANCE TOUR

6.1 OVERVIEW OF EDITING

Chapters 6 through 9 tour across the Wavestation's editing system. They show 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 6-1 is a map of the Wavestation's *architecture*, along with references to corresponding sections in the remainder of this manual.

Figure 6-1 Wavestation General Signal Flow



If you were to create a new sound by strictly following 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

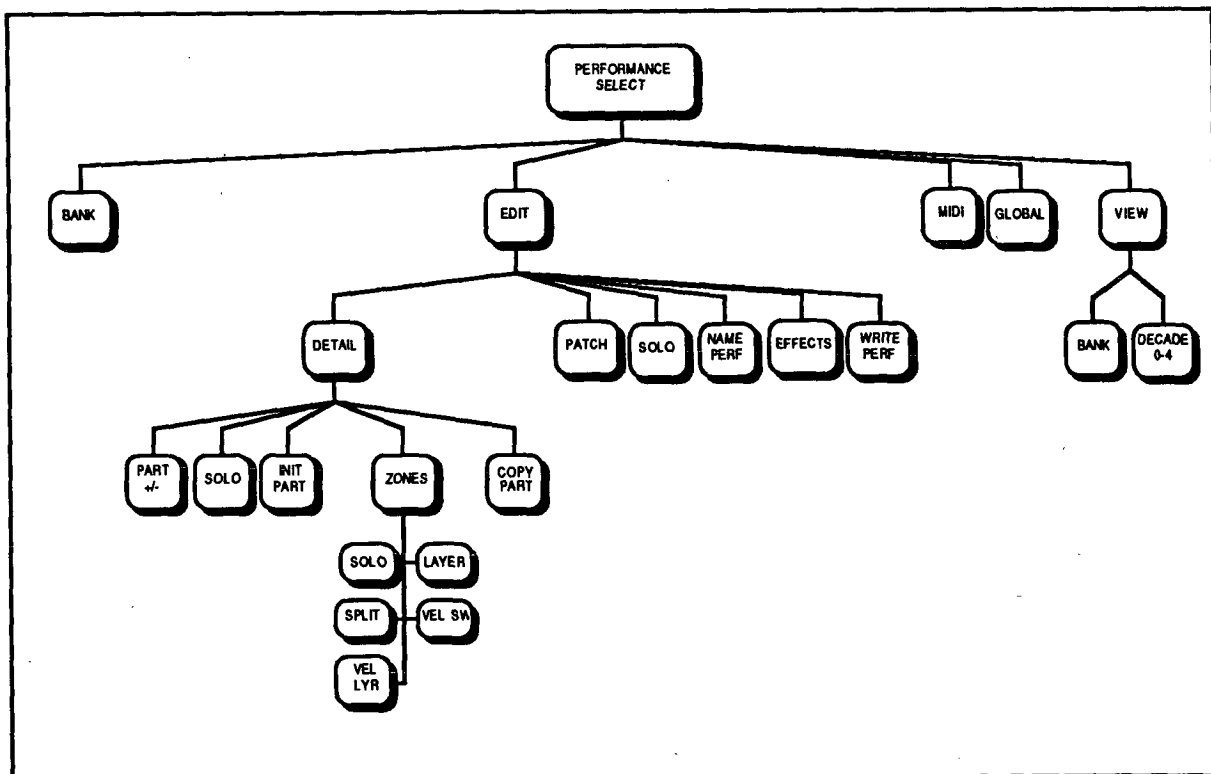
Macros for the voice amp, filter, pitch and pan, possibly touching up the details for individual waves or modules. After building or editing up to eight such Patches, you would assign them to newly initialized Parts of a Performance, set their key and velocity zones and other playback details. As a final 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 you need to be aware of this signal flow. However, to *learn* to program the Wavestation, 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.

6.2 OVERVIEW OF PERFORMANCES

Figure 6-2 shows how the Performance menus are organized. Use this and the following tree charts to keep your bearings throughout the tours. (By referring to the Path descriptions, you can easily find your way around.)

Figure 6-2 Performance Menus



Memory Protection

NOTE: To preserve the factory sounds and tour with peace of mind, check that Memory Protect Internal (on the GLOBAL page) is on. Before disabling protection, it may be a good idea to backup the factory sounds either to a RAM card, or via MIDI System Exclusive dump.

6.3 ASSIGNING PATCHES TO PARTS

Recall from the overview that Performances have Parts, which contain Patches that play according to certain Part Details and Zone Settings.

So, one of the first things to try to do to a Performance is to select different Patches for its eight Parts. You can easily change the Patches assigned to each Part on this page. (On this page, Patch names are abbreviated.)

Editing the Parts couldn't be simpler.

- First, select the EDIT PERFORMANCE page.

Path: EDIT

EDIT PERFORMANCE				[PERFORMANCE is EDITED]	
Performance: CARD 12 GIGSET 1					
PART#	PATCH	PART#	PATCH		
1:	CARD 12 Trumpet	5:	ROM 22 Waterphone		
2:	CARD 13 Trombone	6:	CARD 13 Shakuhachi		
3:	RAM2 11 Soprano Sax	7:	RAM2 11 Soprano Sax		
4:	--	8:	RAM1 34 Yore Guess		
DETAIL		PATCH		SOLO	
		NAME		EFFECTS	
				WRITE	

- Cursor up/down to the Bank field of the desired Part.
- Select the desired bank.
- Cursor to the Patch number field and select the desired Patch, using the dial, INC/DEC, or the keypad.

There are 35 Patches in each bank. The symbol "--" (meaning "empty") is also a possible value.

Editing the Patch selection turns the COMPARE light on. It also invokes the "Performance is edited" warning on the top line. (Similar messages appear on all pages that have a WRITE function. 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.

- To hear this Part by itself, try the SOLO function.

This is a way to hear individual Patches.

6.4 SAVING A PERFORMANCE

Try to save everything that sounds good or would take a lot of work to rebuild. RAM Cards make this easy.

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 power is switched off.

- On the EDIT PERFORMANCE page (shown above), press WRITE.

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- On the WRITE page, select the target destination Bank and Number for the edited Performance.

Path: EDIT - WRITE

WRITE		PERFORMANCE is EDITED	
Data Type:	PERFORMANCE		
Source:	RAM2 40 CHOIR, FEMALE		
Destination:	RAM2 40 CHOIR, FEMALE		
Memory Protect Internal:	ON	Card:	ON
Currently playing:	SOURCE		
EXECUTE		NAME	

- To hear the destination, change the "Currently Playing" field to DESTINATION.
- To write the changes into memory, press EXECUTE.

Memory Protect must be OFF for the memory bank (Internal or Card) into which you are writing.

6.5 EDITING PART DETAILS

Path: EDIT - DETAIL

PERFORMANCE PART DETAIL			
Part: 1	Patch: RAM2 49 CHOIR, FEMALE		
Level: 99	FX Bus: 50/50	Delay: 1024	
Xpose: 0	Detune: 0	Sustain: ENABLED	
Play Mode: LOCAL	Scale: PURE MAJOR C		
Xmit Chan: 12	Prog Change Xmit: OFF		
Mode: POLYPHONIC	[Key Priority: HIGH]		
PART -	PART +	SOLO	INIT ZONES COPY

This page shows the details of each Performance Part.

- Select the number of the Part to be edited (in the first field on the page). Use PART - and PART+ to decrement/increment.

FX Bus is important: it routes the Patch to the MDE. You'll learn more about this in the next chapter.

Using the Wavestation as a Master Keyboard

Each Part contains several parameters controlling its response to the local keyboard or MIDI: Play Mode, Xmit Chan, and Prog Change Xmit.

Play Mode is a powerful option which lets each Part customize whether it plays locally only, only sends MIDI out, or does both. For now, leave this set to its default of BOTH.

Xmit Chan and Patch Change Xmit control multi-timbral MIDI output from the Wavestation. They allow you to use regular Wavestation Performances to define

the keyboard and velocity zones played by external instruments. (Zones are introduced in the next section.)

Multi-timbral output is actually enabled on the MIDI TRANSMIT page by switching the Xmit mode from BASIC CHANNEL (default) to PART CHANNEL.

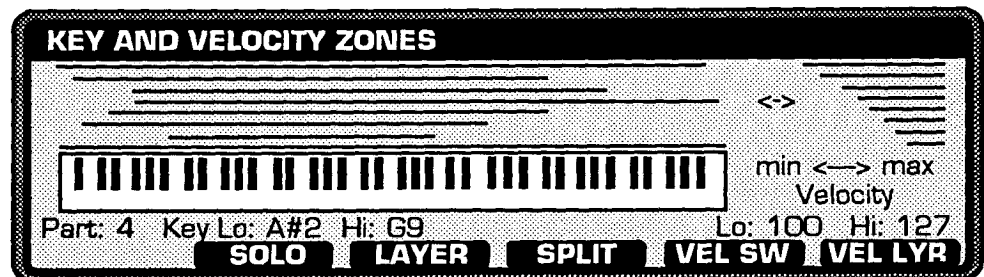
For more information, please see the Reference Guide.

Other Parameters

For more information on Part parameters, please see following sections in the Reference Guide: PERFORMANCE PART DETAILS, KEY AND VELOCITY ZONES, MIDI TRANSMIT, and MIDI RECEIVE.

6.6 CHANGING KEYBOARD ZONES

Path: EDIT - DETAIL - ZONE



The KEY AND VELOCITY ZONES page graphically displays the keyboard layers and splits, as well as velocity ranges programmed into the Performance. In general, Patches create sound and can be thought of as instruments, while the Zones and Details determine how the eight instruments play together.

Automatic Zoning

- To automatically distribute the current Parts over the keyboard or velocity range, select the desired keyboard mode (LAYER, SPLIT, VEL SW, VEL LYR).

The automatic zoning feature quickly sets up the basic keyboard mode with appropriate defaults for each non-empty Part. (For zoning to work, there must be more than one non-empty part.) From this initial setup you are free to customize the zoning.

For example, if there are five Parts with Patches assigned to them, pressing LAYER would form them into a five-layer stack.

SPLIT would assign the Parts consecutively to five ranges across the keyboard. Part 1 would be the lowest range, and Part 5 the highest.

VEL SW would assign discrete fifths of the velocity range to each part. For example, there are 127 MIDI attack velocity values (0 = Note Off). This amounts to approximately 25 velocity steps per part. Part 1 would sound from 1-25, Part 2 from 26-50, and so on. When there are only 2 active Parts, the switch point defaults to 100.

VEL LYR is similar to VEL SW, except that instead of forming discrete velocity zones, the zones overlap. As shown in the display page above, all Parts are set to a maximum velocity of 127, but each Part is assigned an increasingly higher minimum velocity. Part 1 would be played from the entire velocity range, Part 2 from 26-127, Part 3 from 51-127, and so on. 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.

Manual Zoning

- ☛ To establish the basic characteristics of the ZONE, first use automatic zoning. (Press LAYER, SPLIT, VEL SW, or VEL LYR.)
 - ☛ To select any Part for specific editing, adjust the Part number using the Up/Down cursors.
- The double arrow moves to the corresponding display line.
- ☛ Select the desired zone parameter by cursoring left/right.
 - ☛ Enter desired key and velocity limits using the dial, INC/DEC, or keypad. Key and velocity amounts may also be entered from the keyboard, or over MIDI.

6.7 INITIALIZING A PART

After experimenting with existing Parts, you may want to start from scratch. To clear a Part and set all its parameters to their defaults:

- ☛ On the PERFORMANCE PART DETAIL page, press INIT (for initialize).
- ☛ You will be given a warning (ARE YOU SURE?), after which you can press YES.
- ☛ Repeat this for undesired Parts in the Performance.

7 EFFECTS TOUR

7.1 OVERVIEW OF THE EFFECTS SYSTEM

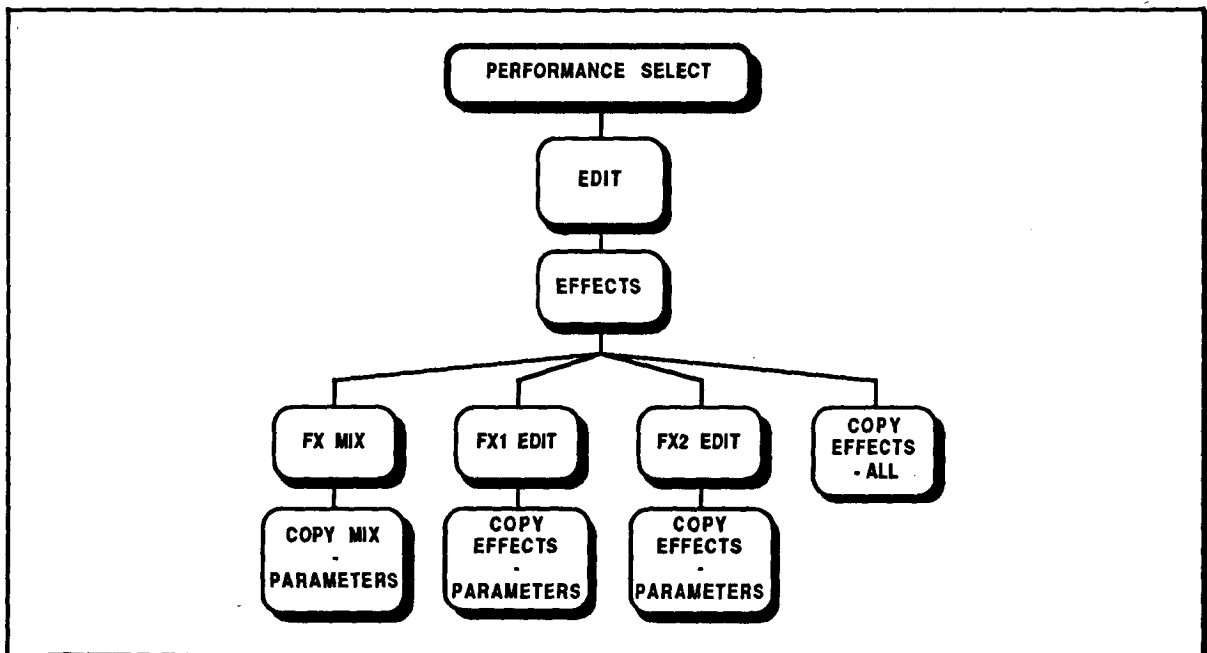
The Wavestation includes a self-contained Multi Digital Effects (MDE) processor. This module has two important functions. First, it provides two independent and identical processors, called EFFECT 1 and EFFECT 2 (or, FX1 and FX2). Each of these run one of 47 different effects programs (such as reverb, delay, distortion, and so on).

Second, the MDE programs all the routing associated with the effects. This includes the configuration of FX1 and FX2 (series or parallel), the routing of Parts through or bypassing 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, although both occur within the Performance. The higher level is where you choose either parallel or series processing, and where you select one of the effects programs for FX1 and FX2. 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 explanations of each type of effects program, please see the Reference Guide [EDIT EFFECT 1 (2)].

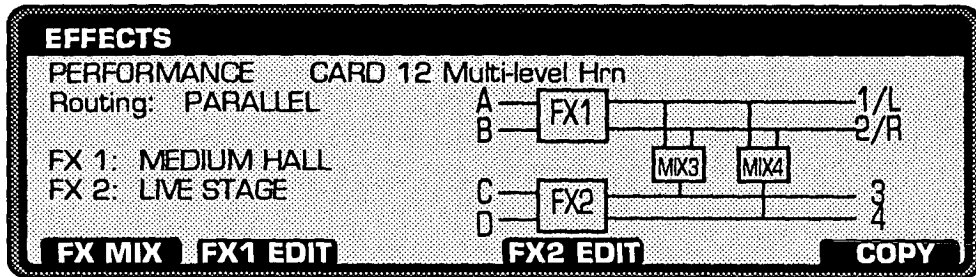
Figure 7-1 Effects Menus



Normally, each Performance has its own pair of effects. But in MULTI mode, you can use up to 16 Performances simultaneously. To prevent the individual Performance effects selections from competing, MULTI MODE Setups have their own separate set of effects settings which override the individual Performance effects.

7.2 EFFECTS BUSES AND ROUTING

Path: EDIT - EFFECTS



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

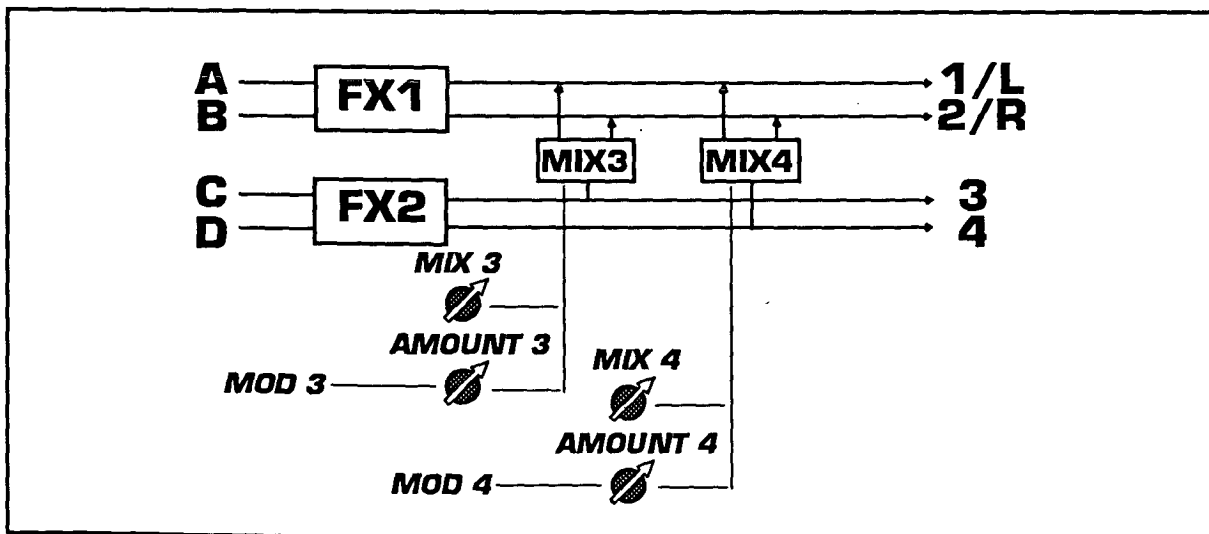
The MDE has four inputs (A - D) arranged as two buses. You route Patches to these inputs by using the FXBus parameter, as discussed below in Section 7.3.

There are four outputs (1 - 4), which correspond to the back-panel jacks. The relationship between the inputs, the FX1 and FX2 processors, and back-panel outputs is controlled on the EDIT EFFECTS page by the Routing parameter. This sets the effects processing to either Parallel or Series mode.

Parallel Routing

The parallel mode allows separate processing for the A/B and C/D inputs. See Figure 7-2.

Figure 7-2 Parallel Routing

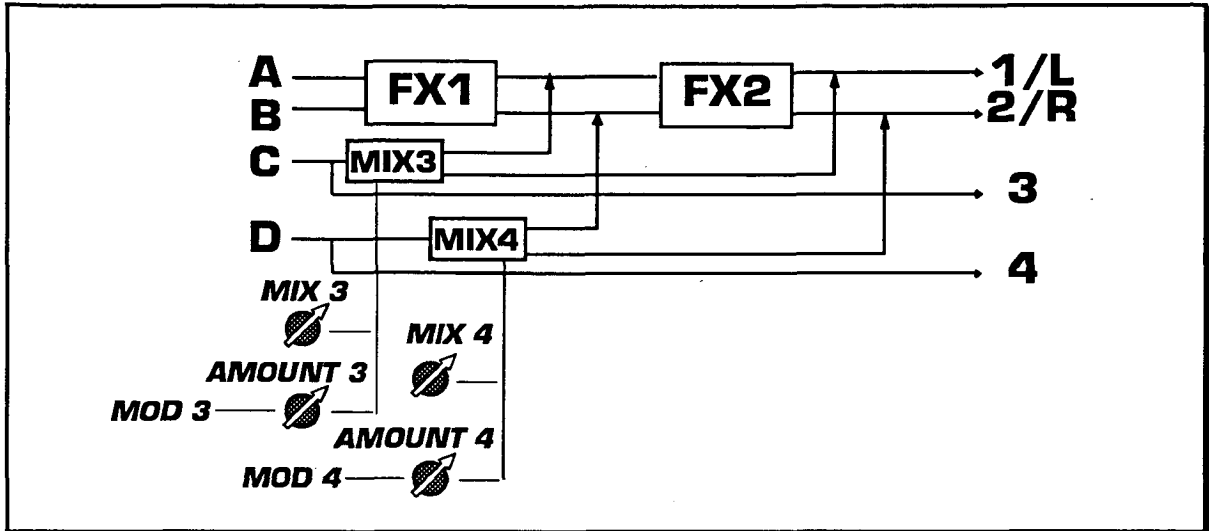


The panned input at A/B goes through FX1 to output 1/2. Input C/D goes through FX2 to output 3/4. Also, FX2 can be mixed into the 1/2 output through MIX3 and MIX4. This gives you dynamic control over the panning.

Series Routing

The series mode makes "multi-effects" processing possible for input A/B. See Figure 7-3.

Figure 7-3 Series Routing



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

FX Mix

Path: EDIT - EFFECTS - FX MIX

EFFECTS MIX

PERFORMANCE CARD 28 Multi-level Hrn

Routing: PARALLEL

Mix 3: LEFT Mix 4: RIGHT

Mod 3: WHEEL Mod 4: WHEEL

Amt 3: +15 Amt 4: -15

FX1 EDIT
FX2 EDIT
COPY

Mix 3/4

Both configurations include Mix 3/4 parameters. The configuration diagrams show how the mixture function changes with the configuration. In parallel mode, Mix 3/4 controls the left/right placement of FX2. In series mode, Mix 3/4 controls the FX2 Wet/Dry mix for buses C and D.

Mod 3/4

In addition to the modulation possibilities available through the effects themselves, the Mod parameter allows you to achieve dynamic control over the effects mix, especially when using the series configuration. For example, you can easily control reverb or flanging depth from a footpedal. Mod3 and Mod4 allow you to pick a controller for varying the initial levels set by Mix3 and Mix4.

SYMBOL Modulation Source

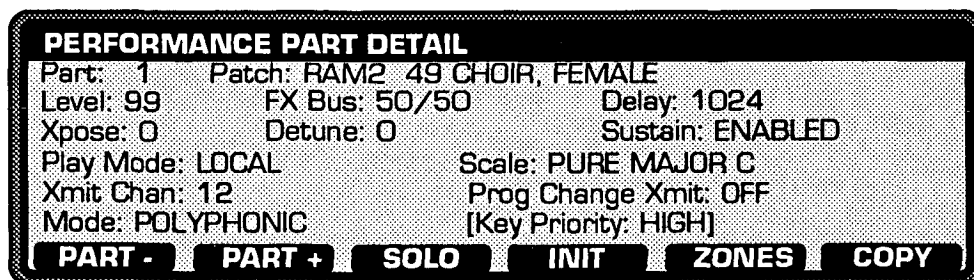
NONE	No modulation
WHEEL	Mod wheel
AT	Channel aftertouch
VEL	Last Note-On velocity (Not gated by Note-Off)
KEY	Highest key number; if none down, then last key
ENV	Summed amplitude envelopes of all buses
KEYDN	Key down gate
FSW	Footswitch momentary, push-on/release-off (Set FOOT PEDAL ASSIGN
FSWTOG	Footswitch toggle, push-on/push-off to EFFECTS SWITCH)
PEDAL	Footpedal (Set FOOT PEDAL ASSIGN to MODULATION)
XMIDI1	MIDI Controller 1
XMIDI2	MIDI Controller 2
WH+AT	Sum of mod wheel and aftertouch
JOY-X	Horizontal axis Joystick controller
JOY-Y	Vertical axis Joystick controller

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.

7.3 ROUTING PATCHES INTO THE MDE

Path: EDIT - DETAIL



You assign Performance Parts to the MDE input buses on the PERFORMANCE PART DETAILS page.

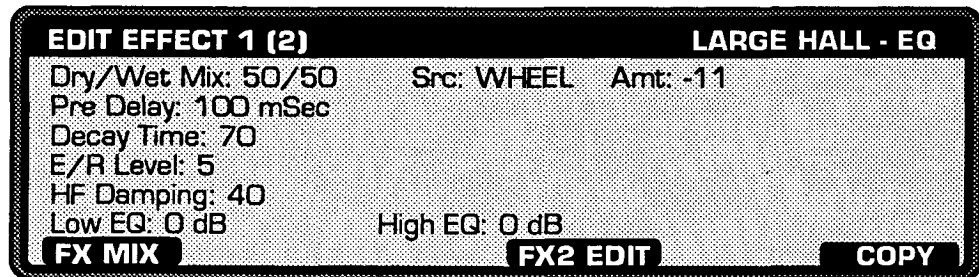
☛ In the FX Bus field, select the desired bus assignment. The options and their meanings are:

- BUS-A Bus A only
- 99/1 - 1/99 Panned to A/B

BUS-B	Bus B only
BUS-C	Bus C only
C+D	Centered to C/D
BUS-D	Bus D only
ALL	All four buses
PATCH	Bus selected at Patch level

7.4 EFFECTS EDITING

Path: EDIT - EFFECTS - FX1 EDIT (or FX2 EDIT)



This example just shows one of the 47 effects you might see here. Each effect contains a number of parameters that can be accessed and adjusted.

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

7.5 SELECTING PERFORMANCE EFFECTS

Having learned about the effects system, you can now choose the desired configuration and try different effects by dialing the Effect 1 or Effect 2 fields. 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.

A descriptive list of the effects choices follows.

7.6 EFFECTS LIST

00 No Effect

REVERB - EQ

01 Small hall reverb - EQ

The tight, well-defined reverberation patterns of a light, spatial hall.

02 Medium hall reverb - EQ

Short and emphasized early reflections characteristic of a warm, spatial hall.

03 Large hall reverb - EQ

The natural, spacious and dense ambience characteristic of a concert hall.

04 Small room reverb - EQ

A light, tight room good for thickening.

05 Large room reverb - EQ

A warm, tight room.

06 Live stage - EQ

A dense, tight room.

07 Wet plate reverb - EQ

A dense, open plate.

08 Dry plate reverb - EQ

A light, open plate.

09 Spring reverb - EQ

Resonant springs.

EARLY REFLECTIONS

10 Early reflections - EQ 1

Dense E/R.

11 Early reflections - EQ 2

Modulated E/R.

12 Early reflections - EQ 3

This effect uses a reverse envelope on the early reflections.

GATED REVERB - EQ

In these effects an early reflections reverb is gated by a modulation source. The gate hold time is adjustable.

13 Forward gated reverb - EQ

14 Reverse gated reverb - EQ

STEREO DELAY

15 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.

16 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

17 Dual mono delay

Two separate, parallel delays.

MULTI - TAP DELAY - EQ

18 Multi-tap delay - EQ 1

Two multi-repeat, parallel delays with input modulation.

19 Multi-tap delay - EQ 2

Two multi-repeat, parallel delays with cross panning and input modulation.

20 Multi-tap delay - EQ 3

Two multi-repeat, parallel delays with crossover feedback and input modulation.

STEREO CHORUS - EQ

21 Stereo chorus - EQ

A stereo effect that combines two parallel chorus circuits using phase-inverted LFOs.

22 Quadrature chorus - EQ

Two parallel chorus circuits using quadrature-phased LFOs.

23 Crossover chorus - EQ

Two parallel chorus circuits using quadrature-phased LFOs and crossover output mixture.

HARMONIC CHORUS

24 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

25 Stereo flanger - EQ 1

A stereo effect combining two flanger circuits, with phase-synchronous LFOs.

26 Stereo flanger - EQ 2

A stereo effect combining two flanger circuits, with phase-inverted LFOs.

27 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

28 Enhancer - exciter - EQ

A stereo exciter with spatial delays.

DISTORTION - FILTER - EQ

29 Distortion - filter - EQ

This effect has a "dirty" sound and "wah" effect. It is effective for solos.

30 Overdrive - filter - EQ

This is an effect that simulates the overdrive generally used by guitars.

STEREO PHASER

31 Stereo phaser 1

Phaser 1 uses phase-synchronous LFOs.

32 Stereo phaser 2

Phaser 2 uses phase-inverted LFOs.

ROTARY SPEAKER

33 Rotary speaker

The "speaker" is modulated by a free running LFO. The slow and fast speed switch is chosen by the acceleration mod source. Continuous controllers are filtered by the acceleration amount. In other words, if the controller is moved suddenly, the acceleration rate determines 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.

34 Stereo mod - pan - EQ

Two parallel dynamic pan effects with phase-synchronous LFOs.

35 Quadrature mod - pan - EQ

Two parallel dynamic pan effects with quadrature-phased LFOs.

EQUALIZATION

36 Stereo parametric equalizer

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

STEREO COMBINATION MODULATED/FIXED DELAY - EQ

In these effects, a mono-in/stereo-out chorus or flanger drives a stereo delay line which includes a sample/hold feature for capturing and recirculating the delay line contents.

37 Chorus - stereo delay - EQ

This is a mono input, stereo output chorus fed into a stereo delay with sample/hold.

38 Flanger -stereo delay - EQ

This is a mono input, stereo output flanger fed into a stereo delay with sample/hold.

DUAL MONO DELAY - REVERB

39 Delay/hall

A monophonic delay in parallel with a monophonic hall reverb.

40 Delay/room

A monophonic delay in parallel with a monophonic room reverb.

DUAL MONO FIXED/MOD DELAY

41 Delay/chorus

A monophonic delay in parallel with a monophonic chorus.

42 Delay/flanger

A monophonic delay in parallel with a monophonic flanger.

DUAL MONO DELAY - OVERDRIVE - DISTORTION

43 Delay/distortion-filter

A monophonic delay in parallel with a distorted "wah" effect.

44 Delay/overdrive-filter

A monophonic delay in parallel with an overdrive "wah" effect.

DUAL MONO DELAY - PHASER

45 Delay/phaser

A monophonic delay in parallel with a monophonic phaser.

DUAL MONO DELAY - ROTARY

46 Delay/rotary

A monophonic delay in parallel with a monophonic rotary speaker simulator.

STEREO PITCH SHIFTER

47 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.

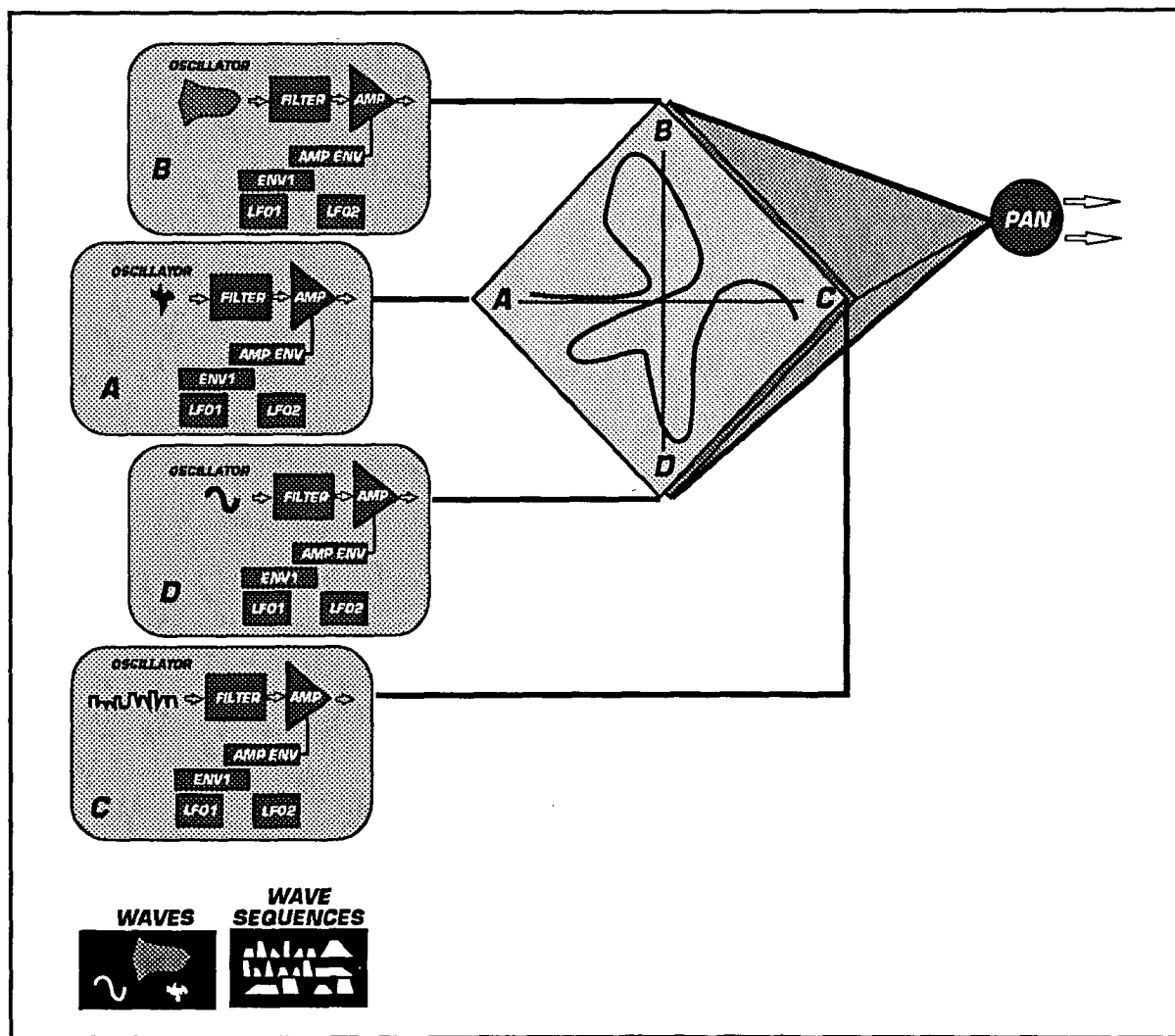
8 PATCH TOUR

8.1 OVERVIEW OF PATCHES

The structure of the basic subtractive synthesizer patch hasn't changed much in twenty years. You start with a raw sound, such as a basic waveform or noise, filter it with a dynamic low-pass filter, and then contour it with a dynamic amplifier.

The Wavestation's sound generation system contains 32 completely digital voices, each of which contain an oscillator, filter, amplifier, two envelope generators, and two LFOs. But the Wavestation also makes some astonishing improvements on the classic analog model in several key areas. Let's touch on these briefly, while referring to Figures 8-1 through 8-3.

Figure 8-1 Four-Oscillator Patch Signal Flow



Oscillator Structure

A Patch can be defined to operate with four, two or one oscillator(s) -- which are actually complete voices. This structure choice creates 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 pitch is adjustable to the cent (1/100th semitone) over several octaves in addition to the five octaves of control provided by its keyboard, or eight octaves provided by MIDI. Although the keyboard 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.

Voice-based Patches

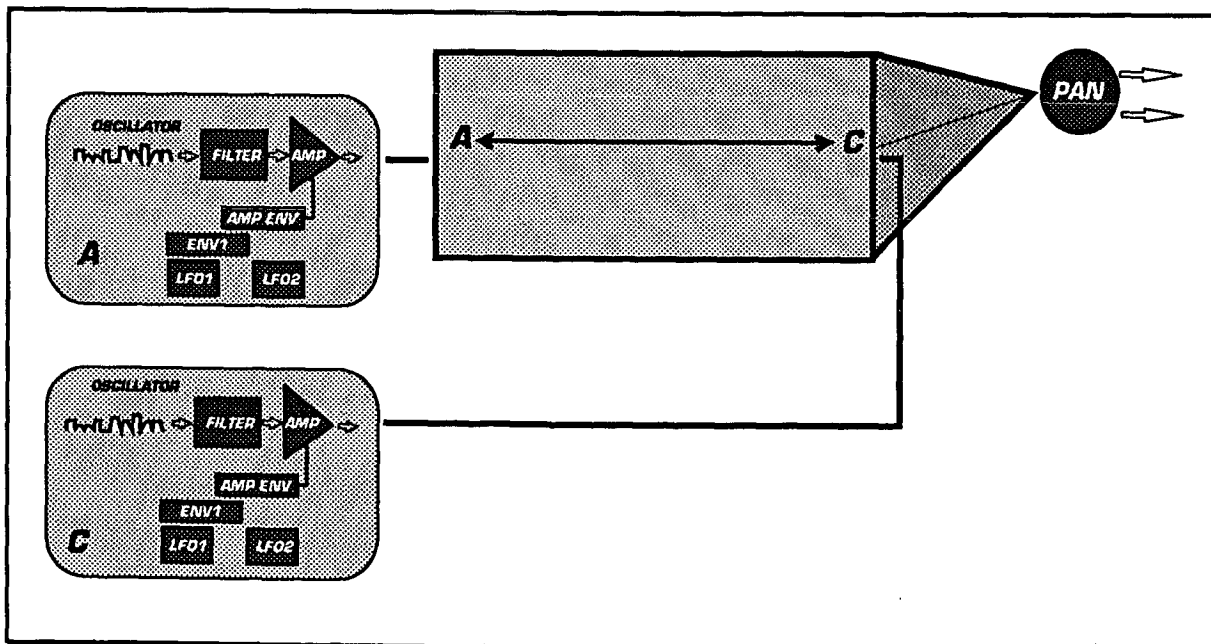
All Patch controls default to a Wave choice of ALL. So, normally, all four-, two-, or one oscillator(s) are summed together and receive the same synthesizer processing by common filter and amp parameters. However, a Patch can be made much more complex because each oscillator is in fact a complete synthesizer voice with its own filter, amplifier, two envelopes, and two LFOs.

Vector Synthesis

When the Patch structure is four oscillators, you can use Vector Synthesis to arrange for elegant dynamic timbre modulation (as shown in Figure 8-1).

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 8-2).

Figure 8-2 Two-Oscillator Patch Signal Flow



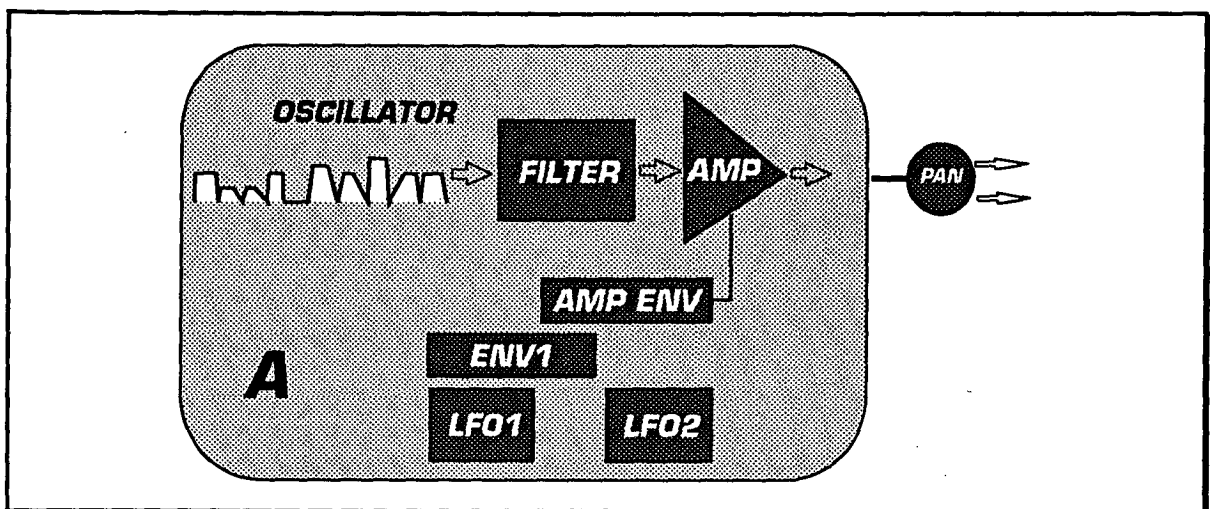
Waves

Each oscillator in the Patch can play any internal ROM waves plus those available from ROM cards. In general, 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 wave selections. These Wave Sequences are treated just like normal waves, and can be processed in the same ways, including Vector Synthesis and Multi-Voice Patch processing. We'll tour Wave Sequencing more closely in the next chapter.

Figure 8-3 Single-Oscillator Patch Signal Flow



Filter

The traditional dynamic tone control has been enhanced with an "exciter" which can clarify the sound and add presence before attenuation by the amplifier.

Pan

Voices can be positioned anywhere in the stereo field, or panned by modulators.

Pan may be modulated by keyboard position or velocity using the the BUS A-B PAN page.

The 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.

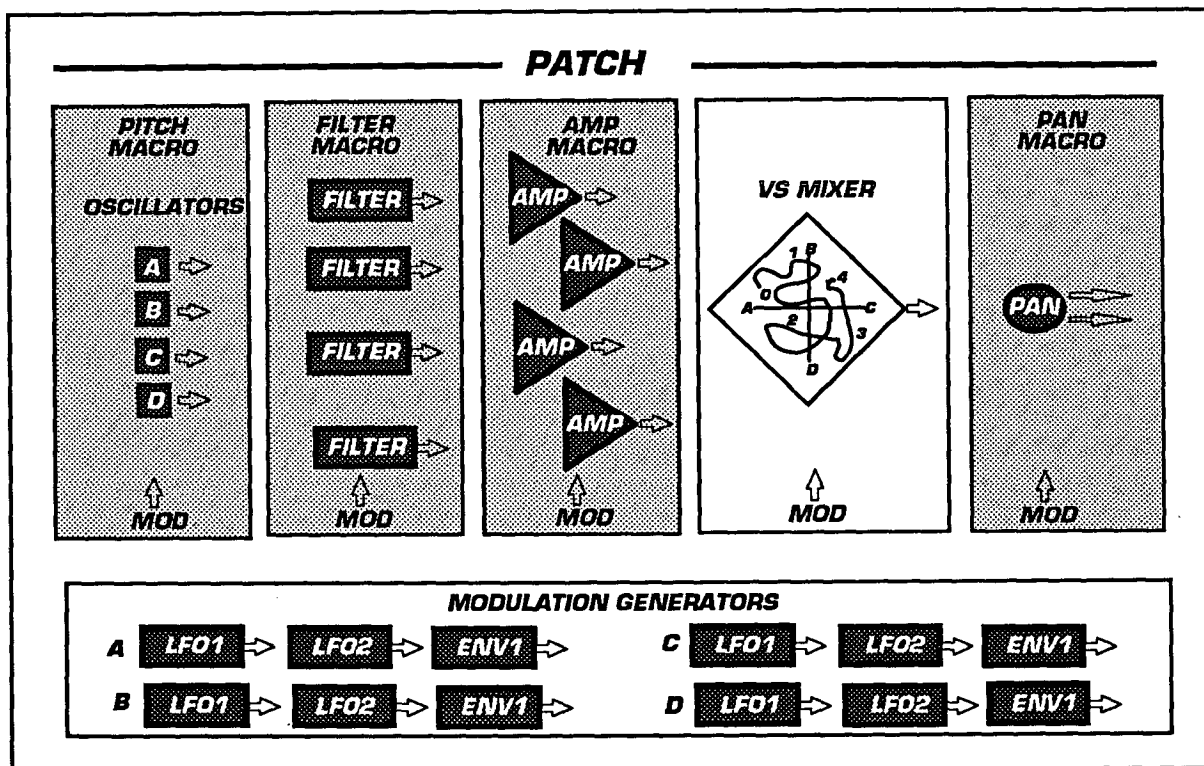
The FX Bus parameter on the PERFORMANCE PART DETAIL page makes it easy to set the initial pan position of each individual part.

On the EFFECTS 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.

Macros

Most of the parameters in a Patch are grouped into four modules: Pitch, Filter, Amplifier, and Pan. Each of these modules can be separately preset by *Macros*. Macros allow you to quickly make broad changes in a Patch, without having to adjust individual parameters. For example, amplifier Macros are available for all of the traditional instrumental envelopes. To get a basic response, instead of dealing with a dozen envelope parameters, you simply select "Piano," "Clav," "Strings," and so on.

Figure 8-4 Patch Macros (In grey)

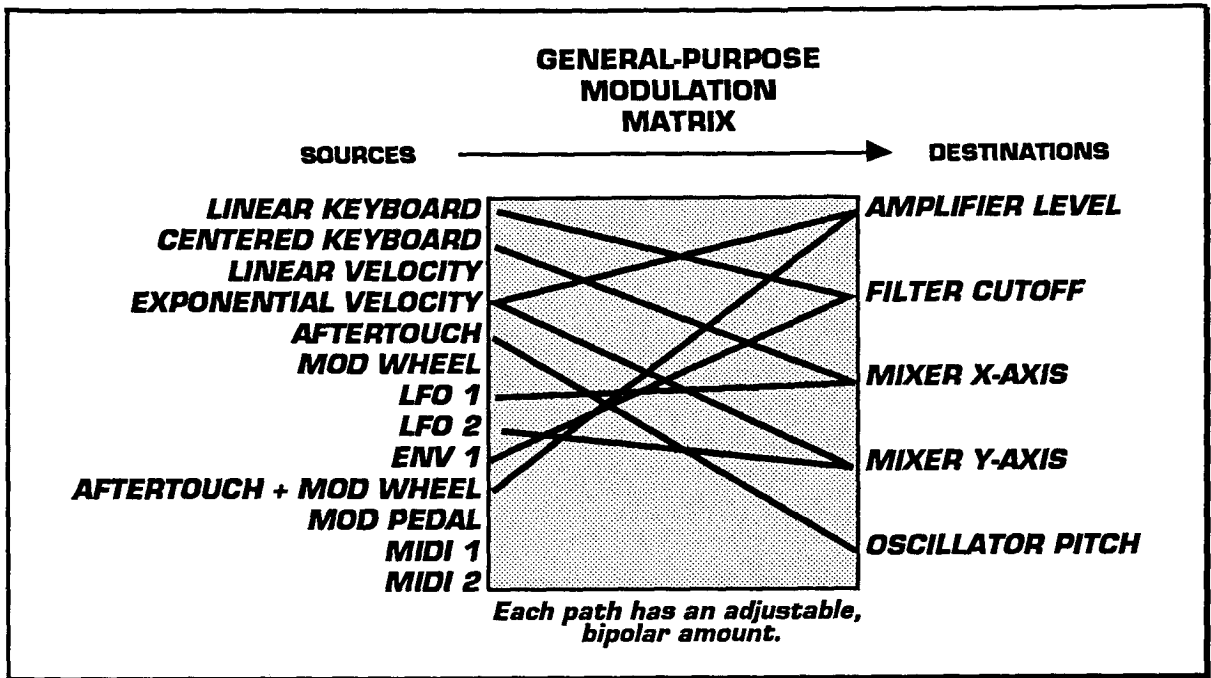


Modulation

An extensive modulation system underlies each Patch. The various sources and destinations can be reached via any of the destination modules. For example, under AMP ENVELOPE is the AMP MOD page. Most destinations can be assigned two discrete sources. Several destinations have additional, fixed modulation paths.

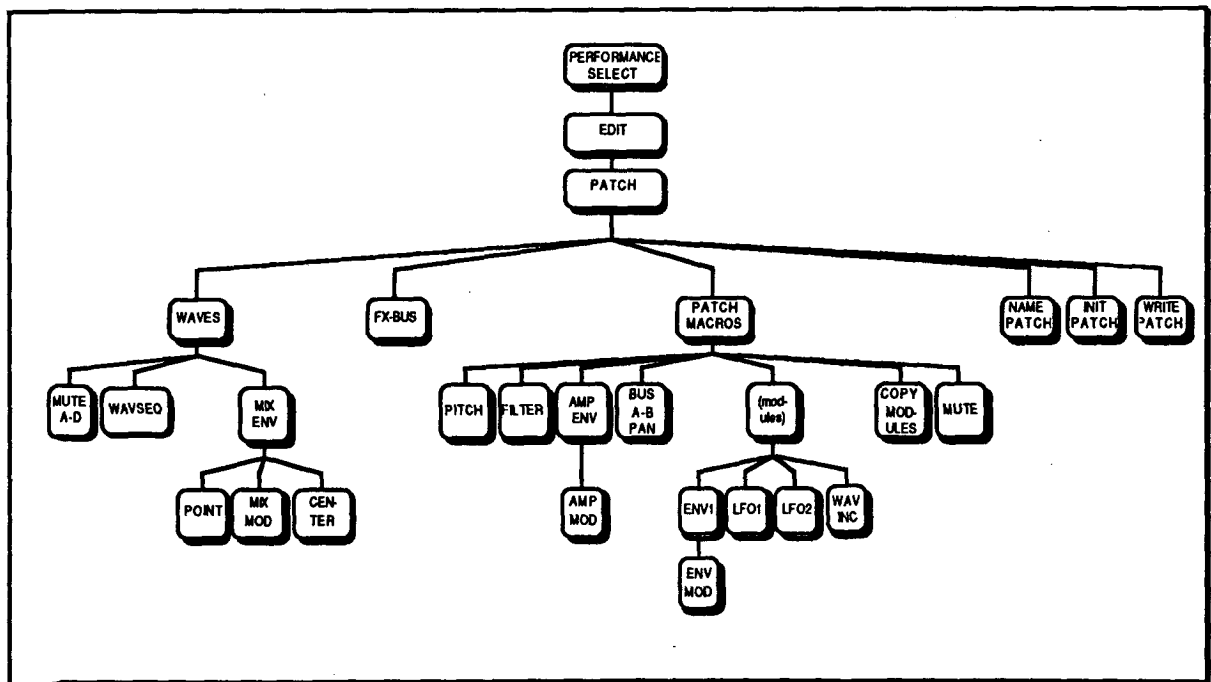
Figure 8-5 shows a typical way in which the general-purpose modulation sources and destinations could be patched. There are many more possible destinations than can be shown here.

Figure 8-5 General-Purpose Modulation Matrix (example)



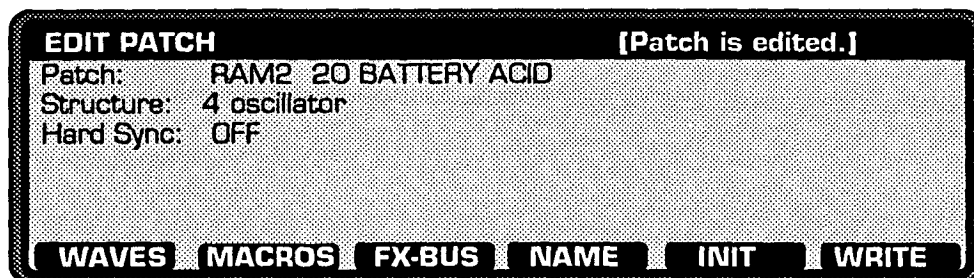
Finally, Figure 8-6 shows the menu organization of all the Patch resources.

Figure 8-6 Patch Menus



8.2 ENTERING PATCH EDIT MODE

Path: EDIT - PATCH



The Patch selected here is the Patch in the Part highlighted on the Edit Performance page. Likewise, changing the Patch selected on this screen changes the Patch in the highlighted Part.

This is the main page for Patches. There are 35 per bank. Normally you'll proceed by entering the WAVES or MACROS pages -- with MACROS suggested first if you are new to the instrument.

You can also name, clear, or duplicate a patch from this page.

- ☛ To initialize a Patch, select INIT.

You'll get an "Are you sure?" warning.

- ☛ Press YES.

Now you start from scratch.

If you do begin a new Patch by initializing, probably your next choice is to set the Structure, since it is so fundamental to the Patch.

Structure

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

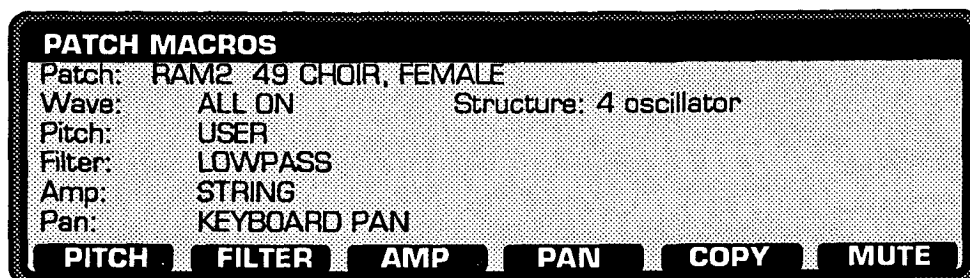
When ON, B/C/D are synced to A. This means that regardless of the length of their cycles, they will always restart at the same time oscillator A does. This allows you to vary timbre by modulating the pitch of oscillators B, C, and D - see the Reference Guide [EDIT PATCH]. If the Structure is one oscillator,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

8.3 SAVING A PATCH

- ☛ Save a Patch in the same way that you saved a Performance: on the EDIT PATCH page, press WRITE, then EXECUTE.

8.4 SELECTING MACROS

Path: EDIT - PATCH - MACROS



- For each module (Pitch, Filter, etc.) try selecting different Macros.
- To construct a multi-voice Patch, instead of setting the Wave parameter to ALL, select A, B, C, or D individually.

When the need arises, you still have quick access to the individual Macro parameters by pressing the soft key with the same name (PITCH, FILTER, etc.). When you begin to edit specific parameters of a Macro, its title changes to USER. You can re-select any Macro simply by dialing.

Pitch

The Pitch Macros assign various modulations to the oscillator pitch. Choices include: DEFAULT, ENVELOPE 1 BEND, DESCENDING SWEEP, ASCENDING SWEEP, AFTERTOUCHE BEND, MIDI-BEND, and AFT + MIDI-BEND.

Filter

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

Amp

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

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

Remember that this Macro can only do its work if the filter output 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.

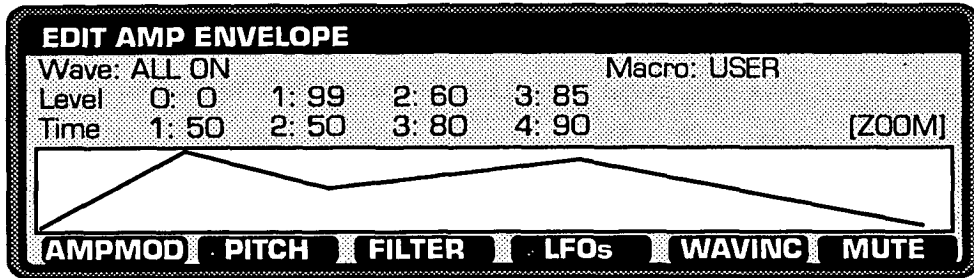
Pan

The Pan Macros control the modulation of the initial Pan position which is set using the PERF PART DETAIL FXBus parameter.

Pan Macros include: KEYBOARD-PAN, VELOCITY PAN, KEY + VELOCITY, and OFF.

8.5 TWEAKING THE AMPLIFIER

Path: EDIT - PATCH - MACROS - AMP



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 envelopes so that you can play it faster. Here is where you do it.

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.

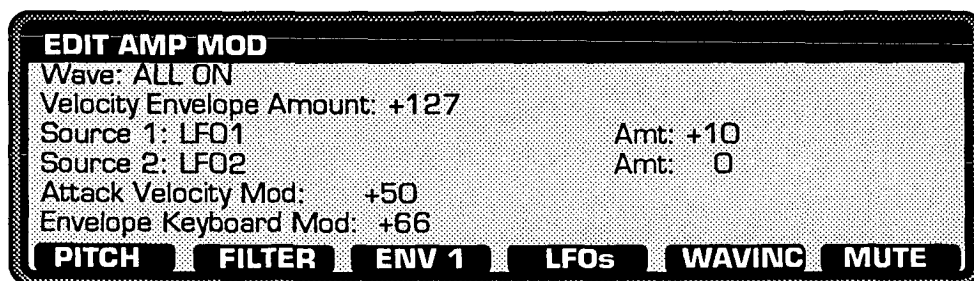
- Cursor to the desired fields and change the values.

Any changes that you make will be reflected in the graphic display.

When you raise the total time sufficiently, the display automatically scales the graphic to fit on the page. ZOOM will appear to tell you that you are viewing a compressed graphic.

Amplifier Modulation

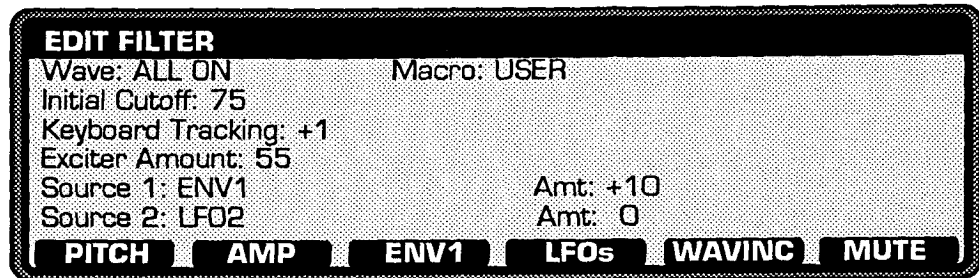
Path: EDIT - PATCH - MACROS - AMP - AMPMOD



After setting the basic feel of the Patch, come here to adjust its velocity response, as well as other amplifier modulation. For example, increasing the Velocity Envelope Amount makes the Patch increasingly sensitive to velocity. Applying positive modulation to the Attack Velocity Mod parameter accelerates the attacks (Amp Envelope time 1) of notes that you play harder. Applying positive modulation to the Envelope Keyboard Mod shortens the lengths of Amp Envelope times 2 and 4 as you play higher on the keyboard.

8.6 TWEAKING THE FILTER

Path: EDIT - PATCH - MACROS - FILTER



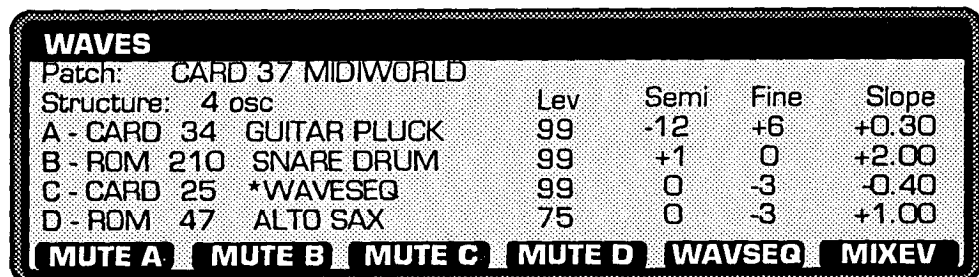
The filter module determines overall tone color. The FILTER page contains the frequently-used Cutoff and modulation Source settings. In practice, you often need to balance these adjustments against each other.

Try using the exciter to increase high-end clarity.

Envelope 1 is often used to modulate the filter. Its parameters are similar to those of the Amplifier envelope.

8.7 ASSIGNING WAVES

Path: EDIT - PATCH - WAVES



NOTE: The WAVSEQ soft key does not appear unless the patch contains a Wave Sequence (wave numbers 0 - 31).

Waves can be found in ROM or on PCM Cards, where locations #32 and up are looped waveforms or transients. In addition, in ROM, RAM1/2, and ROM or RAM Program Cards, waves #0-31 are Wave Sequences. These are identified by an asterisk (*) before their names.

In addition to having a wave selection, each oscillator's initial pitch can be coarsely or finely tuned. A little detuning can enrich the sound.

Also, instead of the pitch of the oscillators always tracking with standard keyboard intonation, they can have individual tracking slopes. A value of +1.00 is normal.

Slope values above +1.00 increasingly stretch the oscillator tuning. In other words, above C4 the oscillator gets increasingly sharp, and below C4 the oscillator gets increasingly flat. Since the ear is less pitch-sensitive in the bass

and treble ranges, most acoustic pianos and some electric pianos are actually stretch tuned. A moderate use of this parameter helps to imitate this.

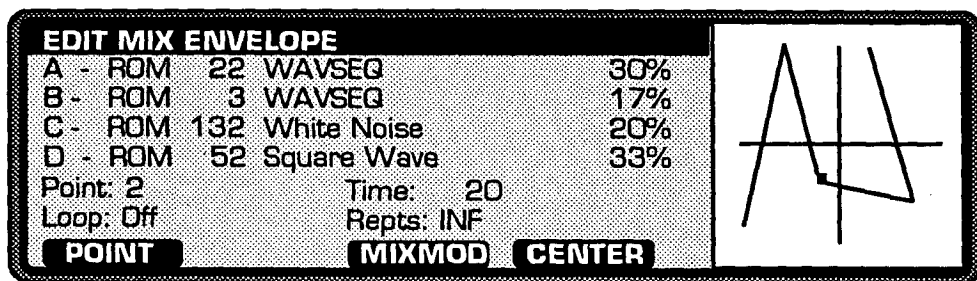
Conversely, decreasing the slope from +1.00 shrinks the oscillator tuning.

Negative values cause the oscillator to inversely track the keyboard. (Normally you would use this adjustment on oscillators that contribute harmonics within a patch, rather than on ones responsible for fundamental pitch.)

Keyboard Slope may also be used to play microtonal scales. A slope of 0.50, for instance, produces the quarter-tone scale. For more information, see the Reference Guide [EDIT SCALE].

8.8 VECTOR SYNTHESIS

Path: EDIT - PATCH - WAVES - MIXEV



- ☛ To set the levels of the mixer envelope, select a point and then use the joystick to set the position.

As you select points and move them with the joystick, the graph updates to show the vectors you create.

- ☛ To set equal levels for all oscillators at the current point, press **CENTER**.

This sets all levels to 25% in four-oscillator mode, or 50% in two-oscillator mode.

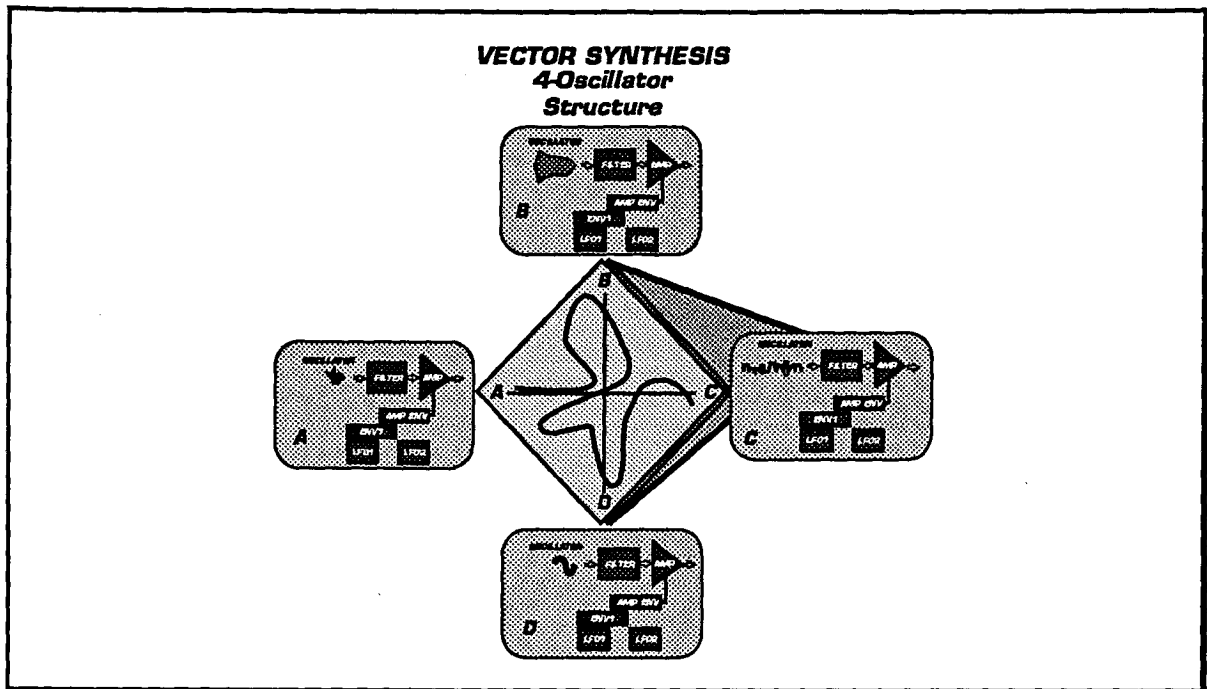
The Mix Envelope implements *Vector Synthesis* by allowing you to set the relative loudness of each oscillator at each of five break-points. You can also set the time values for each of the four envelope segments. Altogether, this allows you outstanding control of the dynamic mixture of the oscillators over the duration of a note.

For example, in the graph above, the note starts with a predominant oscillator A, increases to B at point 1, provides a roughly equal mixture at point 2, then a 50/50 C/D mix at point 3. The mixture stays at point 3 while the note is held, then releases to point 4. The result of this vector-defined mixing is a complex, dynamic timbre.

With four-oscillator structures, a two-dimensional graphic displays the values of each of the breakpoints (but not the times of the envelope segments). Two-oscillator structures have a linear graphic display.

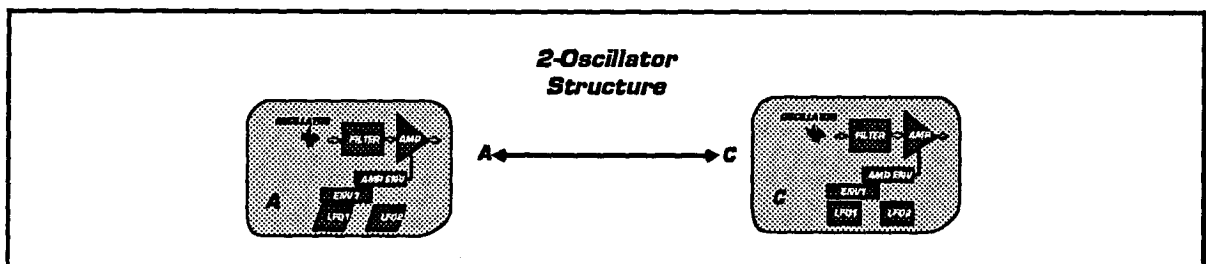
Nothing prevents you from choosing Wave Sequences for the oscillators, and applying Vector Synthesis over all four of them.

Figure 8-6 Another View of Vector Synthesis . . .



Note that the page example assumes a Structure of four oscillators. With a two-oscillator structure, only the A-C mix is available.

Figure 8-7 . . . and of Two-oscillator Dynamic Synthesis



With a two-oscillator structure, the mix of Waves A and C is displayed as points on a line.

If you have a single-oscillator Structure there can be no mixture, so the mix envelope screen is not available.

In addition to the features listed above, the Mix Envelope may be looped between various points, using either forward only or forward and backward looping. It is also possible to route two modulation sources to each axis of the mix (A-C and B-D), for even further dynamic control of the vector timbre. For more information, see the Reference Guide [EDIT MIX ENVELOPE] and [EDIT MIX MOD].

9 WAVE SEQUENCE TOUR

9.1 INTRODUCTION TO WAVE SEQUENCING

Since Wave Sequencing is the Wavestation's principal innovation, we might as well discuss it a bit before attempting to make music with it.

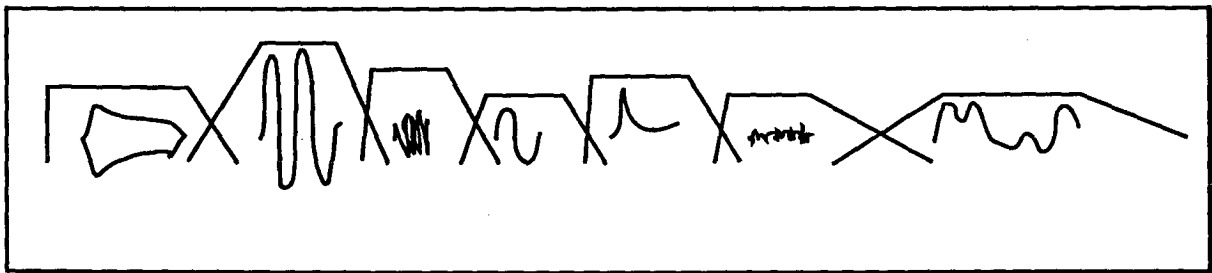
You are probably aware of MIDI sequencers that play synthesizers by sending notes to them. Imagine a setup of several different synthesizers and samplers on a MIDI bus, each with their own characteristic sound. Now suppose that you have created a multi-timbral sequence which plays these instruments and switches patches on them so quickly that perhaps 50 different sounds can be heard during one note. 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's Wave Sequencing mode 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 9-1 A Wave Sequence with Seven Steps

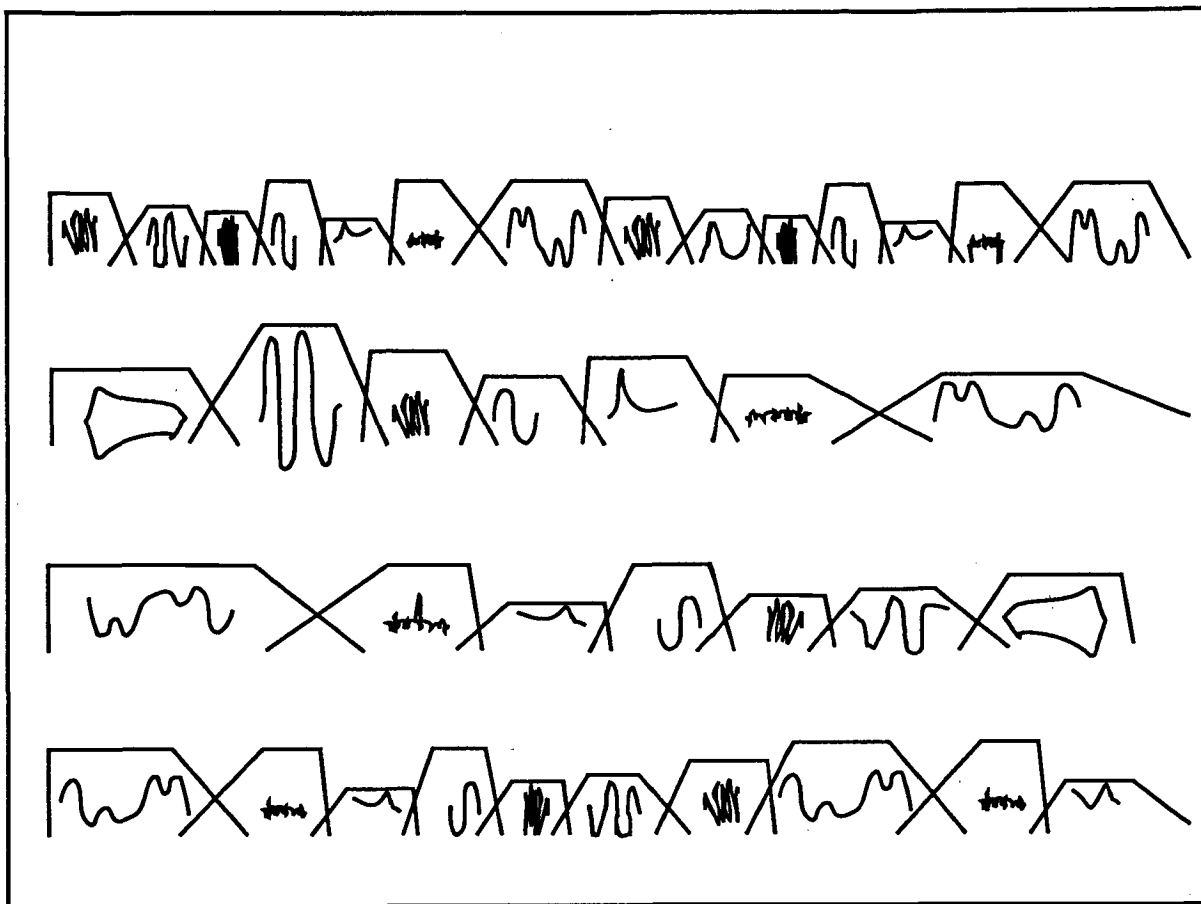


Note that this rough drawing is not a waveform, but a picture of the overall amplitude envelope of the wave sequence. Generally, a Wave Sequence crossfades between the wave steps.

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 9-2 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. And, 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 then there is the whole realm of effects modulation via the MDE processor.

It is debatable whether we can imagine sounds as complex and potentially expressive as are suggested by four-track wave sequencing without actually having the Wavestation with which to hear and communicate them. Orchestrating such a density of timbre might well qualify as advanced synthesis — composition enveloping *music concrete*, resynthesis, and “granular” synthesis, which until now has only appeared in 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

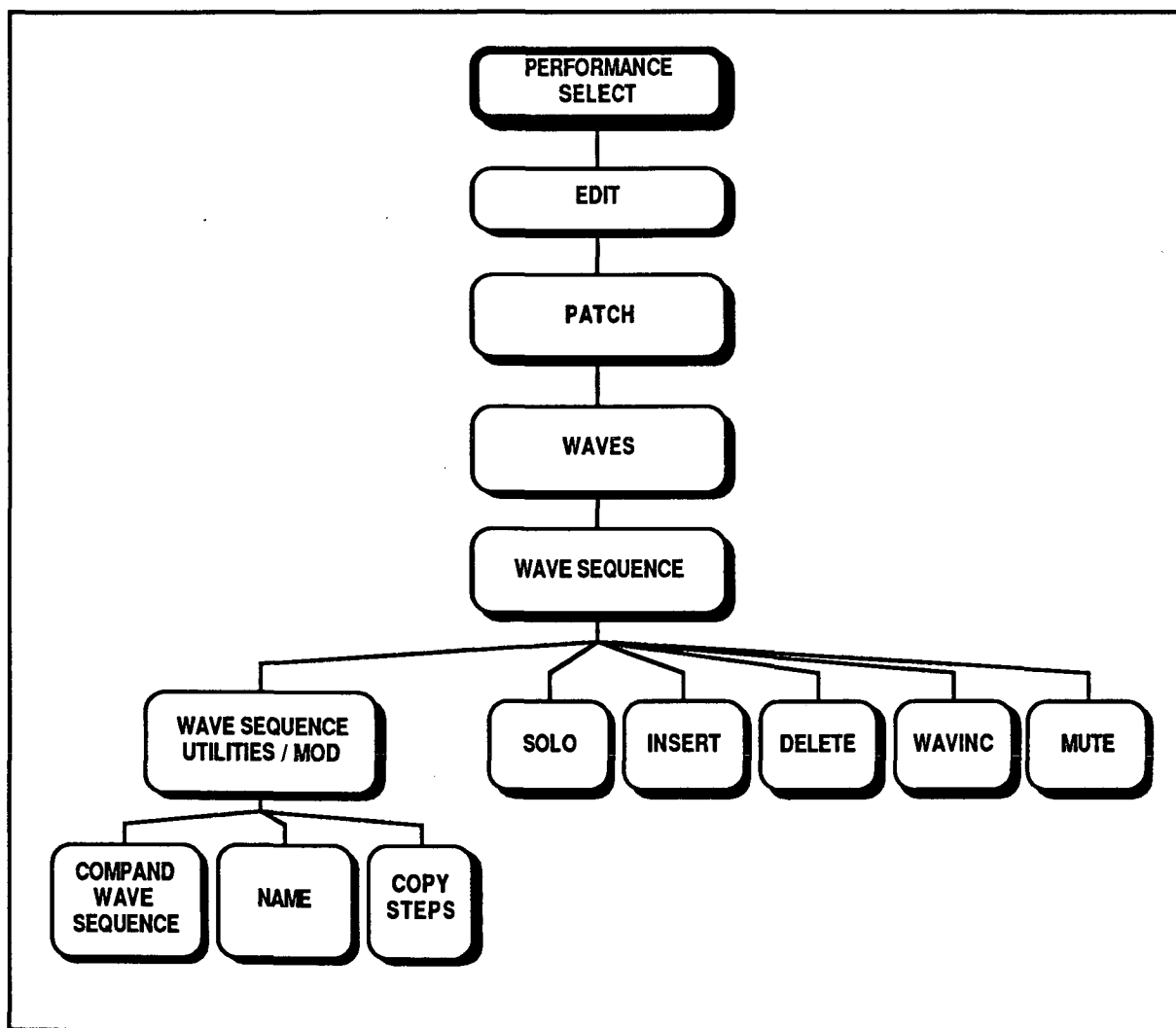
create. Seen in this light, the Wavestation actually offers a major, expensive studio art form in a performer's package.

By this time you might be thinking that the Wavestation offers a mind-boggling amount of timbral versatility - and you'd be right. 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 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 complete the tour! Figure 9-3 shows how the Wave Sequencing system is organized.

Figure 9-3 Wave Sequence Menus



9.2 BUILDING WAVE SEQUENCES

Path: EDIT - PATCH - WAVES - WAVSEQ

NOTE: The WAVSEQ soft key does not appear unless you select at least one Wave Sequence on the WAVES page.

WAVE SEQUENCE											
Wave:	A	ON	Wave Seq:	ROM 31	Richter		↓				
Step	Wave		Semi	Fine	Lev	Dur	Xfd				
1	CARD	37 Trumpet	+24	0	75	395	124				
2	ROM	100 Pulse-0	-12	+1	56	Gate	10				
3	ROM	101 Pulse-1	0	-20	80	482	733				
Loop Dir:		B/F	Start:	3	End:	7	Repts:	OFF			
UTILS		SOLO		INSERT		DELETE		WAVINC		MUTE	

Here is where you select the waves for each step of the selected Wave Sequence. Loop control is also included on this page.

Wave Sequences are always automatically saved, so it is not necessary to manually save them. Since this is the case, it's a good idea to back up any important Wave Sequence before editing it. Wave Sequences are stored in internal RAM or Performance cards.

Each step can be customized with parameters for tuning offset in Semitones and Cents, sustain Level, sustain Duration, and Crossfade with the next step.

9.3 WAVE SEQUENCE UTILITIES and MODULATION

Path: EDIT - PATCH - WAVES - WAVSEQ - UTILS

WAVE SEQUENCE UTILITIES				
Patch:	CARD 10 SUPER SOUND			
Wave:	A ON Wave Seq: CARD 16 OB Sax			
Mod Source:	ENV 1			
Mod Amount:	+127			
Start Step:	13			
Compress/expand time values by	100%			
COMPAND	NAME	COPY	WAVINC	MUTE

This page allows you to modulate the starting step of the Wave Sequence, or to use a mod source to control the progression from step to step. It also lets you stretch or shrink the overall time of a Wave Sequence.

9.4 CONCLUSION

This completes our tour of the Wavestation. If this survey aroused your curiosity, you are ready for the Wavestation Reference Guide.

At this point we encourage you to set the books aside, dive in, and start editing. The Wavestation opens up a vast new expanse of sounds waiting to be realized. To find them, there is no substitute for good old-fashioned hands-on play and experimentation.

<h2>10 APPENDIX</h2>

10.1 ERROR MESSAGES

ARE YOU SURE?

Generally, any action that alters memorized data needs to be confirmed.

BATTERY LOW (INTERNAL)

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.

BATTERY LOW (RAM CARD)

If you see this indication, immediately take whatever steps you can to back-up your custom patches into internal RAM or MIDI. If these are unavailable, you can always write-out crucial data by hand on the data forms provided.

Concerning battery replacement, follow the instructions provided with the card. Following battery replacement, copy desired data to the card.

CANNOT COPY ALL STEPS - NO MORE STEP MEMORY AVAILABLE

CANNOT INSERT STEP - NO MORE STEP MEMORY AVAILABLE

These may appear when you are inserting or copying. The total Wave Sequence memory per bank is 500 steps. One sequence can have a maximum of 255 steps.

The only way to get more steps is to clear unused sequences. The easiest way to clear a large sequence is to copy a tiny sequence over it.

CANNOT WRITE TO ROM CARD

You tried to write to a ROM card.

CARD IS NOT FORMATTED

Cards must be formatted before they can be used by the Wavestation. For Card formatting, see the GLOBAL page.

CARD NOT INSERTED

A Card must be inserted for the operation to work.

GLOBAL CARD PROTECT SETTING IS ON

You tried to write to a RAM Card while GLOBAL Memory Protect Internal was enabled.

To un-protect memory, go to the GLOBAL page.

GLOBAL INTERNAL MEMORY PROTECT IS ON

You tried to write to RAM 1 or 2 while GLOBAL Memory Protect Internal was enabled.

To un-protect memory, go to the GLOBAL page.

KORG CARD FORMAT MISMATCH

The KORG PROG DATA card inserted is not formatted for the Wavestation. 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).

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.

PROTECTED CARD

Card protection is set on the card itself. Flip the switch on the back of the card before attempting to write to it (and remember to flip it back after you're done!).

SYSEX TRANSFER COMPLETED

Confirms successful data transfer.

SYSEX CHECKSUM ERROR

A data error occurred during SysEx reception.

SYSEX WRITE PROTECT ERROR

You must turn Write Protect OFF (GLOBAL page) to receive sysex dumps of Performances, Patches, or Wave Sequences. If you are dumping to a RAM bank, make sure that Memory Protect Internal is OFF. If you are dumping to a RAM Card, make sure that Memory Protect Card is OFF.

10.2 SPECIFICATIONS AND OPTIONS*

System:	Advanced Vector Synthesis. 24-bit digital processing, 19-bit DAC.
Wave Memory:	365 sampled and single-cycle waveforms.
Program Memory:	1 ROM Bank, 2 RAM Banks, and 1 Card Bank
Tone generator:	20 bits 32 voices including individual filters, amps, LFOs, and envelopes.
Macros:	Voicing templates for Pitch, Filter, Amp, Pan, Env1 and Keyboard Modes.
Effects:	47 effects programs. Up to 6 simultaneous digital effects, with dynamic modulation.
Performances:	150 internal, 50 in card
Patches:	105 internal, 35 in card
Wave Sequences:	96 internal, 32 in card
Wave Sequence Steps:	1500 internal, 500 in card
Multi-Mode Setups:	16 configurations of multi-timbral, 16-channel MIDI reception
Keyboard:	61 notes, with velocity and aftertouch
Performance Controllers:	Joystick, Pitch wheel, Modulation wheel, and Master Volume
Control inputs:	Damper pedal, assignable footswitch/pedal 1 and 2
Card slots:	PCM data, PROG data
MIDI:	IN, OUT, THRU. Extensive Multi-timbral and Master Controller capability.
Display:	64 x 240 pixel back-lit LCD with soft-key menu system.
Outputs:	1/L, 2/R, 3, 4, headphone
Power consumption:	11 W
Dimensions:	100 (W) x 35 (D) x 11 (H) cm
Weight:	12.5 Kg
Options:	RAM card (MCR-03), ROM card (WPC-XX), PCM card (WSC-XX) Foot Controller EXP-2, Damper Pedal DS-1, Footswitch PS-2

**Specifications, operations, and appearance are subject to change without notice.*

10.3 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								
Play Mode								
Scale								
Xmit Chan								
Program Change Xmit								
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								
Play Mode								
Scale								
Xmit Chan								
Program Change Xmit								
Mode								
Key Priority								
EFFECTS	Effect 1	Effect 2		Routing				
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4			

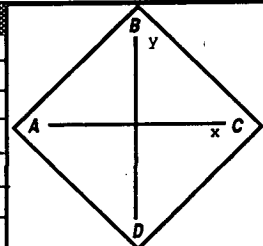
10.4 EFFECTS DATA FORMS

KORG Wavestation Effects Data			
EFFECT			
Number	Parameter Name	Value	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

KORG Wavestation Effects Data			
EFFECT			
Number	Parameter Name	Value	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

10.5 PATCH DATA FORMS

KORG Wavestation Patch Data											
GENERAL						Bank			MACROS		
#/Name						Pitch			Filter		
Waves ALL A B C D						Amp			Pan		
Structure 4 2 1						Hard Sync OFF ON					
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											
X Source 1	Amount	Y Source 1	Amount								
X Source 2	Amount	Y 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.

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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						

10.7 MIDI IMPLEMENTATION CHART
KORG Wavestation Synthesizer

Date: 1 Aug, 1990
 Version : 1.0

Function ***		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 - 16	1 - 16	Memorized
Mode	Default Messages Altered	3 X *****	1, 3, 4 X X	Mode Messages Ignored
Note Number :	True voice	0 - 127 *****	0 - 127 0 - 127	
Velocity	Note ON Note OFF	○ (9N, v=1~127) X (9N, v=0)	○ (9N, v=1~127) X	
After Touch	Key's Ch's	X ○	○ ○	
Pitch Bend		○	○	
Control Change	0 Bank (msb)	○	X	Assignable
	01 Mod Wheel	○	○	
	04 Foot Cntrl	○	○	
	06 Data	○	○	
	16 Joy-X	○	○	
	17 Joy-Y	○	○	
	32 Bank (lsb)	○	○	
	38 Data (lsb)	○	○	
	64 Damper	○	○	
	100 RPN (lsb)	○	○	
101 RPN (msb)	○	○		
1-95 Controls		X	○	
Prog Change :	True #	0 - 127 *****	0 - 127	
System Exclusive		○	○	
Common :	Song Pos	X	X	
	Song Sel	X	X	
	Tune	X	X	
System Real Time :	Clock	X	○	
	Commands	X	X	
Aux Messages :	Local ON/OFF	X	X	Note 1, 2
	All Notes OFF	X	○	
	Active Sense	○	○	
	Reset	X	X	
Notes		1. Ignored in OMNI mode. 2. Also Reset All Controllers message.		

Mode 1 : OMNI ON, POLY
 Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON, MONO
 Mode 4 : OMNI OFF, MONO

○ : Yes
 X : No