



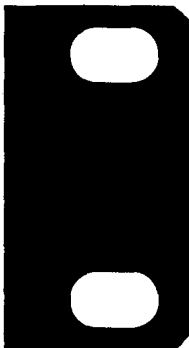
WAVESTATION

SR



*Reference Guide* by Dan Phillips

*Advanced Vector Synthesis  
Wave Sequencing*



**av** AV Synthesis System

**KORG**

---

## CONTENTS

ABOUT THIS REFERENCE GUIDE .....	1
A-B PAN.....	2
AMP ENV.....	5
AMP MOD.....	8
BANK COPY.....	10
BUS ASN.....	12
CARD FORMAT.....	14
DEMO SEQUENCE.....	15
EDTMULTI.....	16
EDTPERF.....	19
ENV1.....	23
ENV1 MOD.....	26
EXIT.....	28
FILTER.....	29
FX ALL COPY.....	32
FX MIX.....	34
FX MIX COPY.....	38
FX PARAMS COPY.....	39
FX SELECT.....	40
FX1 (2).....	43
GLOBAL.....	88
LFO 1 (2).....	90
MACROS.....	93
MIDI.....	96
MIDI RECEIVE.....	98
MIDI REMAP.....	100
MIDI STATUS.....	102
MIXENV.....	103
MIXENVMOD.....	108
MULTISET.....	110
NAME CARD/MULTI/PATCH/PERF/WAVESEQ.....	112
PART COPY.....	114
PATCH.....	115
PATCH PARAMS COPY.....	117
PERFMAP.....	119

---

PERFORM .....	121
PITCH .....	123
SCALE .....	127
SYSEX DATA XMIT .....	129
WAVES .....	132
WSEQ .....	135
WAVESEQ COPY .....	139
WAVSEQ STEPCOPY .....	140
WAVESEQLOOP .....	143
WAVESEQMOD .....	145
WRITE PERF/PATCH/MULTI/SCALE .....	147
WS UTILITY .....	150
ZONES .....	152
APPENDIX 1: COMPATIBILITY .....	155
APPENDIX 2: MIDI RECEIVED DATA .....	158
APPENDIX 3: MIDI TRANSMITTED DATA .....	161
APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT .....	163
INDEX .....	186

---

## **ABOUT THIS REFERENCE GUIDE**

The Wavestation SR Reference Guide is intended for those who have read the accompanying Player's Guide, or who have some experience with professional synthesizers. It is not organized to be read from cover to cover, but as an extended "Help" system for those occasions when you may need more information about what is displayed on the Wavestation SR screen.

The Wavestation SR's operating system is organized into over 50 display *pages*, which are in turn organized into 11 *levels*. For easy reference, this manual provides a detailed explanation of every page, arranged alphabetically by page title.

For each page you will find the level on which the page is found, a picture of the page, and an entry for each parameter, including the parameter name which appears on the screen and the full, more complete name.

The Wavestation SR has a set of key combination shortcuts, to make it easier to move through levels and banks and to enter parameter values. These work the same way anywhere that you can enter data.

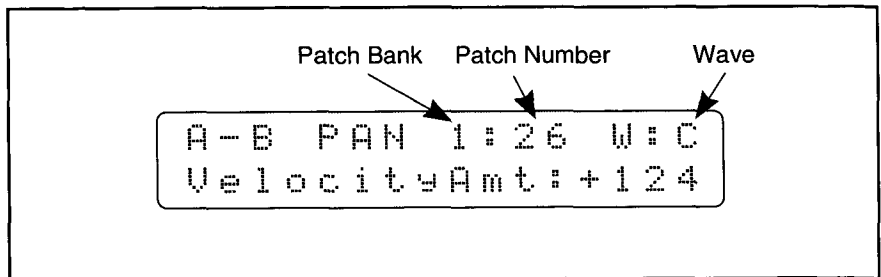
### ***Key Combination Shortcuts***

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

## A-B PAN

*patch bus a-b pan*

*Edit Patch level*



This page sets the modulation of the Pan position, the left-right orientation of the sound within the stereo field. Pan may be modulated by velocity and keyboard position (MIDI note number).

The initial Pan position is set on the EDT PERF or EDTMULTI pages, with the FX Bus parameter (or by MIDI Pan, controllers #10 and #42). To use the modulation routings on this page, the FX Bus parameter must be set to BUS - A, BUS - B, or one of the 99 intermediate values (99/1...1/99). If the FX Bus parameter is set to PATCH, BUS - C, BUS - D, or C + D, the A-B PAN modulators have no effect.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Patch page; they are displayed here for your convenience only.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared

when you exit the Edit Patch level.

### **Mac - Macro**

The Pan Macros allow you to instantly program several useful effects, which you may then modify as you wish. If you edit the Pan parameters after calling up a Macro, the label changes to User.

Note that calling up a Macro will cancel any previous changes to this page.

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

### **Velocity Amt - Velocity Amount**

+/- 127. A value of 0 means that velocity has no effect on pan.

A MIDI velocity of 1 (very low) will always place the note at the pan position set in the FX Bus parameter of the EDT PERF (Edit Performance) page. Greater velocities will affect the pan as discussed below.

When the Velocity Amount is positive, greater velocities will pan notes further to the right. For rightward panning across the entire stereo field, set the Velocity Amount to 127, and the Edit Performance page's FX Bus parameter to BUS - A.

With negative Velocity Amounts, greater velocities will pan notes further to the left. For leftward panning across the entire stereo field, set the Velocity Amount to -127, and the Edit Performance page's FX Bus parameter to BUS - B.

### **Keyboard Amt - Keyboard Amount**

+/- 127. A value of 0 means that keyboard position has no effect on pan.

This parameter controls the spread of the keyboard, or the range of MIDI note numbers, across the stereo image. For stereo panning which directly relates to keyboard position, set the FX Bus parameter (EDT PERF page) to 50/50.

Positive Keyboard Amounts pan lower notes to the left and higher notes to the right.

Negative values pan lower notes to the right and higher notes to the left.

Keyboard pan modulation is especially effective in simulations of acoustic keyboards, such as pianos and harpsichords.

### **Other Ways to Set and Modulate Pan**

For other ways to set and modulate Pan, see:

the EDT PERF and EDTMULTI pages, FX Bus parameter;

the BUS ASN (Bus Assign) page;

the FX MIX page, Mix 3/4 parameters using Parallel routing;

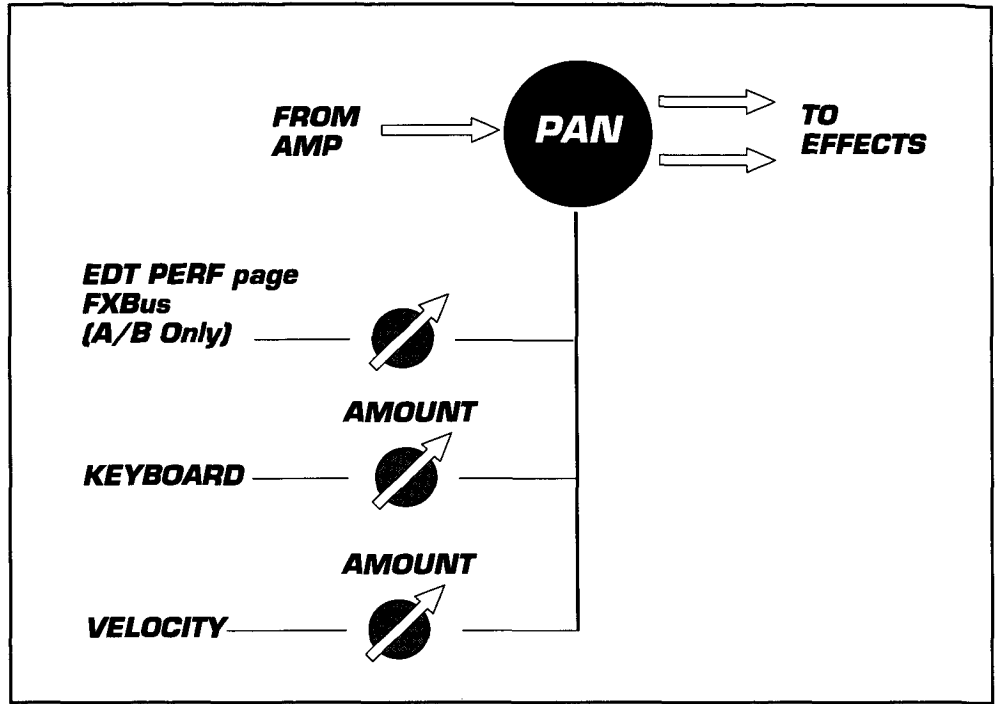
and the Stereo Mod-Pan effect.

### **UP/DOWN CURSORS**

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...

**A-B PAN**

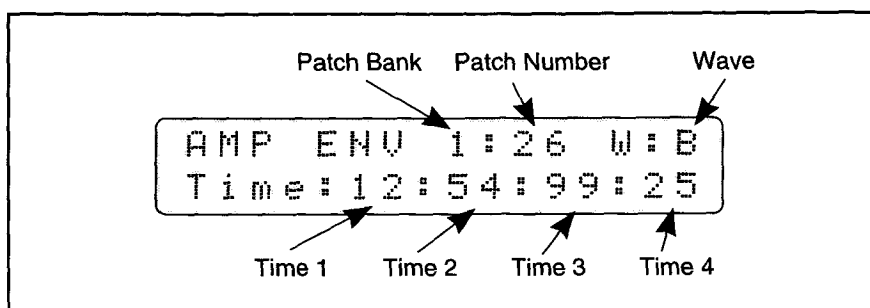
*Pan Block Diagram*



## AMP ENV

*amplitude envelope*

*Edit Patch level*



The amplifier shapes the loudness of the Wave according to this envelope.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### *W - Wave*

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

### *Mac - Macro*

The Amp Envelope Macros allow you to instantly program several useful effects, which you may then modify as you wish. If you edit the Amp En-

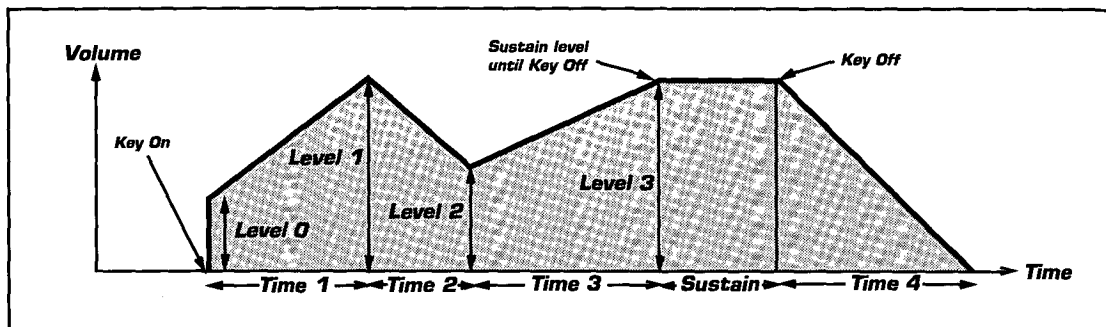


velope parameters after calling up a Macro, the label changes to User.

Note that calling up a Macro will cancel any previous changes to this page.

This page's Macros include DEFAULT, PIANO, ORGAN, ORGAN RE-LEAS(e), BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF, which can serve as a programmable mute.

*Amplitude Envelope*



**Time - Times 1 - 4**

0 - 99. The duration of the selected envelope segment. The envelope times adjust the rate at which the note develops. Greater time values mean slower envelopes.

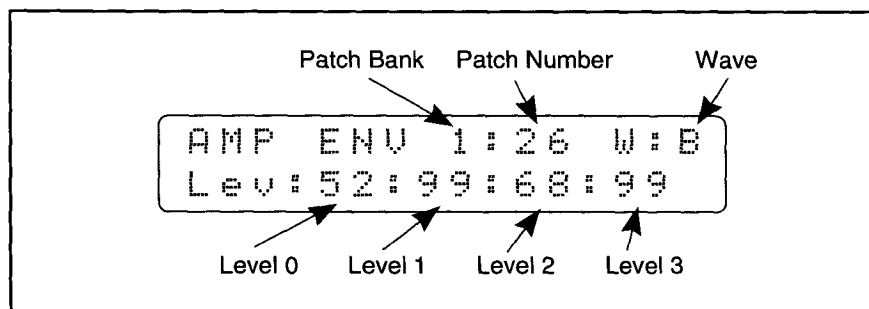
Time 1 is the attack time.

Time 2 is the decay time.

Time 3 is the slope time (the time between Level 2 and Level 3).

Time 4 is the release time.

*Levels screen, Amp Env page*



**Lev - Levels 0 - 3**

0 - 99. The levels of the breakpoints in the envelope determine its shape.

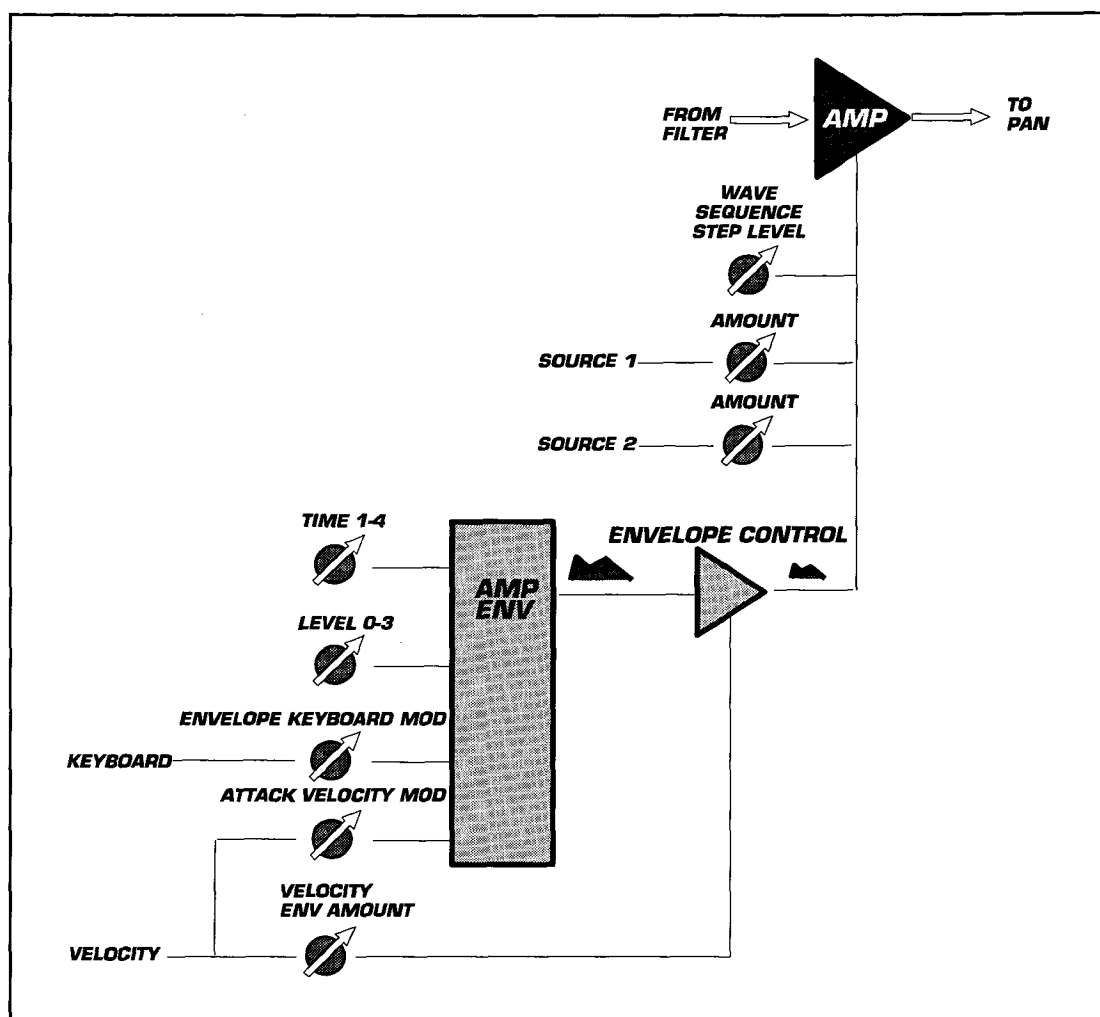
Level 0 is the initial level initiated by a Key On.

Level 1 is the attack level.

Level 2 is the decay level.

Level 3 is the sustain level.

## Amplifier Module Block Diagram



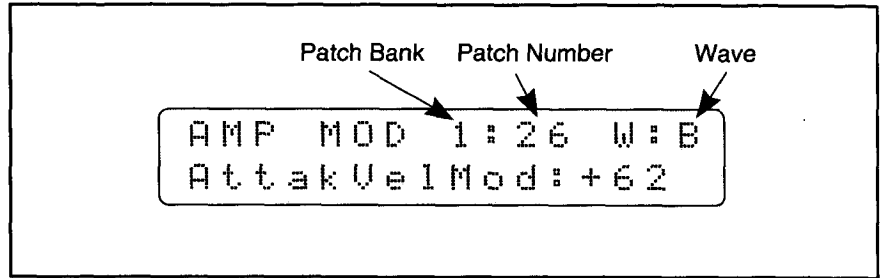
## UP/DOWN CURSORS

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...

## **AMP MOD**

*amplitude modulation*

*Edit Patch level*



Please see the figures under AMP ENV.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

### **VelEnvAmt - Velocity Env Amount**

+/- 127. Raising this control from 0 makes the envelope level increasingly dependent on velocity. Positive values convert harder playing into louder notes, as is normal. Negative values soften the Patch as you play harder.

---

By using less than maximum velocity sensitivity, you can limit the volume range of the Patch. This effect, similar to dynamics compression, can make mixing easier.

### **Src1/2 - Source / Amount 1, 2**

The normal Patch modulation sources can be used, including KEYBD (Linear Keyboard), CTRKB (Centered Keyboard), VEL (Linear Velocity), EXVEL (Exponential Velocity), LFO 1 and 2, ENV 1 (Envelope 1), AT (Aftertouch), AT+WH (Aftertouch + Mod Wheel), WHEEL, MIDI 1 and 2, and PEDAL.

For complete descriptions of these modulators, please see the entry for the PATCH MACRO page.

Each modulator can have its own level and a normal or inverted (+/- 127) effect.

For example, when applied to the amp, the LFOs can create a tremolo.

### **AttakVelMod - Attack Velocity Modulation**

+/- 127. Controls the influence of velocity on the envelope Time 1 only.

Positive amounts of Attack Velocity Modulation mean that playing harder speeds up the envelope attack time, and playing more softly makes it slower (down to the original value of Time 1). Negative values mean the opposite.

### **EnvKbdMod - Envelope Keyboard Modulation**

+/- 127. Controls the influence of the keyboard (note position) on envelope Times 2 and 4 only.

When the Envelope Keyboard Modulation is positive, higher notes have faster envelope times than lower ones. Negative values mean the opposite.

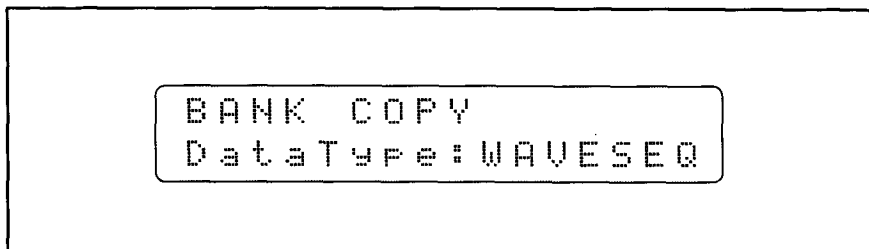
### **UP/DOWN CURSORS**

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...

## BANK COPY

*copy bank data*

*MIDI/Global level*



This page lets you quickly transfer complete sets of Performances, Patches, and Wave Sequences between cards and internal memory. (For transferring individual Performances and Patches, use WRITE.)

**NOTE:** To back up an entire Bank of memory (RAM 1 to CARD, for instance), set Data Type to ALL.

### **Frm - From**

This is the Bank which the data will be Moved from. RAM 1 - 3, ROM 4 - 11, and CARD are possible.

### **To**

This is the Bank which the data will be Moved to. RAM 1 - 3 and CARD are possible.

### **Data Type**

This is the type of data to be Moved. PERF (Performances), PATCH, WAVESEQ (Wave Sequences), and ALL are possible.

### **MOVE BANK?**

Pressing +1/'YES while this command is highlighted copies the selected data, and also changes all source Bank references to point to the destination Bank.

For example, suppose that in RAM1 you have Performances which call for Patches and Wave Sequences in various banks. If you set the Data Type to ALL and then MOVE RAM1 to CARD, all references to RAM1 Patches and Wave Sequences are converted to CARD Patches and Wave Sequences (because these Patches and Wave Sequences have indeed been copied to the card). All references to banks other than RAM1 will remain unchanged.

This way, to the extent that a bank of Performances is self-contained, you can just take the card to another Wavestation SR and have it sound exactly right. You won't have to worry about first installing Patches or Wave Sequences into RAM1.

MOVE is generally most useful with the Data Type parameter set to ALL.

If you use the MOVE function with PERFORMANCES selected as the Data Type, the Patch *references* will be changed to the destination bank, but the actual Patch data will not be copied.

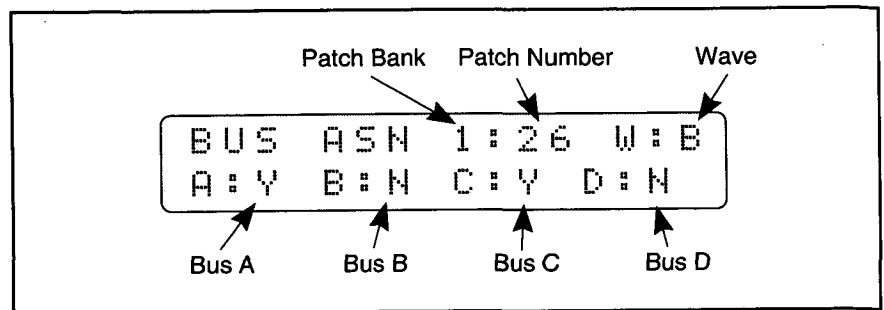
As an example, assume that you select PERFORMANCES as the Data Type, and use MOVE to transfer them from RAM 1 to CARD. The card currently contains Patch data - specifically, CARD Patch #33 is named Bubble. If one of the Performances had called on RAM 1 Patch #33 (Blowhorn), after the move it will call on CARD Patch #33. Since the Patch data has not been transferred from RAM 1 to the CARD, this will result in the Performances playing Bubble instead of Blowhorn.

Similarly, using the MOVE function with PATCHES selected causes the references to Wave Sequences to change, but does not copy the actual Wave Sequence data.

## BUS ASN

### *patch bus assignment*

#### *Edit Patch level*



The Wavestation SR's effects section has four inputs, or buses - A, B, C, and D. The Effects Mix page determines how these buses are sent to the 2 effects slots, and then to the 4 outputs (see the diagrams on the next page). With the Effects Mix using the Parallel routing, for instance, buses A and B can go through FX1 and on to outputs 1 and 2, and buses C and D through FX2 and on to outputs 3 and 4. Normally, these bus assignments are set by the FX Bus parameter on the EDT PERF (Edit Performance) page, which sets the buses for the entire Part at once. If FX Bus is set to PATCH, however, the settings from the Patch Bus Assignment page are used instead.

The Patch Bus Assignment page lets you make separate bus assignments for each Wave of a Patch - which allows you to do a few interesting tricks. By assigning each Wave of a 2 or 4 oscillator Patch to a separate bus, for instance, you can use the mix envelope and/or your controller's joystick (or controllers which have been mapped to the joystick on the MIDI Remap page) to affect the pan position. With 4 oscillators, it is even possible to have quadraphonic panning, useful for film and multimedia applications.

#### *(Patch Number and Bank)*

The number and Bank of the Patch currently being edited appear at the top of the screen. These are displayed for your convenience only, and cannot be edited on this page.

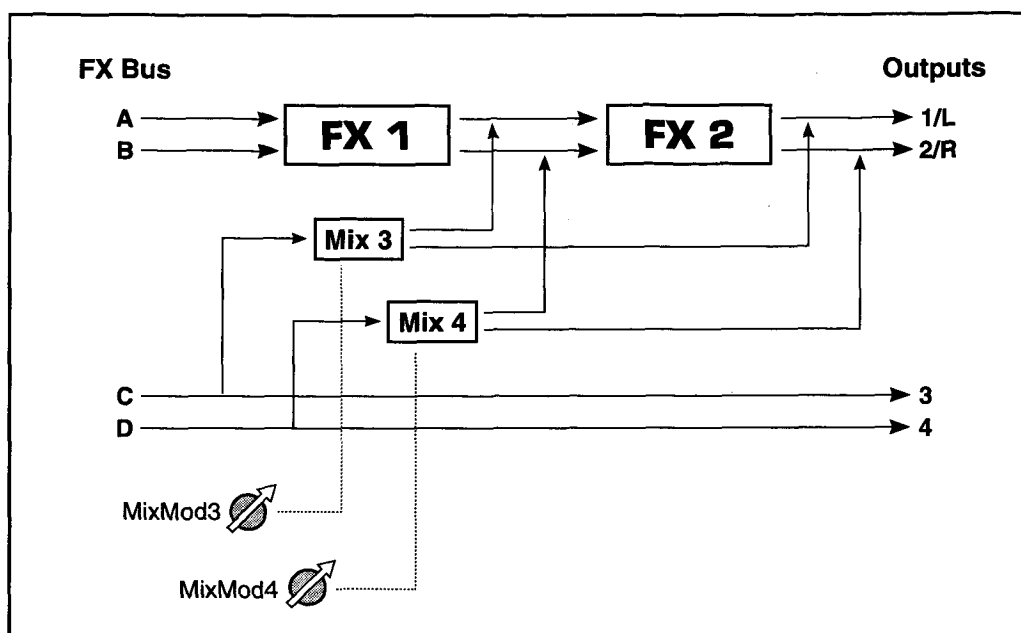
#### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

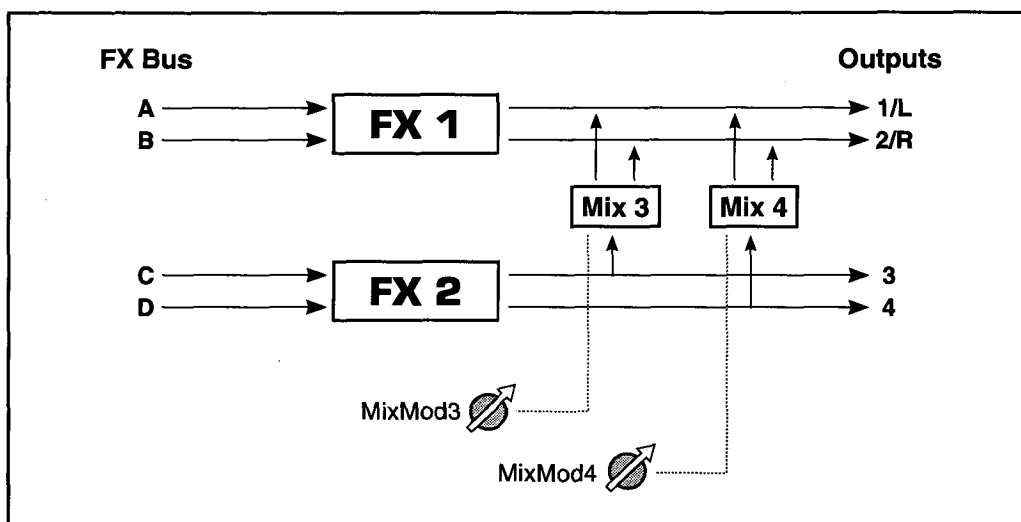
If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

Series Effects Routing



Parallel Effects Routing



If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

A, B, C, D - FX Bus A, B, C, D

Y (yes) means that the wave is routed to this effects bus.

N (no) means that the wave is not routed to this effects bus.

UP/DOWN CURSORS

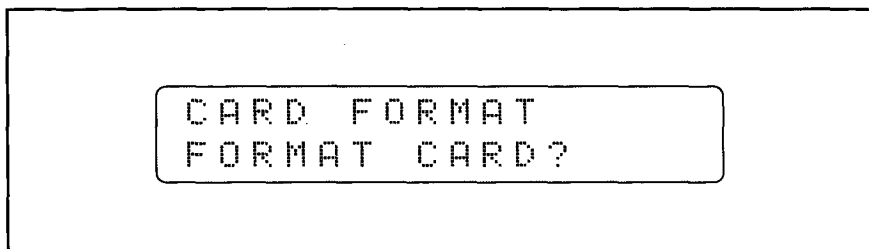
The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...



## CARD FORMAT

*ram card format*

*Global level*



All new RAM Cards must be formatted before they can be used to store Wavestation SR data. Once the Card has been formatted, you can treat it just like RAM 1, 2, and 3, giving you access to 50 more Performances, 35 more Patches, and 32 more Wave Sequences.

If inserting a card invokes one of the following messages:

CARD IS NOT FORMATTED

KORG CARD FORMAT MISMATCH

then it must be formatted before being used in the Wavestation SR.

ROM Cards cannot be formatted.

Both the physical Protect switch on the RAM Card and the GLOBAL page Protect Card parameter must be set to OFF for the formatting operation.

Attempting to format a ROM Card or write-protected RAM Card will cause the Wavestation SR to ignore the Card until it is reinserted.

**NOTE:** Formatting a card which displays a KORG CARD FORMAT MISMATCH message will erase any other data, such as M- or T-series voices, which might be on the card. Make sure that you are not destroying important data!

### FORMAT CARD?

Pressing +1/YES brings up the question, "ARE YOU SURE?" Since formatting will erase all of the data on the card, you should be certain that it contains no important data. Pressing +1/YES again formats the Card. Pressing -1/NO (or any other key) at either the initial command or the "ARE YOU SURE?" message cancels the operation, leaving the Card's data intact.

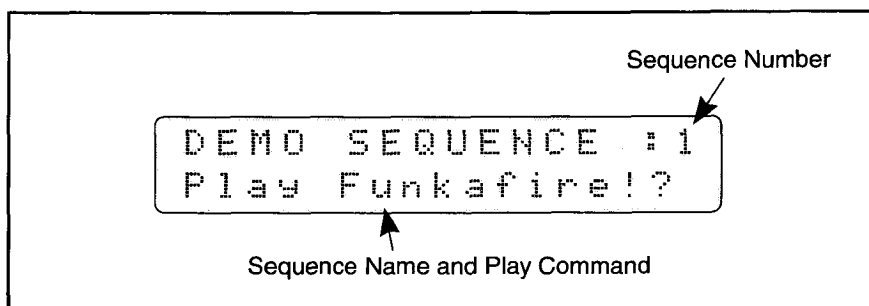
If you press +1/YES and the format works properly, you'll see the message "CARD FORMATTED," and then the NAME CARD page will appear. Name the card whatever you like (within the boundaries of 16 characters and good taste).

If the format does not work for some reason, you'll see the message "CARD FORMAT FAILED." Make sure that the card is properly seated in the slot, and try again.

## DEMO SEQUENCE

*play demo sequence*

*MIDI/GLOBAL level*



The Demo Sequence page allows you to play built-in musical examples of the Wavestation SR's capabilities. You can also use this feature to test the audio signal path from the instrument, or to listen to while adjusting the volume level.

You can also get to this page by pressing the PERF and BANK buttons together; this shortcut works from all of the SR's pages.

### *(Sequence Number)*

This is the number of the current demo sequence; it can be changed by using the Up and Down cursors. The name of the sequence is shown on the bottom line.

### **Play (Sequence Name)?**

Pressing +1/YES will play the named sequence. After the first sequence finishes, the next one will start to play.

As the sequence begins to play, the display will change to read, "Any key to stop." Pressing any of the front panel buttons will stop the playback.

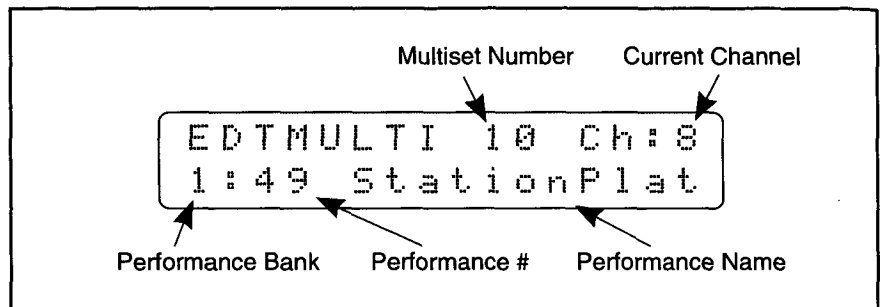
### **UP/DOWN CURSORS**

The Up and Down cursors change the current Sequence Number, as displayed in the upper right-hand corner of the screen.

## EDTMULTI

*edit multiset*

*Edit Multiset level*



MULTI Mode enables the Wavestation SR to receive multi-timbrally, one Performance per channel. The EDT MULTI (Edit Multiset) page allows you to assign any Performance to any MIDI channel. Any channel may also be ignored, allowing you to reserve it for other use.

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

The Multiset serves to select an initial set of Performances and effects settings. These setups allow you to try various sound combinations without having to specifically program those selections from a sequencer. Although it is possible to change Multisets via MIDI Program Changes or System Exclusive commands, this is not always necessary - because each channel of a Multiset responds to MIDI Program Changes *independently*. This means that, in MULTI Mode, the Wavestation SR functions as up to 16 discrete synthesizers.

Multisets are stored in internal battery-backed RAM and can be dumped via MIDI System Exclusive.

### *(Multiset Number)*

0 - 31. This displays the number of the current Multiset. To select another Multiset, you must exit back to the MULTISSET page; the number is displayed here for convenience only.

### *Ch - Current Multiset Channel*

1 - 16. A Multiset may have separate Performance, Level, FX Bus, and On/Off settings for each of the 16 MIDI Channels; this is the one currently being edited. Change it by using the UP and DOWN Cursors.

If the settings of the MIDI page's Basic Channel and Number of Multi/Mono Channels parameters mean that the current channel will not respond to MIDI, or if the channel's Play parameter is set to OFF, the word

"OFF" will flash over this parameter.

### *(Performance Bank)*

The Bank of the Performance assigned to the current Multiset Channel is displayed at the very left of the bottom line. 1 - 3 stand for RAM1 - RAM3, 4 - 11 for ROM4 - ROM11, and C for CARD. This may be changed either by using the +1/YES and -1/NO buttons, or by pressing the BANK button.

### *(Performance Name and Number)*

0 - 49. This is the Performance assigned to the current Multiset Channel. The first 11 characters of the name are displayed.

You can change a Channel's Performance simply by selecting the Performance name and number and then pressing the +1/YES and -1/NO buttons. You can also use MIDI Program Changes, if you like.

### **Play - Play This Multiset Channel**

ON causes the channel to be played, as normal.

OFF causes the channel to be ignored.

You can use this feature to free up MIDI channels for other instruments in your setup, on a Multiset-by-Multiset basis. If you want to set up a consistent MIDI channel limit for the Wavestation SR, you can also use the MIDI page's Number of Multi Channels parameter.

### **Lev - Level**

0 - 127. Each channel has its own volume level, so that you can easily balance the volumes within the Multiset. The Channel Level responds to MIDI Volume (Controller #7); conversely, changing this parameter sends MIDI Volume data on the current channel. You can use this to automate mixes by recording volume changes into a sequencer, channel by channel, and then playing them back into the Wavestation SR.

### **FX Bus - Effects Bus**

This parameter controls the panning and routing of the Performance to the effects (which in turn control the routing to the back panel outputs), and can be controlled through MIDI Pan as discussed below. See FX MIX for more discussion of FX Bussing.

BUS-A is hard left.

BUS-B is hard right.

99/1 through 1/99 are intermediate pan positions between Buses A and B, from left to right.

BUS-C, C+D, BUS-D, and ALL route the Performance to Bus C, to both C and D, to D, and equally to A, B, C, and D, respectively. These settings are useful in separating out Performances for special internal or external processing; for more information, see FX MIX, and the EFFECTS Tour in the Player's Guide.

PERF uses the Part FX Bus settings from the original Performance.

**MIDI Pan**

Each channel responds to incoming MIDI Pan messages (Controllers #10 and #42). MIDI Pan sets the pan position for new notes, or assigns the channel to special FX bussing (without affecting notes that are currently sounding). Also, as you change the FX Bus value, the Wavestation SR will send out MIDI Pan messages.

There are two modes of panning: normal panning, which goes from BUS-A (hard left) to BUS-B (hard right), and special bussing, which includes BUS-C, C+D, BUS-D, ALL, and PERF (or PATCH, in PERF Mode). Controller #10 handles normal panning, and controller #42 takes care of special bussing. The table below shows the values of controllers #10 and #42 for selected FX Bus settings; note that pan is continuous between A and B.

Wavestation SR FX Bus	MIDI Pan Controllers	
	#10	#42
BUS-A (hard left)	0	1
50/50 (center)	64	
BUS-B (hard right)	127	
BUS-C	Ignored	2
C+D		3
BUS-D		4
ALL		5
PERF (or PATCH in EDTPERF)		6

When a channel is set to use special bussing (BUS-C, for instance), controller #10 won't have any effect. Sending a controller #42 value of 1 will reset the channel to normal panning (50/50). Once a channel is set to normal panning, you can simply send controller #10 messages; you don't need to keep setting controller #42 to 1 (doing so won't have any effect).

**NOTE:** some factory Performances use PATCH Bussing to mute selected Waves in a Patch. Changing the pan of these Performances will override the PATCH Bussing, and so the sound of the Performance may change.

Panning is also affected by modulators on the A-B PAN page, and can be further varied by the Stereo Mod-Pan effect.

**Xmit Multi Dump? - Transmit Multisets over System Exclusive**

Pressing +1/YES at this prompt will send out a MIDI SysEx dump of all the parameters for the 32 Multisets. This may be recorded into a sequencer or MIDI Librarian for later use. Note that this does not include the Performance, Patch, and Wave Sequence data used by the Multisets.

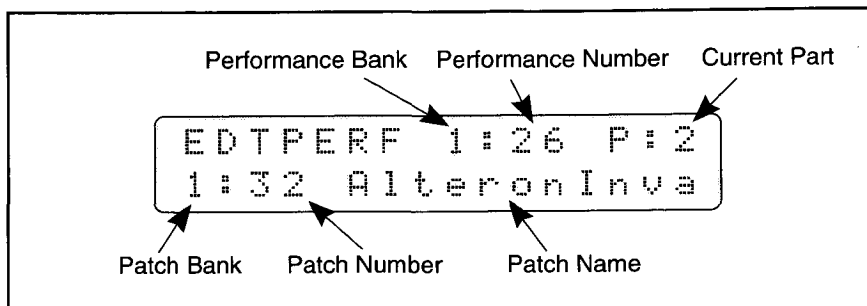
**UP/DOWN CURSORS**

The Up and Down cursors change the current Multiset Channel, as displayed in the upper right-hand corner of the screen.

## EDTPERF

*edit performance*

*Edit Performance level*



For an introduction to Performances, please see Chapter 6, "Performance Tour," in the Player's Guide.

Performances have no sound of their own. Instead, Performances "point to" Patches, which are the basic instrumental units of sound, and organize them in various ways.

Each of the eight Parts in a Performance contain a Patch. In addition, Parts can customize Patches in a variety of ways, through the ZONES and EDIT PERF pages (as well as the Performance's effects).

Changing the Patches which are assigned to its Parts is one way to change the sound of a Performance. The other way is to edit the Patches themselves.

As you can see, a Part has a lot to it. One basic Patch can produce a variety of effects within a Part, without your having to keep several separate, slightly different versions of the Patch itself.

*(Performance)*

0 - 49. The Bank and number of the Performance being edited. These may not be changed on this page, and are displayed only for your reference.

**P - Current Part**

1 - 8. There are eight Parts in a Performance. The current Part may be changed by using the UP and DOWN cursors.

*(Patch Bank)*

The Bank of the Patch assigned to the Part is displayed at the very left of the bottom line. 1 - 3 stand for RAM1 - RAM3, 4 - 11 for ROM4 - ROM11, and C for CARD.

*(Patch Number and Name)*

--, 0 - 34. This is the Patch assigned to the current Part.

You can change a Part's Patch simply by selecting the Patch name and

number and then pressing the +1/YES and -1/NO buttons.

If you are not using the current Part, you can set it to an "empty" Patch by pressing the +1/YES or -1/NO buttons until you see "--". A Part with an empty Patch makes no sound.

To add a Patch to an empty Part, cursor to "--" and press the +1/YES and -1/NO buttons until the desired Patch appears.

## **Part Volume**

0 - 99. Volume level of the Part.

## **Delay**

0 - 9999. Delay between the time that a key is depressed and the time that the Part sounds, in milliseconds.

## **Transpose**

+/- 24. Semitone transposition of the Part, in steps.

## **Detune**

+/- 49. Fine tuning of the Part in cents; a cent is 1/100 of a semitone.

## **FX Bus**

This parameter controls the routing of the Patch to the effects (the effects, in turn, control the routing to the back panel outputs). See FX MIX.

The FX Bus can also be controlled by MIDI Pan messages, as described under EDT MULTI. MIDI Pan will override the FX Bus settings of all 8 Parts.

FX (Effects) Bus values are:

BUS-A, 99/1 ~ 1/99, BUS-B, BUS-C, C+D, BUS-D, ALL, and PATCH.

Panning is also affected by modulators which can be found under EDIT BUS A-B PAN, and can be further varied by the Stereo Mod-Pan effect.

If PATCH is selected, the Part uses the bus settings made in the PATCH BUS ASSIGNMENT page. By assigning each wave of a 2 or 4 oscillator patch to a separate bus, it is possible to use the mix envelope and a MIDI joystick (or other controller routed to the Joystick on the MIDI REMAP page) to affect the pan position.

## **Mode - Voice Mode**

The Voice Mode controls the number of voices that the part will play simultaneously, and how it will play them.

UNILEGATO (Unison Legato) mode is monophonic, so that only one note can be played at a time. If you play legato, notes are not re-triggered (the envelopes will continue to evolve as if the original note was still held down, instead of going back to their attack segments). This is good for imitating the phrasings of wind instruments, or analog lead synthesizers, and is generally the preferred mode for MIDI wind controllers.

UNI RETRIG (Unison Retrigger) mode is also monophonic, so that only one note can be played at a time. Each new note re-triggers the envelopes.

POLYPHONIC (Polyphonic) mode plays voices up to the maximum num-

ber of voices. This is the normal mode.

## Key Priority

This only appears when the Part's Voice Mode is either UNI LEGATO or UNI RETRIG. These modes mean that you can only play one key at a time. The Priority parameter tells the keyboard what to do when more than one key is held down.

LOW means play the lowest key.

HIGH means play the highest key.

LAST means play the most recent key. This is the most commonly used setting.

## Sustain

This allows you to choose whether or not the Part responds to the Sustain Pedal. If you're setting up a split between a piano and a bass, for instance, you may want the piano to respond to the Sustain Pedal while the bass remains unaffected.

ON means that the Sustain Pedal will affect the Part.

OFF means that the Part will ignore the Sustain Pedal.

## Scale

This parameter determines the intonation of the Part.

Pressing EDIT while on this parameter takes you to the EDIT SCALE level.

EqTemp1 (Equal Temperament 1). This is the default, most widely used keyboard tuning.

EqTemp2 (Equal Temperament 2). Similar to Equal Temperament 1, this scale includes random detuning useful for simulations of acoustic instruments.

Pure Major and Pure Minor. Both produce a modified just intonation.

User 1-12. These may be modified and overwritten. Some of them have already been set to useful intonations by the factory.

To the right of the scale name is the tonic key parameter. This setting affects the Pure Major, Pure Minor, and User scales, but does not affect Equal Temperament 1 or 2.

For more information, see the SCALE page.

## Part Play

This parameter is included for compatibility with the MIDI controller features of the Wavestation A/D and keyboard. On the Wavestation SR, it should generally be set to BOTH.

LOCAL means that the Part will sound as normal (on the A/D and keyboard models, the Part will play internal sounds, but not transmit over MIDI).

MIDI (OFF) means that the Part will not make any sound (on the A/D and keyboard models, the Part will transmit over MIDI).

BOTH means that the Part will play as normal (on the A/D and keyboard



models, the Part will both play internal sounds and transmit over MIDI).

### **Solo Part?**

Soloing allows the current Part to be heard by itself. Pressing "+1/YES" will solo the Part, and return you to the Patch parameter so that you can see the name of the soloed sound.

When the current Part is soloed, an "S" will flash in front of the Part number. As you change the current Part with the UP and DOWN cursors, the solo travels along; this way, you can quickly browse through each of the Patches in the Performance.

To turn off soloing, simply return to this parameter (which will now display "Un-Solo Part?") and press "+1/YES." Solos will also be canceled when you move to a page on a higher Level, such as PERF or MULTI.

### **Init Part? - Initialize Part**

Initializing the Part sets neutral, default parameters for programming from scratch. Note that this only erases Part parameters, such as the Level, Delay, and Patch assignment; the data for the Patch played by the Part will be unaffected.

Pressing +1/YES will bring up an "Are you sure?" warning message. Pushing the same button again initializes the Part; any other buttons cancel the operation, leaving the Part intact.

### **Init Perf? - Initialize Performance**

This command initializes all 8 Parts of the Performance, allowing you to start completely from scratch. It is the same as manually initializing all 8 Parts at once.

Pressing +1/YES will bring up an "Are you sure?" warning message. Pushing the same button again initializes the Performance; any other buttons cancel the operation, leaving the Performance intact.

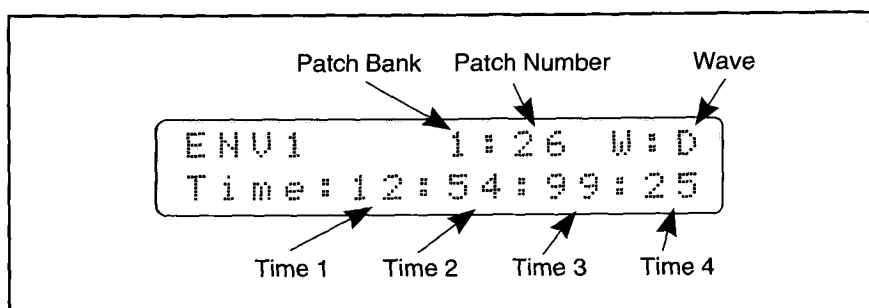
### **UP/DOWN CURSORS**

The Up and Down cursors change the current Part, as displayed in the upper right-hand corner of the screen.

## ENV1

### *envelope 1*

#### *Edit Patch level*



ENV 1 can be a modulation source for many of the Wavestation SR's parameters. It is very similar to the AMP ENV, except that Level 4 is adjustable (rather than always 0).

#### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

#### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (since this is the next level up, you can get there by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

#### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

## Time - Times 1 - 4

0 - 99. The duration of the selected envelope segment. The envelope times adjust the rate at which the note develops. Greater time values mean slower envelopes.

Time 1 is the attack time.

Time 2 is the decay time.

Time 3 is the slope time (the time between Level 2 and Level 3.)

Time 4 is the release time.

## L - Levels 0 - 4

0 - 99. The levels of the breakpoints in the envelope determine its shape.

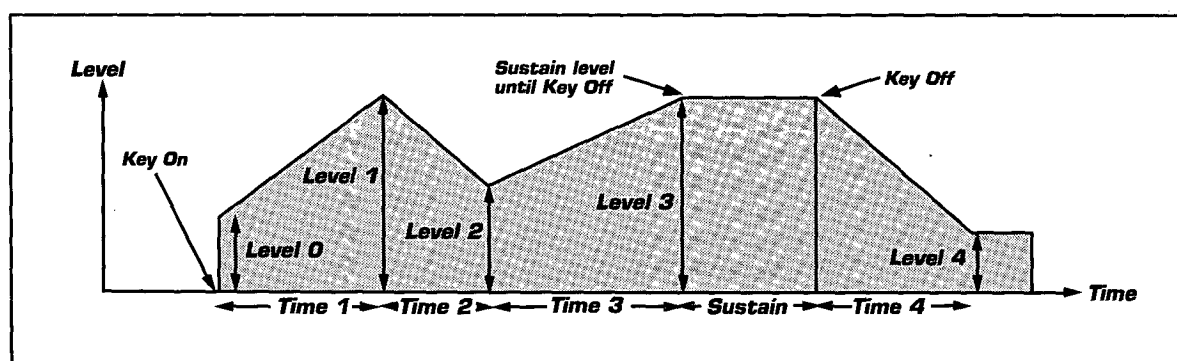
Level 0 is the initial level when a note is first played.

Level 1 is the attack level.

Level 2 is the decay level.

Level 3 is the sustain level.

Level 4 is the release level. Note that Envelope 1 differs slightly from the Amp Envelope by having an adjustable Level 4, so that it doesn't have to fade all the way to zero.



## Mac - Macro

The Envelope 1 Macros allow you to instantly program several useful effects, which you may then modify as you wish. If you edit the Envelope 1 parameters after calling a Macro, the label changes to User.

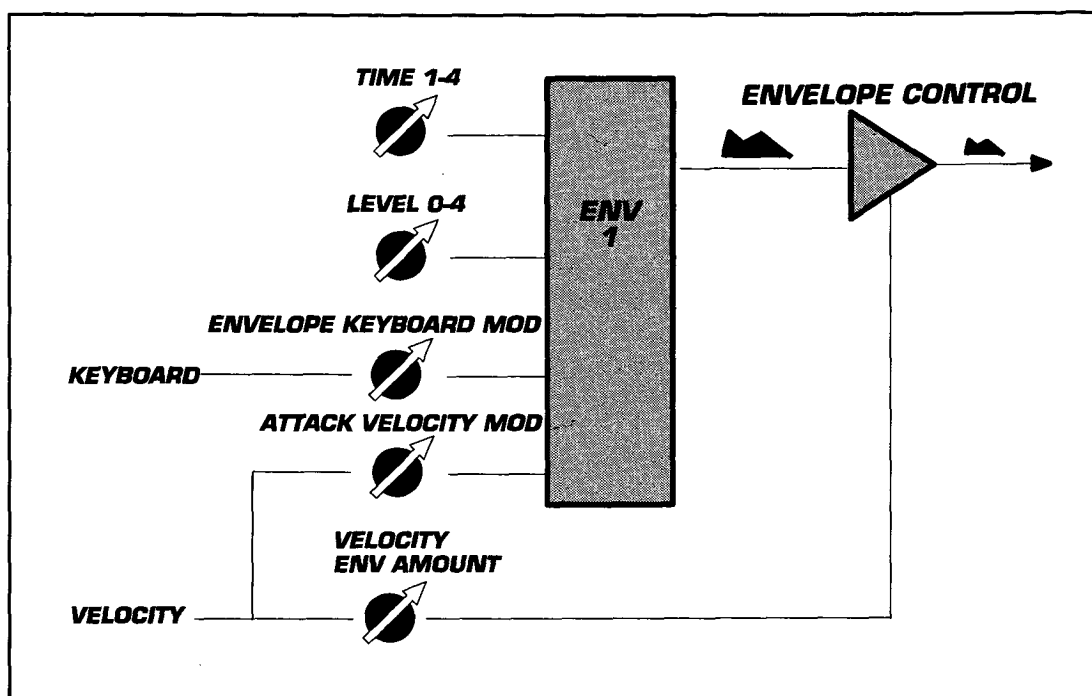
Note that calling up a Macro will cancel any previous changes to this page.

Available Envelope 1 Macros include DEFAULT, PIANO, ORGAN, ORGAN RELEAS(e), BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF.

## UP/DOWN CURSORS

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...

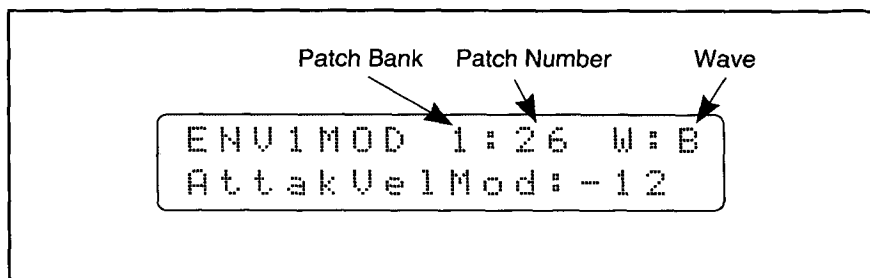
Envelope 1 Block Diagram



## ENV1 MOD

*envelope 1 modulation*

### *Edit Patch level*



This page controls the modulation routings for ENV1. You can use velocity to control the attack time and/or overall level of the envelope, in addition to modulating the decay and release times with MIDI note number. For a complete description of the envelope, see the entry under ENV1.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

**AttackVelAmt - Attack Velocity Modulation Amount**

+/- 127. Controls the effect of velocity on ENV1's Time 1.

With positive values, playing harder speeds up the envelope attack time, and playing softly makes it slower (down to the programmed attack time). Negative values do the opposite.

**VelEnvAmt - Velocity Env Modulation Amount**

+/- 127. Controls the effect of velocity on the overall level of ENV1. When ENV1 is modulating the Filter, this parameter is generally used for velocity control of brightness.

When VelEnvAmt is positive, the level of the envelope increases as you play harder. To allow for headroom, the initial levels are decreased, so that as velocity increases, the levels go up to their programmed values.

With a negative VelEnvAmt, minimum velocities produce the programmed envelope levels, and playing harder causes the levels to decrease.

**EnvKeyMod - Envelope Keyboard Modulation Amount**

+/- 127. Controls the effect of the keyboard position (MIDI note number) on envelope Times 2 and 4.

Positive values mean that higher notes have faster envelope times than lower ones. Negative values mean the opposite.

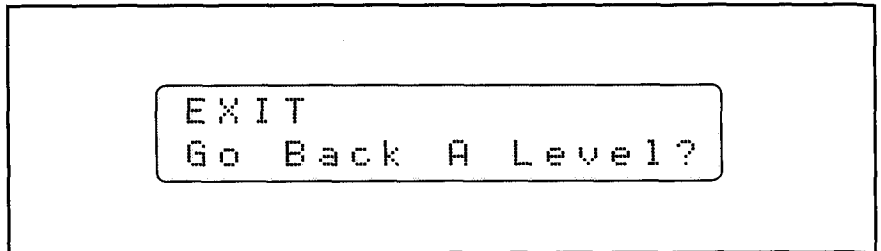
**UP/DOWN CURSORS**

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...

## **EXIT**

*exit to previous level*

*Edit Multiset, Edit Performance, Edit Effects, Edit Patch, Edit Scale,  
Edit Wave Sequence and Write levels*



This page appears as the last page in the Write level and all Edit levels, and allows you to go back to the previous level. For instance, from the Edit Patch level, you would go to the Edit Performance level.

You can also use the EXIT key combination, MIDI/GLOBAL and PAGE-, from any page.

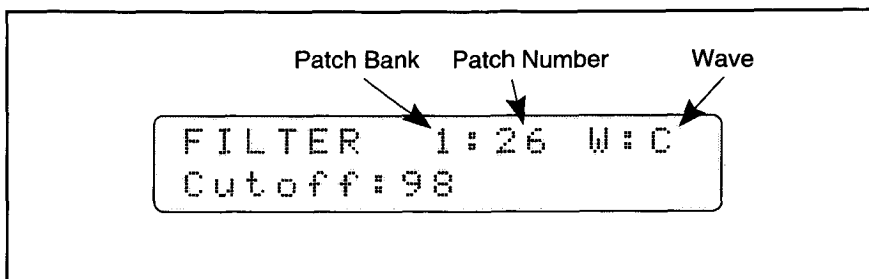
### **Go Back A Level?**

Pressing +1/YES will take you to the previous level.

## FILTER

*patch filter*

*Edit Patch level*



This classic 24 db/octave low-pass filter sets the basic Patch timbre, and shapes it over time in response to physical or programmed controllers.

For most sounds, you will probably use ENVELOPE 1 as Source 1.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 through 3 are RAM 1 - 3, 4 through 11 are ROM 4 - 11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.



**Cutoff - Initial Cutoff**

0 - 99. The filter cutoff is the basic tone control for subtractive synthesis. Higher values set a higher cutoff, therefore a brighter timbre.

**Exciter - Exciter Amount**

0 - 99. Increasing the exciter amount extends and clarifies the higher frequencies.

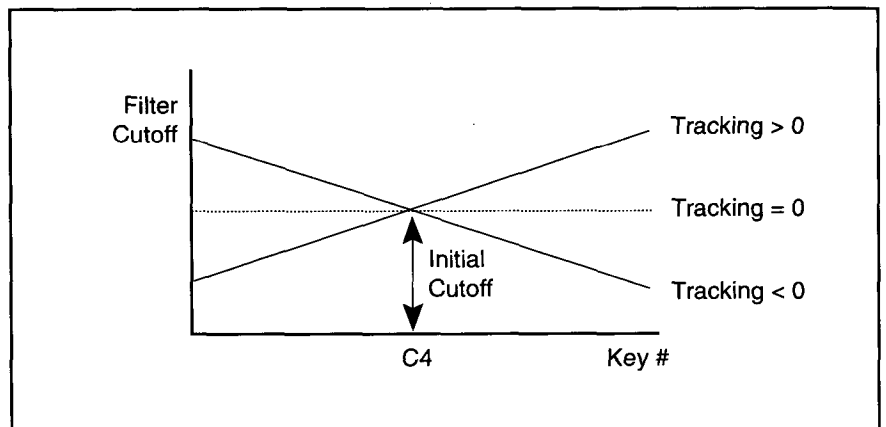
**Kbd Track - Keyboard Tracking**

+/- 127. This controls how key position (MIDI note number) affects the filter cutoff.

Positive values cause the Patch to get brighter as you play higher. This is a good effect to make use of in solo Patches.

If you are attempting to simulate acoustic instruments, you may find negative settings to be more useful. These make the lower pitches have a brighter timbre than the higher pitches, which tends to produce a more consistent sound.

The Keyboard Tracking is centered around C4. (This is the same as selecting CENTERED KEYBOARD as a modulation source.)



**Src 1/2 - Filter Modulation Source / Amount 1, 2**

Often, one of the modulation sources will be ENV 1 (Envelope 1). Other choices can be drawn from the normal Patch modulation sources, including KEYBD (Linear Keyboard), CTRKB (Centered Keyboard), VEL (Linear Velocity), EXVEL (Exponential Velocity), LFO 1 and 2, AT (Aftertouch), AT+WH (Aftertouch + Mod Wheel), WHEEL, MIDI 1 and 2, and PEDAL.

For complete descriptions of these modulators, please see the entry for the PATCH MACRO page.

Each modulator can have its own level and a normal or inverted (+/- 127) effect.

**Macro**

The Filter Macros allow you to instantly program several useful effects, which you may then modify as you wish. If you edit the Filter parameters after calling up a Macro, the label changes to User.

Note that calling up a Macro will cancel any previous changes to this page.

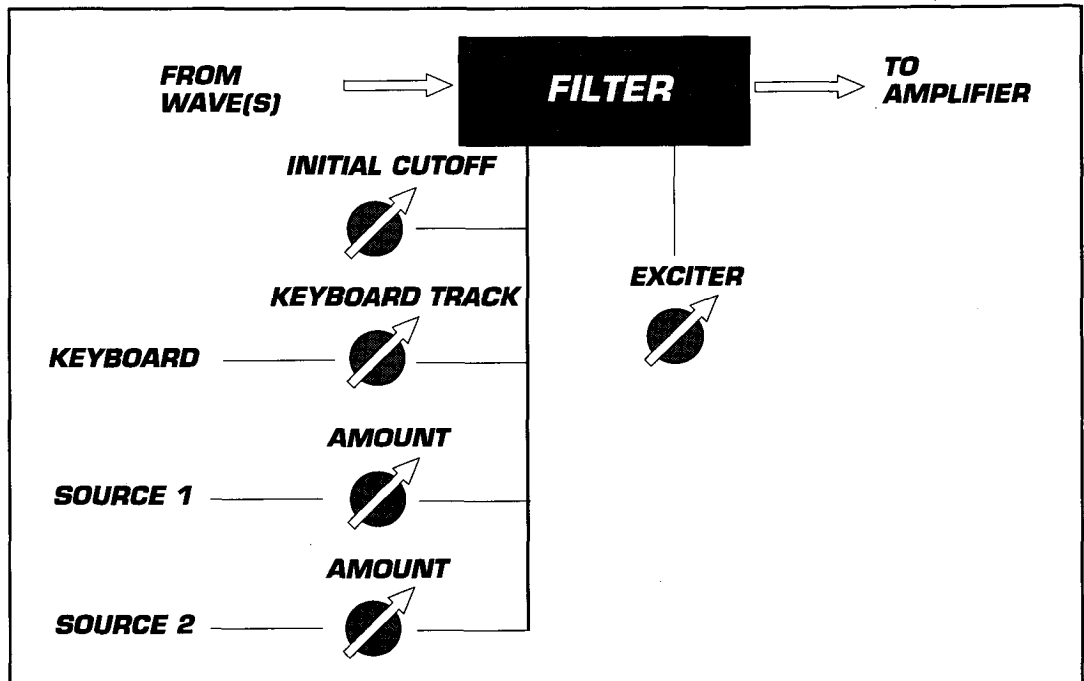
Many of the Macros include modulation routings, such as setting Source1 to LFO1. Since the Filter Macros only affect parameters on the Filter page, the parameters of the modulation source itself are unaffected, and you may want to fine-tune them yourself.

Available Filter Macros include BYPASS, LOWPASS, LOWPAS(s)/LFO, and AT SWEEP.

**UP/DOWN CURSORS**

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: All, A, B, C, D, All...

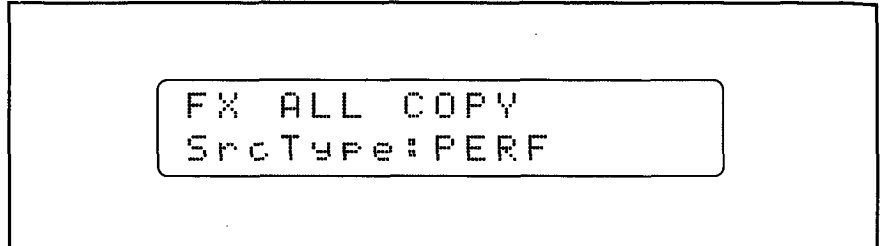
*Filter Block Diagram*



## **FX ALL COPY**

*copy fx1, fx2, and fx mix*

*Edit Performance and Edit Multiset levels*

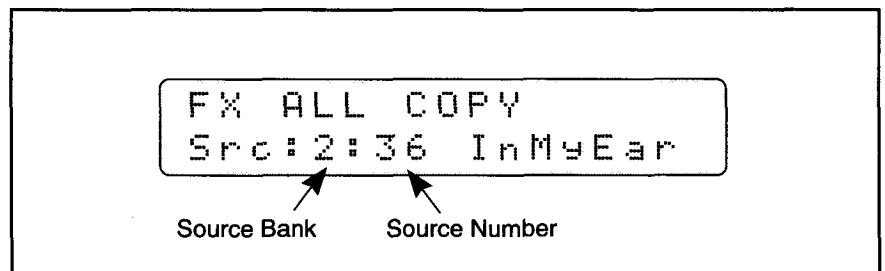


Use this function to copy all effects programming between Performances or Multisets. Specifically, this includes the effects choices for FX1 and FX2 (along with their programmable parameters), the Routing, and the effects mix parameters.

**NOTE:** Performance effects may only be edited when in PERF mode. In MULTI mode, only the Multiset effects may be edited; the Edit Performance level effects pages will not appear.

### **SrcType - Source Type**

The effects may be copied from either a Performance or a Multiset; the default Source Type is the same as the current play mode.



### **Src - Source Bank and Number**

This determines the Bank and number of the Performance, or the number of the Multiset, from which the effects will be copied. If the Source Type is Multiset, "Ms" will be displayed before the number.

The default source is the current Performance or Multiset.

You can change the Bank either by using +1/YES and -1/NO, or by pressing the Bank button.

### **Dst - Destination Bank and Number**

This determines the Performance or Multiset into which the effects will be copied. Unlike the Source Type, the Destination Type is automatically determined by the current play mode; if you're playing Performances, you can only copy into Performances, and if you're playing Multisets, you can

only copy into Multisets.

As in the Source parameter, you can change the Bank either by using +1/  
YES and -1/NO, or by pressing the Bank button.

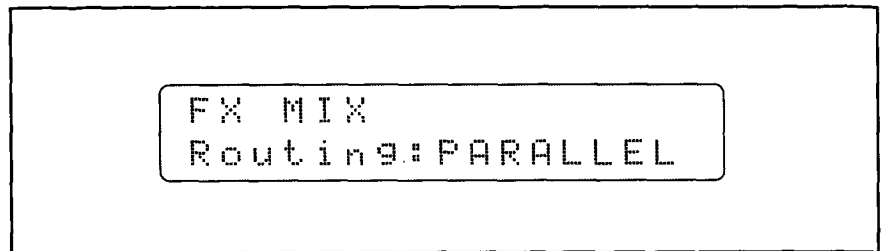
**COPY ALL FX?**

When this text is displayed, pressing YES will carry out the copy.

## FX MIX

*effects mix*

*Edit Performance and Edit Multiset levels*



The FX MIX page gives you access to all the controls of the Performance or Multiset effects routing.

### *(Performance/Multiset)*

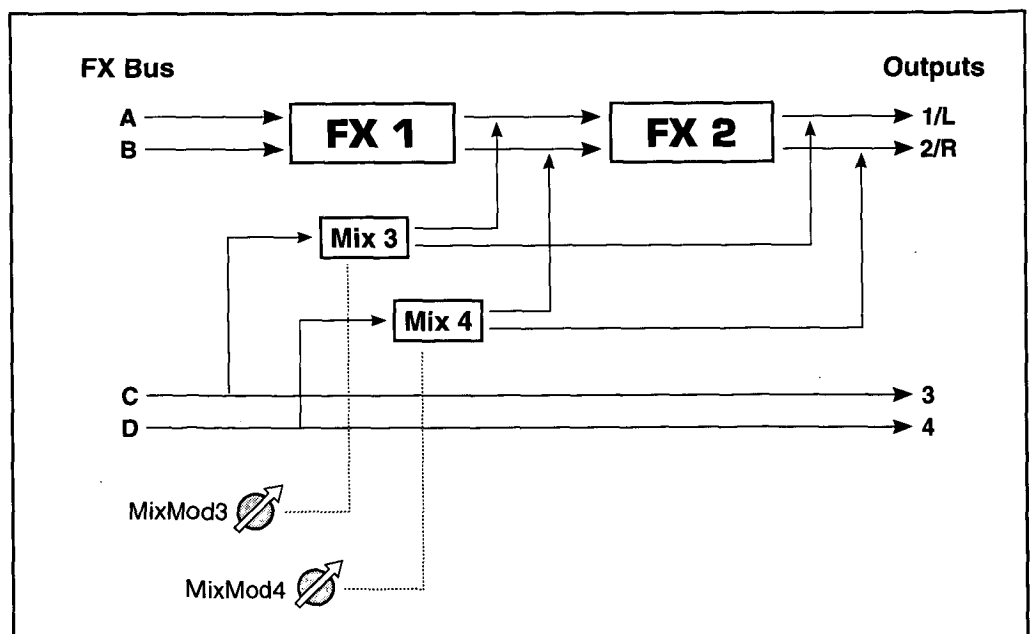
This displays the current Performance or Multiset, to which the effects parameters belong. This information is for your reference only, and cannot be changed on this page.

## Routing

The Routing parameter allows you to configure the effects in two different ways, Series and Parallel. Note that the Routing can also be set on the FX SELECT page.

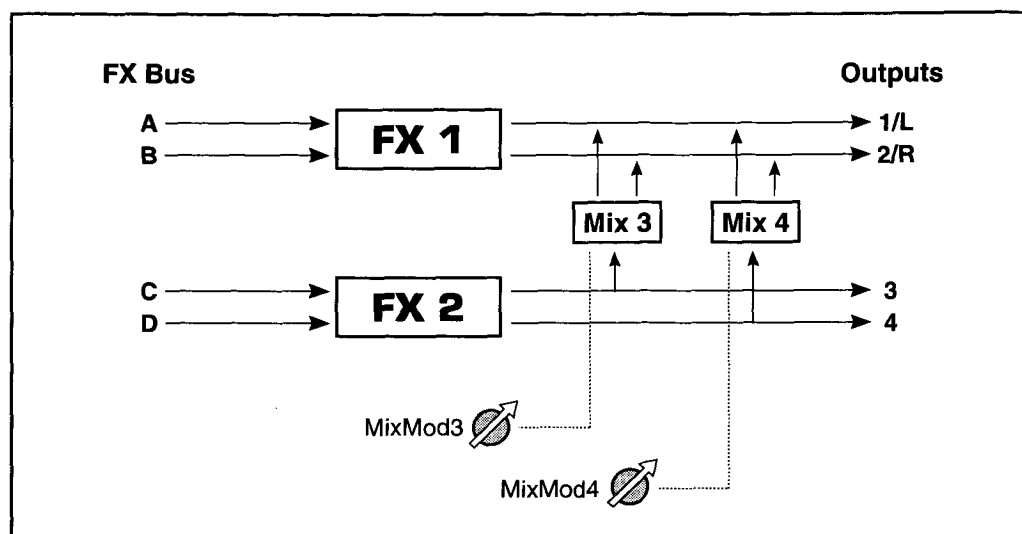
SERIES means that the output of FX1 goes into FX2, creating a combined effect (such as chorus and reverb).

### *SERIES routing*



PARALLEL means that FX1 and FX2 work separately, for two different effects (such as distortion on the right side of a keyboard split, and delay on the left).

### PARALLEL routing



### Mix 3/4

Both the Series and Parallel routings include Mix 3/4 parameters, but the functions are slightly different. In both cases, the Mix 3 and Mix 4 parameters control the initial mix levels, which can then be modulated as set by Mod 3/4. The diagrams above show how the mix function changes with the routing.

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

#### Series Mix 3/4

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

OFF means that the signal only goes directly to output 3 (for Bus C) or 4 (for Bus D), bypassing FX2. Buses C and D are not heard at the main stereo outputs 1/L and 2/R. You can use this for independent processing of Buses C and D with outboard effects.

DRY means that the signal goes directly to the main stereo outputs, bypassing FX2. Bus C goes to output 1/L, and Bus D to output 2/R.

9/1 through 1/9 send the signal both through FX2 and directly to the stereo outputs; the first number is the amount sent directly to the outputs, and the second is the amount sent to FX2. This gives you an additional dry/wet mix for Buses C and D.

WET is the default. It means that the signal goes entirely through FX2, and then on to the main stereo outputs.

You can use the Series routing and Mix 3/4 in many sophisticated ways. For instance, you can send two sounds through the same reverb with different dry/wet mixes, or to send one sound through both chorus and re-

verb, and the second sound only through the reverb.

**Parallel Mix 3/4**

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

OFF means that the output of FX2 only goes directly to outputs 3 (for the left) or 4 (for the right), and is not heard at the main stereo outputs 1/L and 2/R.

LEFT means that this output of FX2 is sent to output 1/L. This is the default for Mix 3.

9/1 through 1/9 pan this output of FX2 between the main stereo outputs.

RIGHT means that this output of FX2 is sent to output 2/R. This is the default for Mix 4.

You can use the Parallel routing's Mix 3 and 4 for dynamically controlled panning, as well as for isolating Buses C and D from the main mix.

**Mod 3/4**

The Mod parameters allow you to achieve dynamic control over the effects mix. For example, you can easily control reverb or flanging depth from a wheel or pedal on your MIDI controller.

Mod 3 and 4 allow you to pick a controller for varying the initial levels set by Mix 3 and Mix 4. The controller choices are listed below.

SOURCE	DESCRIPTION
NONE	When NONE is selected, no modulation is used.
WHEEL	This is the MIDI Modulation Wheel.
AT	This is Channel Aftertouch (note that, in the Patch modulation matrix, both Polyphonic and Channel Aftertouch are recognized - but as the effects are modulated globally, as opposed to on a key-by-key basis, having Polyphonic Aftertouch here wouldn't make much sense).
VEL	This modulation source uses the last Note-On velocity. This value will remain even after the note is released.
KEY	Similar to VEL above, KEY uses the MIDI note number of the highest key currently held down; if none are down, then the last key's number is used.
ENV	This is the combined value of all currently playing amplitude envelopes.
KEYDN	The "key down gate" is useful for making reverb or delay effects instantly vanish (or increase, for that matter) when you stop playing. As long as a key is held down, the maximum modulation amount is in effect; when no keys are held down, the modulation stops.
FXSW	This is the Effects Switch, which may be assigned to any MIDI Controller on the MIDI Remap page (the default is Controller #12). It is meant to be used with one of your controller's foot-

---

switches. When the footswitch is held down, the modulation is at its maximum amount; when it is released, the modulation stops.

- FXTOG** Like FXSW above, FXTOG also receives the Effects Switch, and is meant to be used with one of your controller's footswitches. Unlike FXSW, FXTOG is a toggle switch; pressing down and releasing the switch once sets the modulation to its maximum amount, and doing this again turns the modulation off.
- PEDAL** This receives the MIDI Mod Pedal (Controller #4).
- MIDI 1** This is MIDI Controller 1, which may be assigned to any MIDI Controller on the MIDI Remap page.
- MIDI 2** MIDI Controller 2, like MIDI Controller 1, may be assigned to any MIDI Controller on the MIDI Remap page.
- WH+AT** This is the sum of the Mod wheel and Aftertouch.
- JOYAC** This is the horizontal axis of the Joystick controller, which may be assigned to any MIDI Controller on the MIDI Remap page (in case you don't have a controller with a Joystick); the default is Controller #16.
- JOYBD** The Wavestation Joystick has two axes (that's as in, "the plural of axis," as opposed to, "that large dangerous thing that Jack Nicholson carried around in *The Shining*"); this is the vertical one. The MIDI Remap page allows you to assign it to any incoming MIDI Controller; Controller #17 is the default.

### Amt 3/4

+/- 15. These are the depth of the modulation controller (Mod 3 or 4).

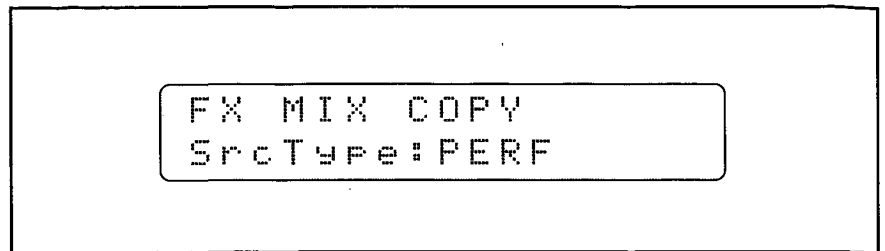
Positive amounts move the mix from left to right or from dry to wet. Negative amounts do the opposite.



## **FX MIX COPY**

*effects mix copy*

*Edit Effects level*



Use this function to copy the Routing and FX MIX parameters between Performances or Multisets.

### **SrcType - Source Type**

The effects may be copied from either a Performance or a Multiset; the default Source Type is that of the current play mode.

### **Src - Source**

This determines the Performance or Multiset from which the effects will be copied. The default source is the current Performance or Multiset.

### **Dst - Destination**

This determines the Performance or Multiset into which the effects will be copied. Unlike the Source Type, the Destination Type is automatically determined by the current play mode; if you're playing Performances, you can only copy into Performances, and if you're playing Multisets, you can only copy into Multisets.

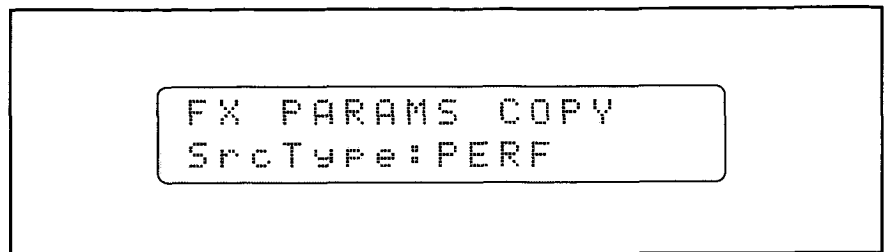
### **Copy Fx Mix?**

When this text is displayed, pressing YES will execute the copy.

## **FX PARAMS COPY**

*effects parameters copy*

*Edit Effects level*



Use this function to copy the effects selection and parameters between effects slots FX1 and FX2, or between different Performances or Multisets.

### **SrcType - Source Type**

The effects may be copied from either a Performance or a Multiset; the default Source Type is that of the current play mode.

### **Src - Source**

This determines the Performance or Multiset from which the effects will be copied. The default source is the current Performance or Multiset.

### **SrcFX - Source Effects**

You can choose to copy the parameters from either Effect 1 or Effect 2.

The default Effect is determined by the page from which you came.

### **Dst - Destination**

This determines the Performance or Multiset into which the effects will be copied. Unlike the Source Type, the Destination Type is automatically determined by the current play mode; if you're playing Performances, you can only copy into Performances, and if you're playing Multisets, you can only copy into Multisets.

### **DstFX - Destination Effects**

You can choose to copy the parameters to either Effect 1 or Effect 2 in the Destination.

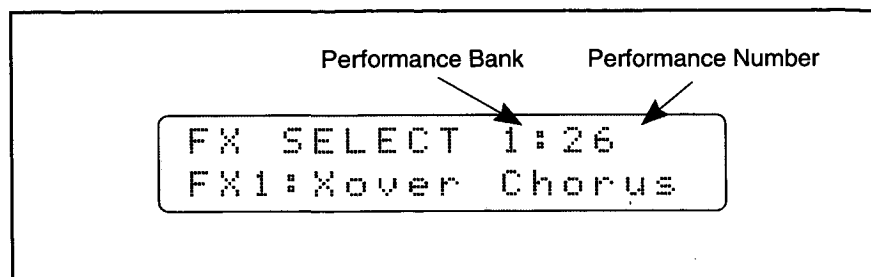
### **Copy FX Params?**

When this text is displayed, pressing YES will execute the copy.

## FX SELECT

*effects select*

*Edit Performance and Edit Multiset levels*



Each Multiset and Performance has a pair of identical effects slots, FX1 and FX2, each of which may use any of the Wavestation SR's 55 effects programs (except for the 2 Stereo Vocoder effects, which take up both slots). These two effects slots can be used together to create a combined effect (in the Series routing), or used independently for two separate effects (in the Parallel routing).

For a general discussion of the effects system, please see Chapter 8, "Effects Tour," in the Player's Guide.

**NOTE:** Performance effects may only be edited when in PERF mode. In MULTI mode, only the Multiset effects may be edited; the Edit Performance level effects pages will not appear.

### *(Performance/Multiset)*

This displays the current Performance or Multiset, to which the effects parameters belong. This information is for your reference only, and cannot be changed on this page.

### FX1/2

These are the effects programs selected for each effects slot. A brief list of the available effects programs is given below; for more details about specific effects, see FX 1/2.

Small Hall, Medium Hall, Large Hall, Small Room, Large Room, Live Stage, Wet Plate, Dry Plate, Spring Reverb (all with EQ)

Early Reflections - EQ 1, 2, and 3

Gated Reverb, Reverse Gate

Stereo Delay, Ping-Pong Delay

Dual Mono Delay

Multi-Tap Delay - EQ 1, 2, and 3

Stereo Chorus - EQ, Quadrature Chorus - EQ, Crossover Chorus - EQ

Harmonic Chorus

Stereo Flanger - EQ 1 and 2, Crossover Flanger - EQ

Enhancer - Exciter - EQ  
 Distortion - Filter - EQ, Overdrive - Filter - EQ  
 Rotary Speaker  
 Stereo Mod-Pan - EQ, Quadrature Mod-Pan - EQ  
 Stereo Parametric EQ  
 Chorus - Stereo Delay - EQ  
 Flanger - Stereo Delay - EQ  
 Dual Mono Delay/Reverb  
 Dual Mono Delay/Chorus  
 Dual Mono Delay/Flanger  
 Dual Mono Delay/Overdrive, Dual Mono Delay/Distortion  
 Dual Mono Delay/Phaser  
 Dual Mono Delay/Rotary Speaker  
 Stereo Pitch Shifter  
 Modulatable Pitch Shifter - Delay  
 Stereo Compressor - Limiter/Gate  
 Small Vocoder 1, 2, 3, and 4  
 Stereo Vocoder 1 and 2

## Routing

Note that the Routing can also be set on the FX MIX page.

**SERIES** means that the output of FX1 goes into FX2, creating a combined effect (such as chorus and reverb).

**PARALLEL** means that FX1 and FX2 work separately, for two different effects (such as distortion on the right side of a keyboard split, and delay on the left).

For more information on effects routing, please see the description of the FX MIX page in this Reference Guide, and Chapter 8, "Effects Tour," in the Player's Guide.

## FXContrlChan - FX Control Channel

This parameter only appears when in MULTI Mode.

Various parameters of the effects can be controlled through the modulation matrix. Since there are 16 complete sets of controllers in MULTI Mode (one for each of 16 MIDI channels), the FX Control Channel sets which one's controllers will be routed to effects modulation.

**NOTE:** The FX Control Channel must be within the range of received MIDI channels, as set by the MIDI page's Basic Channel and Number of Multi Channels parameters.

This parameter sets the MIDI channel that will receive controller data for effects modulation sources. Also, if the MIDI REMAP page's Prog Change to Multi FX parameter is ON, MIDI Program Changes received on this channel will change the effects assigned to the Multiset.

For example, let's assume that the current Multiset's effects are in a Serial

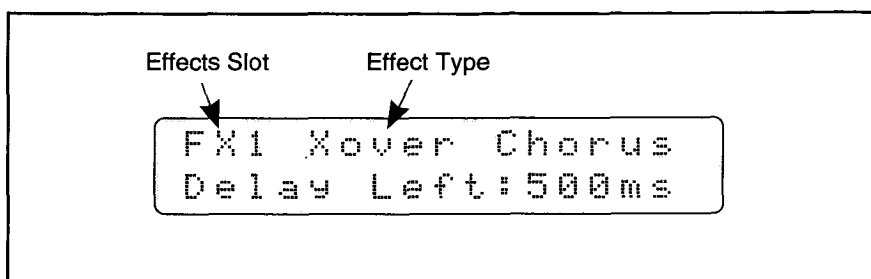
configuration, with Quadrature Chorus as FX1 and Medium Hall as FX2. RAM1 Performance 20 has a Parallel effects configuration, with Distortion-EQ as FX1 and Ping-Pong Delay as FX2. If Prog Change to Multi FX is set to ON, and a Program Change #20 is received on the FX Control Channel, the current Multiset's effects will be changed to a Parallel configuration of Distortion-EQ and Ping-Pong Delay. This allows you to change effects during the course of a piece, without having to change to a different Multiset.

For more discussion of this feature, see Section 11.2 of the Player's Guide, "Guitar Controllers."

## **FX1 (2)**

*edit effect 1 (2)*

*Edit Performance and Edit Multiset levels*



For an introduction to the effects system, please see Chapter 7, "Effects Tour," in the Player's Guide.

FX1 and FX2 each have their own page, and both have access to all of the Wavestation SR's effects types.

**NOTE:** Performance effects may only be edited in PERF mode.

### **(Effects Slot)**

There are 2 effects slots, FX1 and FX2. They are identical, and can each hold one effects type. This is not really a parameter; use the PAGE+ or PAGE- buttons to move between FX1 and FX2.

### **(Effect Type)**

At the right of the top line, the current FX type is displayed. This can only be changed on the Edit Performance level's FX SELECT page (to get there from here, hold down the PAGE+ button and press EDIT, or press PAGE+ repeatedly until you see "EXIT TO PERF LEVEL?" and press +1/YES).

### **(Parameters per Effect)**

The specific parameters on the page vary with the 26 different effects types, as listed below.

#### **EFFECTS MODULATION**

Each effect allows you to modulate some of its parameters in real time. The list of effects modulation sources is slightly different from that of the Patch Macros.

SOURCE DESCRIPTION

NONE When NONE is selected, no modulation is used.

WHEEL This is the MIDI Modulation Wheel.

AT This is Channel Aftertouch (note that, in the Patch modulation matrix, both Polyphonic and Channel Aftertouch are recognized - but as the effects are modulated globally, as opposed

	to on a key-by-key basis, having Polyphonic Aftertouch here wouldn't make much sense).
VEL	This modulation source uses the last Note-On velocity. This value will remain even after the note is released.
KEY	Similar to VEL above, KEY uses the MIDI note number of the highest key currently held down; if none are down, then the last key's number is used.
ENV	This is the combined value of all currently playing amplitude envelopes.
KEYDN	The "key down gate" is useful for making reverb or delay effects instantly vanish (or increase, for that matter) when you stop playing. As long as a key is held down, the maximum modulation amount is in effect; when no keys are held down, the modulation stops.
FXSW	This is the Effects Switch, which may be assigned to any MIDI Controller on the MIDI Remap page (the default is Controller #12). It is meant to be used with one of your controller's footswitches. When the footswitch is held down, the modulation is at its maximum amount; when it is released, the modulation stops.
FXTOG	Like FXSW above, FXTOG also receives the Effects Switch, and is meant to be used with one of your controller's footswitches. Unlike FXSW, FXTOG is a toggle switch; pressing down and releasing the switch once sets the modulation to its maximum amount, and doing this again turns the modulation off.
PEDAL	This receives the MIDI Mod Pedal (Controller #4).
MIDI 1	This is MIDI Controller 1, which may be assigned to any MIDI Controller on the MIDI Remap page.
MIDI 2	MIDI Controller 2, like MIDI Controller 1, may be assigned to any MIDI Controller on the MIDI Remap page.
WH+AT	This is the sum of the Mod wheel and Aftertouch.
JOYAC	This is the horizontal axis of the Joystick controller, which may be assigned to any MIDI Controller on the MIDI Remap page (in case you don't have a controller with a Joystick); the default is Controller #16.
JOYBD	The Wavestation Joystick has two axes (that's as in, "the plural of axis," as opposed to, "that large dangerous thing that Jack Nicholson carried around in The Shining"); this is the vertical one. The MIDI Remap page allows you to assign it to any incoming MIDI Controller; Controller #17 is the default.

### **WAVESTATION SR EFFECTS**

Here is a descriptive list of the Wavestation SR's effects programs. There are 55 programs, which are variations upon approximately 26 basic effects types. Each effect type has its own set of parameters - the effects programs are, in effect, macros for each of the 26 effect types.

## NO EFFECT

### No Effect

Use this setting when no effect is desired for either FX1 or FX2.

## REVERB - EQ

These effects simulate reverberation, adding ambience or spaciousness to a sound. The inputs are summed, equalized, and sent to the reverb. Reverb output mixes with the dry input.

In general, use reverb in moderation; excessive wetness tends to blur the sound.

### Small Hall - *Small hall reverb - EQ*

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

### Medium Hall - *Medium hall reverb - EQ*

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

### Large Hall - *Large hall reverb - EQ*

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

### Small Room - *Small room reverb - EQ*

A light, tight room good for thickening.

### Large Room - *Large room reverb - EQ*

A warm, tight room.

### Live Stage - *Live stage - EQ*

A dense, tight room.

### Wet Plate - *Wet plate reverb - EQ*

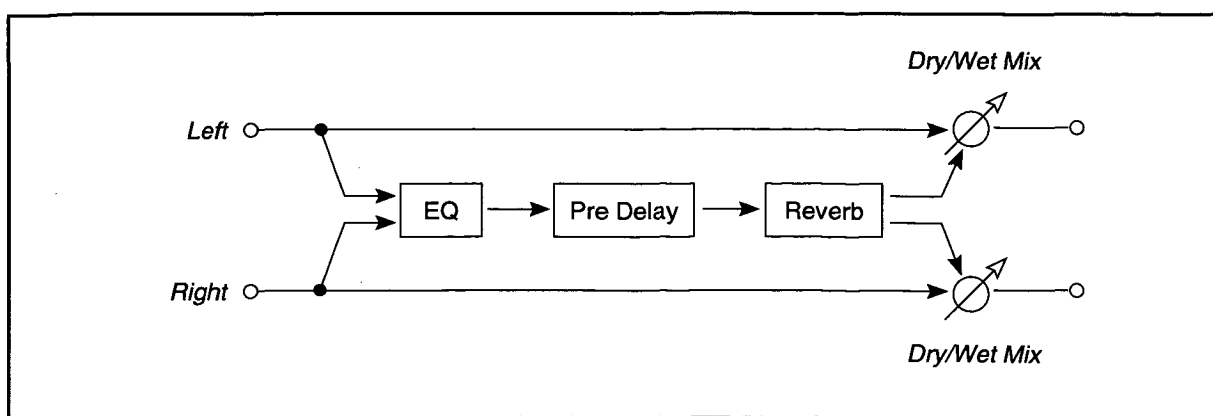
A dense, open plate.

### Dry Plate - *Dry plate reverb - EQ*

A light, open plate.

### Spring Reverb - *Spring reverb - EQ*

Resonant springs.





**Dry/Wet Mix**

DRY, 99/1,...1/99, WET. The output balance of processed and unprocessed sound.

**MixMod - Dry/Wet Mix Modulation**

Mod source and amount (-15 to +15).

**Pre Delay**

0 to 400 ms (except for the Large Hall, which is 0 to 190ms). Time delay between the direct sound and the first early reflections. To lengthen the hall, increase this parameter.

**Decay Time**

0 to 99. Time before reverberation decays. The lower the value, the shorter the decay time.

**Early Reflect - Early Reflection Level**

0 to 10. Level of early reflections.

**HiFreq Damping - High Frequency Damping**

0 to 99. 0 gives you the "liveliest" room; the larger the value, the faster the high frequencies are damped (in other words, the deader the room.)

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies. EQ affects reverb only, not direct signal.

**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies. EQ affects reverb only, not direct signal.

---

## EARLY REFLECTIONS

Early Reflection is an effect that allows you to adjust only the early reflections of reverberation, which are crucial in determining the realism of the sound as it would be heard in an actual room, separate from the reverberant "wash." Adjustment of the Decay Time permits a wide range of effects, such as adding density to the sound or achieving a "live" room sound with more discrete echoes and reflections.

Following an Early Reflections program with reverb (using the Series routing) gives especially high-quality reverberation.

**EarlyReflec1 - Early reflections - EQ 1**

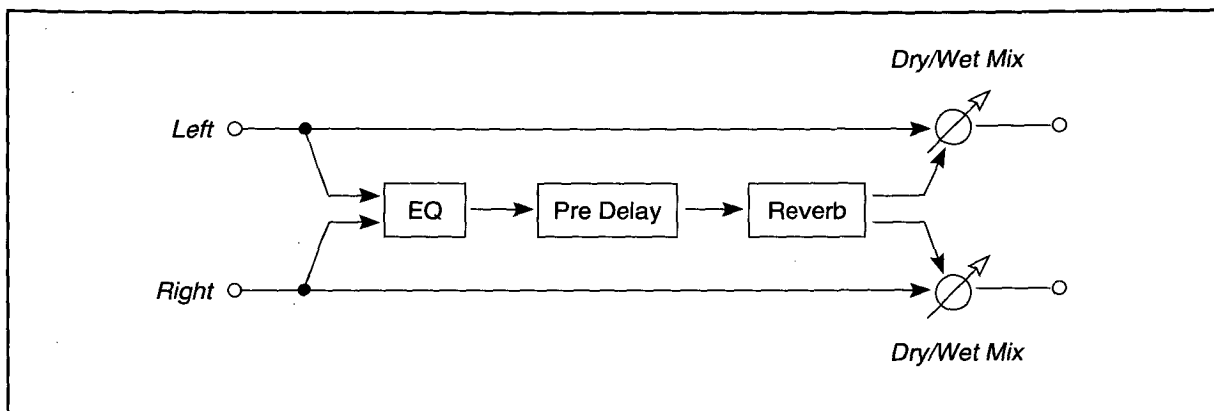
This program creates dense early reflection patterns, with a normal fade-out.

**EarlyReflec2 - Early reflections - EQ 2**

The early reflection levels in this effect are controlled by an envelope which first fades out, and then fades in again.

### EarlyReflec3 - Early reflections - EQ 3

This effect uses a reverse envelope on the early reflections. The reverse effect (similar to a tape recorder being played backwards) can be applied to sounds which have strong attack characteristics, such as cymbals, or to produce "new age" drones.



#### Dry/Wet Mix

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

#### MixMod - Dry/Wet Mix Modulation

Mod source and amount (-15 to +15)

#### Pre Delay

0 to 200 ms. Time between the direct sound and the first early reflections.

#### Decay Time

10 - 800 ms (in 10 ms steps). Decay time for the early reflections.

#### EQ Low

-12 to +12 dB. Control for cutting or boosting the low frequencies.  
EQ affects reflections only, not direct signal.

#### Hi - EQ High

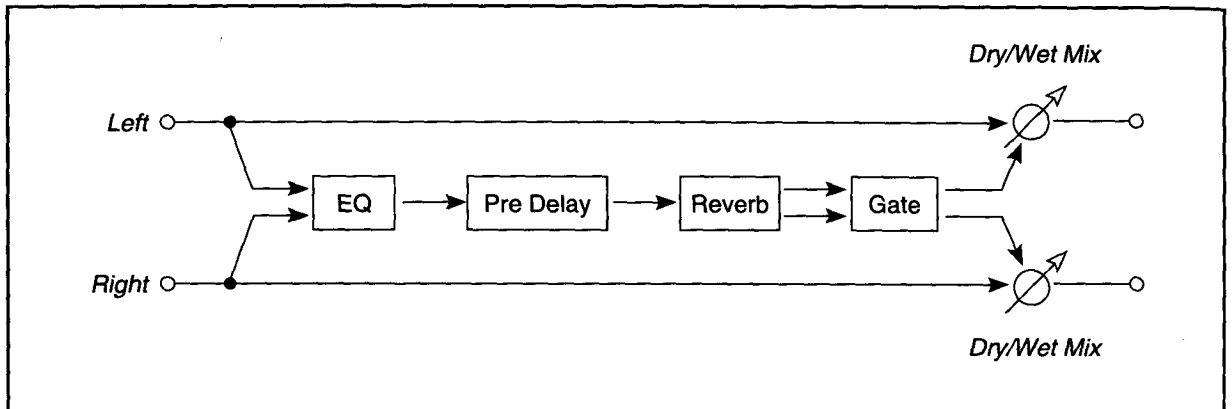
-12 to +12 dB. Control for cutting or boosting the high frequencies.  
EQ affects reflections only, not direct signal.

## GATED REVERB

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

**Gated Reverb - Forward gated reverb**

**Reverse Gate - Reverse gated reverb**



### Dry/Wet Mix

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

### Pre Delay

0 to 200 ms. Time between the direct sound and the first early reflections.

### Decay Time

10 - 800 ms (in 10 ms steps). Decay time for the early reflections.

### GatHldTime - Gate Hold Time

0 to 800 ms (in 10 ms steps). The time the gate will remain open after the modulation source goes below the threshold.

### Gate Key - Gate Key Source

Mod source. The default is KEYDN, so that the gate will always be open while a note is held, and then for a set period (the Gate Hold Time) afterwards. Try using other modulators for interesting real-time effects.

For instance, you could use Velocity (VEL) with a Gate Threshold of 90 or so for a drum kit Performance, so that the reverb effect is only heard at very high velocities.

### Gate Thresh - Gate Threshold

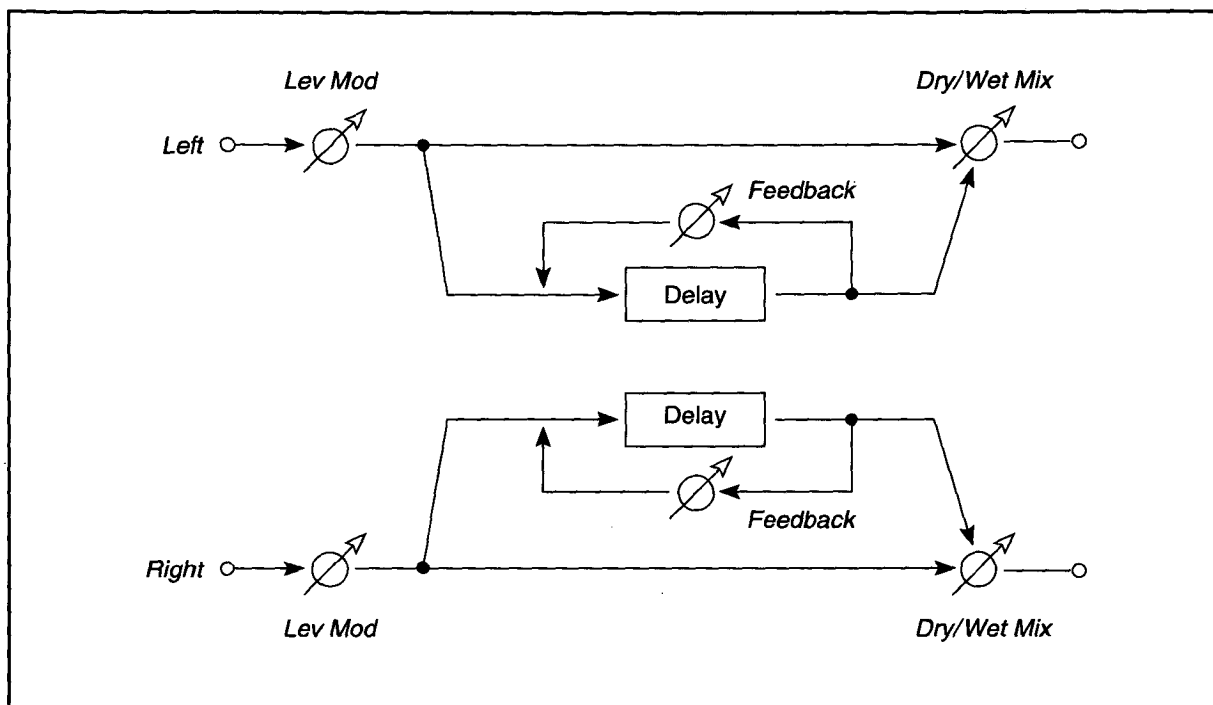
0 - 100. The level at which the gate will open.

## STEREO DELAY

A stereo delay in which the left and right channel delay times are synchronized to one of 43 fixed ratios. The input level can be modulated for swell-in/out delay effects. All parameters except delay time are set to the same value for the two delays.

### Stereo Delay

A stereo delay effect using two delay systems, each of which has a feedback circuit that sends part of the sound back to the delay again.



### Dry/Wet Mix

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

### MixMod - Dry/Wet Mix Modulation

Mod source and amount (-15 to +15)

### LevMod - Input Level Modulation

Mod source and amount (-15 to +15). Positive-going modulation swells effect in; negative-going modulation fades effect out. Negative mod amount values invert modulation so that positive-going modulation fades effect out, and vice-versa.

### Delay Time

0 to 500 ms.

### DelayMod - Delay Time Modulation

Mod source and amount (-15 to +15).

## L/R DlyFact - Left/Right Delay Factor

The left/right delay factor sets the ratio of the left side delay to the right side delay, relative to the Delay Time set above. For example, the factor 3:5 equals the fraction  $3/5$ , or 0.6, so the relationship of the delay times is: left = (Delay Time)  $\times$  0.6, right = (Delay Time)  $\times$  1. Conversely, 5:3 means the relationship is: left = (Delay Time)  $\times$  1, right = (Delay Time)  $\times$  0.6.

The 43 ratios are listed below (each ratio has a reciprocal, except 1:1):

1: 1, 2, 3, 4, 5, 6, 7, 8

2: 3, 5, 7

3: 4, 5, 7, 8

4: 5, 7

5: 6, 7, 8

6: 7

7: 8

## Feedback

-100 to +100.

Amount of feedback (negative values produce inverted phase).

---

## PING-PONG DELAY

Similar to the Stereo Delay above, this effect uses two delay lines whose times are synchronized to one of 43 different ratios (all other parameters of the two delays are set identically). In/out swelling effects can be created by modulating the delay's input level.

### PingPong Dly - Ping-pong delay

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

## Dry/Wet Mix

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

## MixMod - Dry/Wet Mix Modulation

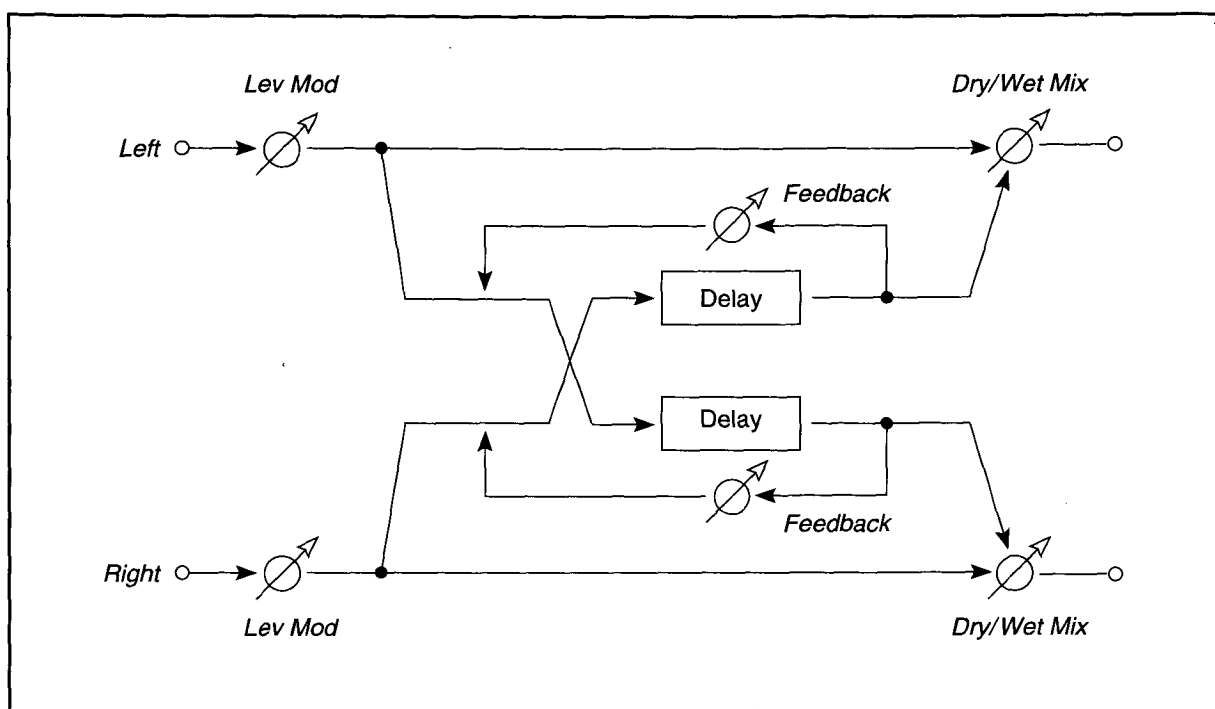
Mod source and amount (-15 to +15)

## LevMod - Input Level Modulation

Mod source and amount (-15 to +15). Positive-going modulation swells effect in; negative-going modulation fades effect out. Negative mod amount values invert modulation so that positive-going modulation fades effect out, and vice-versa.

## Delay Time

0 to 500 ms.



### DlyMod - Delay Time Modulation

Mod source and amount (-15 to +15).

### L/R DlyFact - Left/Right Delay Factor

The left/right delay factor sets the ratio of the left side delay to the right side delay, relative to the Delay Time set above. For example, the factor 3:5 equals the fraction  $3/5$ , or  $0.6$ , so the relationship of the delay times is: left = (Delay Time)  $\times$   $0.6$ , right = (Delay Time)  $\times$   $1$ . Conversely, 5:3 means the relationship is: left = (Delay Time)  $\times$   $1$ , right = (Delay Time)  $\times$   $0.6$ .

The 43 ratios are listed below (each ratio has a reciprocal, except 1:1):

1: 1, 2, 3, 4, 5, 6, 7, 8

2: 3, 5, 7

3: 4, 5, 7, 8

4: 5, 7

5: 6, 7, 8

6: 7

7: 8

### Feedback

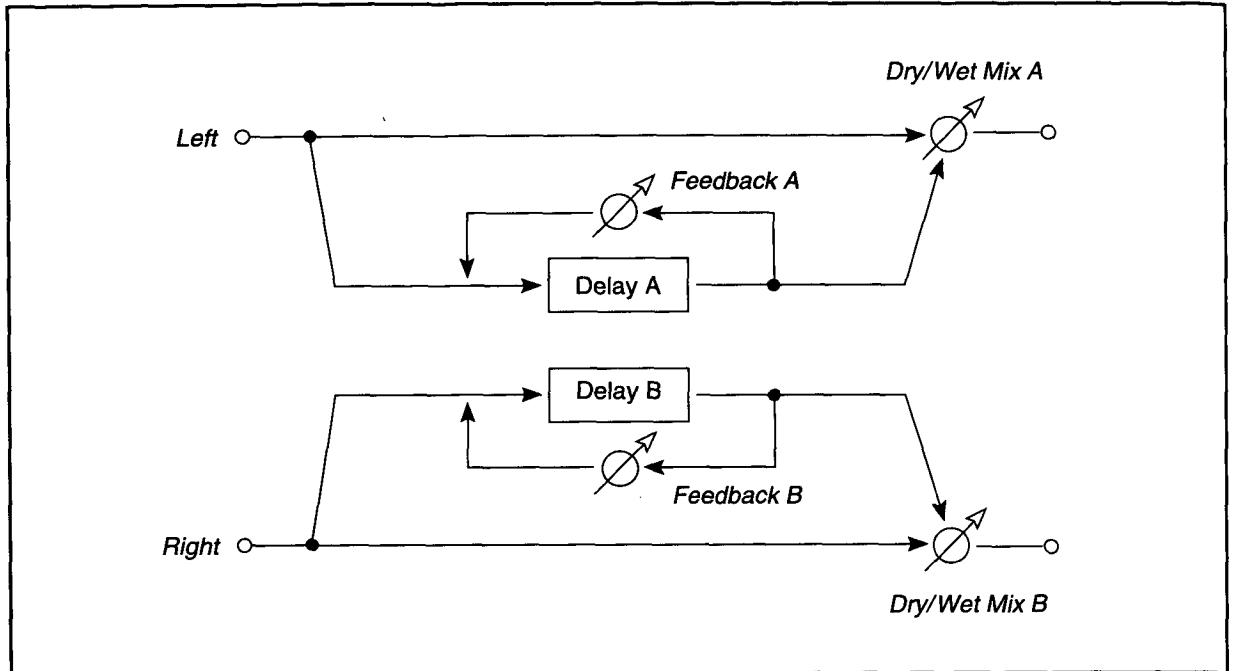
-100 to +100.

Amount of feedback (negative values produce inverted phase).

## DUAL MONO DELAY

### Dual mono delay

Two separate, parallel delays.



#### Dry/Wet Mix A (left)

DRY, 9/1,...1/9, WET.

#### Delay Time A (left)

0 to 500 ms. The time between processed and unprocessed sound.

#### Feedback A (left)

-100 to +100. Amount of feedback (negative values produce inverted phase). In effect, this is the number of delay repeats.

#### Dry/Wet Mix B (right)

DRY, 9/1,...1/9, WET.

#### Delay Time B (right)

0 to 500 ms. Time between processed and unprocessed sound.

#### Feedback B (right)

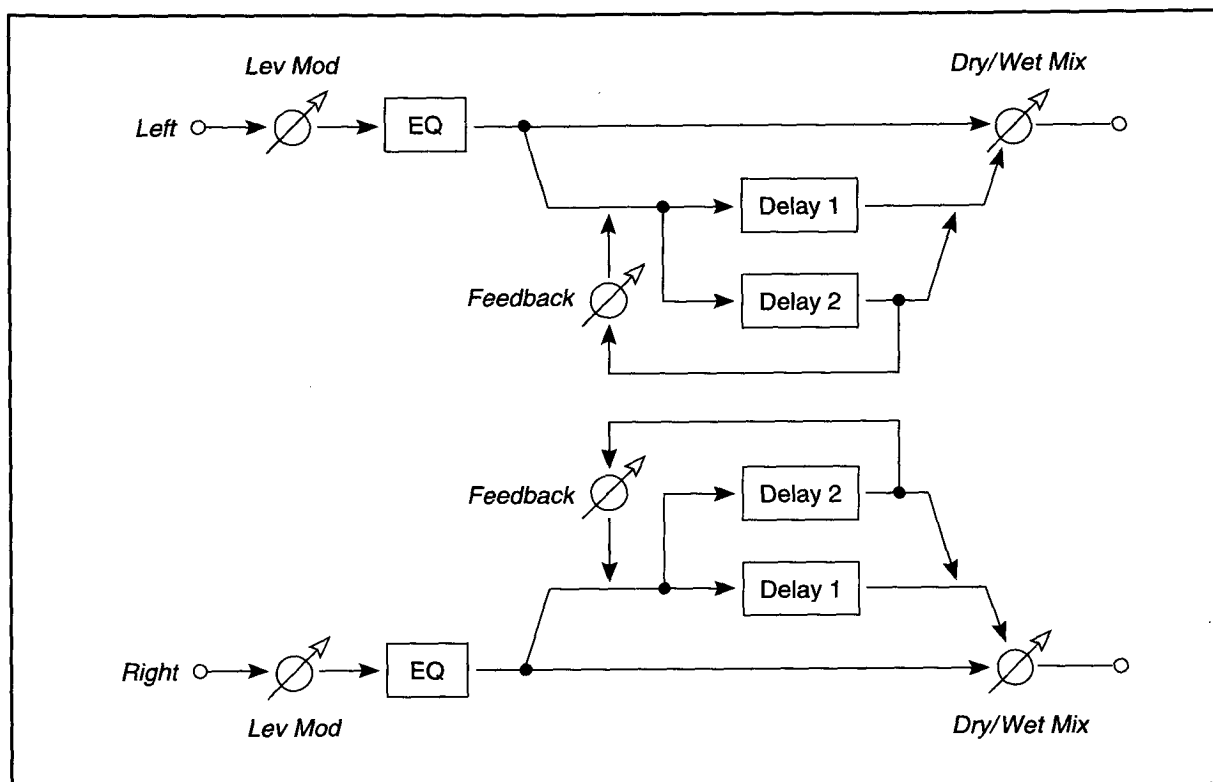
-100 to +100.

## MULTI - TAP DELAY - EQ 1

Each effect input is equalized and then delayed by two independent, stereo series delays. The output of the second delay is fed back into the input. The input level can be modulated for swell-in/out delay effects.

### Multi-Tap 1 - Multi-tap delay - EQ 1

Two multi-repeat, parallel delays.



### Dry/Wet Mix

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

### MixMod - Dry/Wet Mix Modulation

Mod source and amount (-15 to +15).

### LevMod - Input Level Modulation

Mod source and amount (-15 to +15). Positive-going modulation swells effect in; negative-going modulation swells the effect out. Negative amounts invert modulation, so that positive-going modulation swells the effect out, and vice-versa.

### Delay Time 1

0 to 500 ms.

### Delay Time 2

0 to 500 ms.



**Feedback**

-100 to +100. Amount of feedback (negative values produce inverted phase).

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.

**Hi - EQ High**

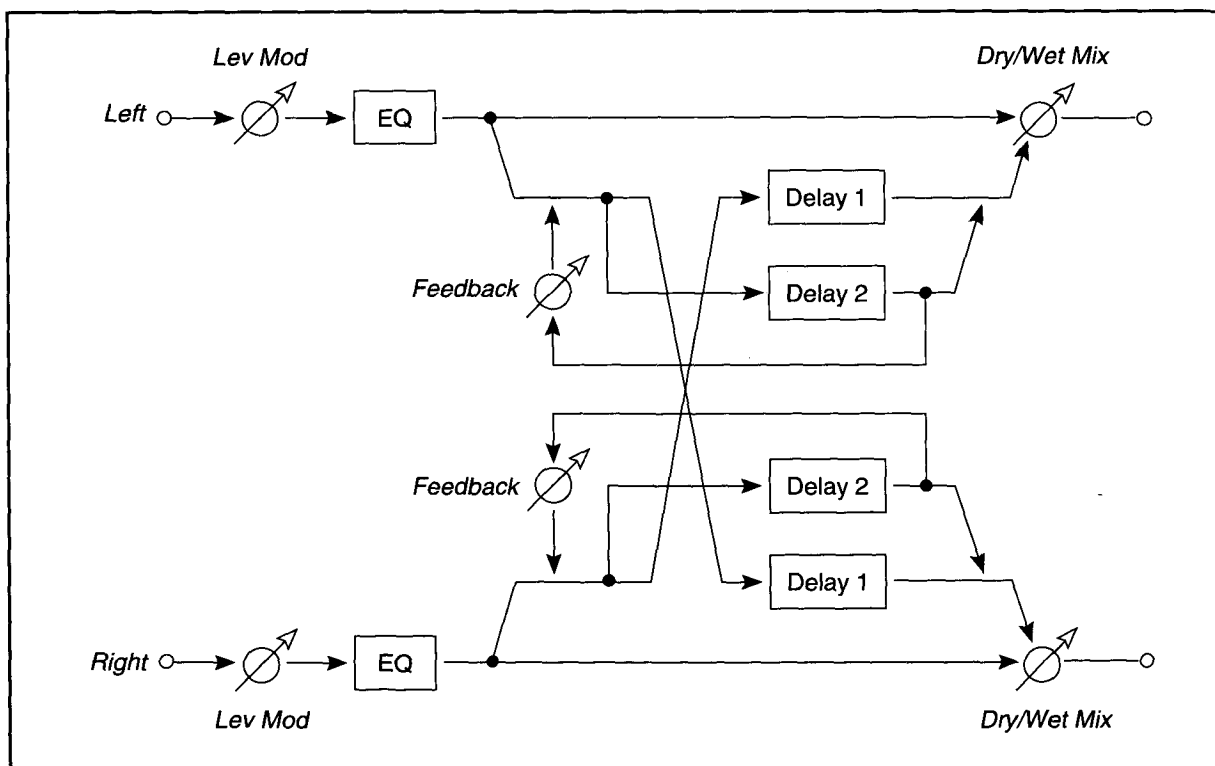
-12 to +12 dB. Control for cutting or boosting the high frequencies. EQ affects both the wet and dry signals.

**MULTI - TAP DELAY - EQ 2**

Each effect input is equalized and then delayed by two independent, stereo series delays. The output of the second delay is fed back into the input. The input level can be modulated for swell-in/out delay effects.

**Multi-Tap 2 - Multi-tap delay - EQ 2**

Two multi-repeat, parallel delays with cross panning.



**Dry/Wet Mix**

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

**MixMod - Dry/Wet Mix Modulation**

Mod source and amount (-15 to +15).

**LevMod - Input Level Modulation**

Mod source and amount (-15 to +15). Positive-going modulation swells effect in; negative-going modulation swells the effect out. Negative amounts invert modulation, so that positive-going modulation swells the effect out, and vice-versa.

**Delay Time 1**

0 to 500 ms.

**Delay Time 2**

0 to 500 ms.

**Feedback**

-100 to +100. Amount of feedback (negative values produce inverted phase).

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.

**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies. EQ affects both the wet and dry signals.

---

**MULTI - TAP DELAY - EQ 3**

Each effect input is equalized and then delayed by two independent, stereo series delays. The output of the second delay is fed back into the input. The input level can be modulated for swell-in/out delay effects.

**Multi-Tap 3 - Multi-tap delay - EQ 3**

Two multi-repeat, parallel delays with crossover feedback.

**Dry/Wet Mix**

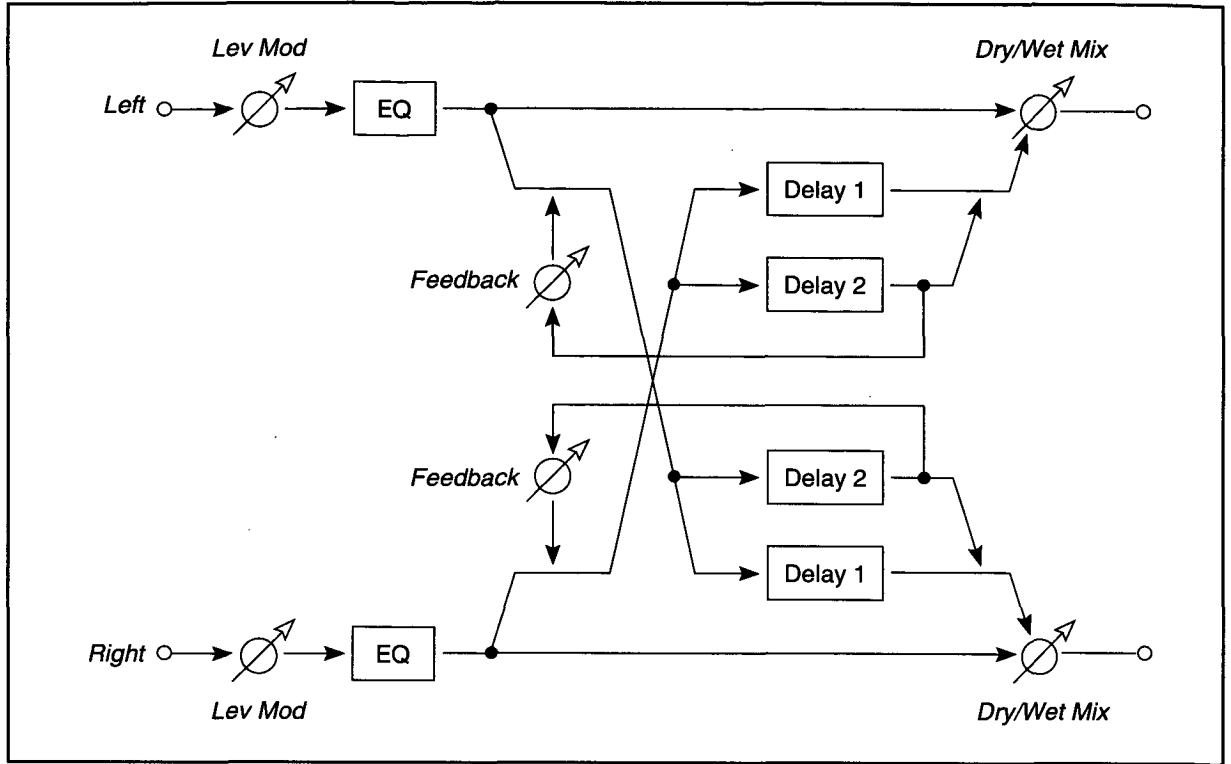
DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound.

**MixMod - Dry/Wet Mix Modulation**

Mod source and amount (-15 to +15).

**LevMod - Input Level Modulation**

Mod source and amount (-15 to +15). Positive-going modulation swells effect in; negative-going modulation swells the effect out. Negative amounts invert modulation, so that positive-going modulation swells the effect out, and vice-versa.



**Delay Time 1**

0 to 500 ms.

**Delay Time 2**

0 to 500 ms.

**Feedback**

-100 to +100. Amount of feedback (negative values produce inverted phase).

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.

**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies. EQ affects both the wet and dry signals.

## STEREO CHORUS - EQ

A chorus is a medium-range delay line (20 - 50 ms), with slight modulation of the delay time.

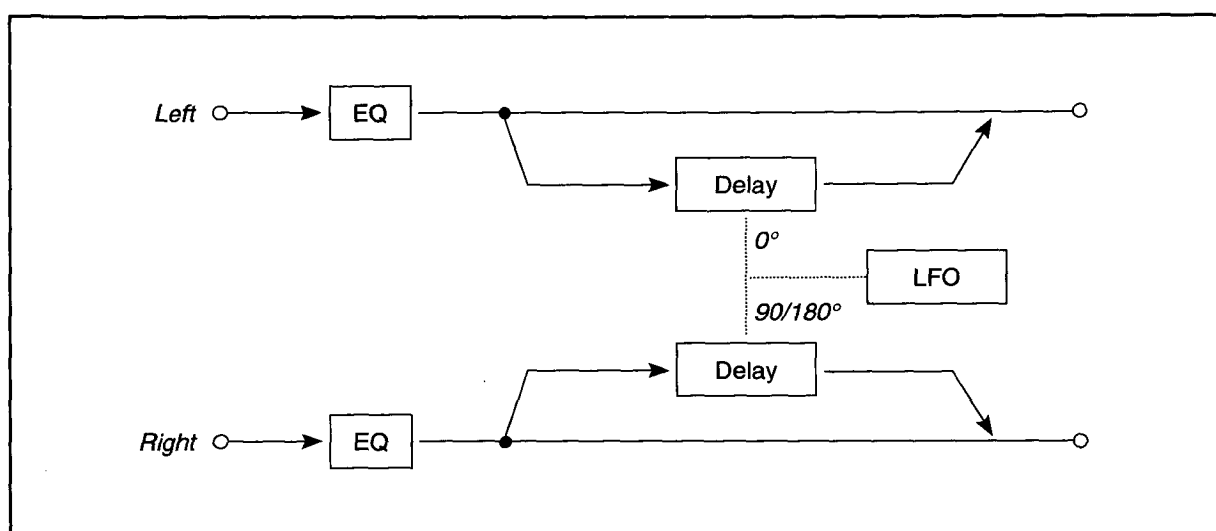
This stereo effect combines two chorus circuits and imparts a natural, warm, and "fat" character to any instrument sound. It is particularly effective with piano, strings, and brass.

### **StereoChorus - Stereo chorus - EQ**

A stereo effect that combines two parallel chorus circuits using LFOs which have an inverted phase relationship (180°).

### **Quad Chorus - Quadrature chorus - EQ**

Two parallel chorus circuits using quadrature-phased LFOs (sometimes described as "phase offset" LFOs). These LFOs are 90° out of phase.



### **Footswitch**

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.

### **Delay Left - Delay Time Left**

0 to 500 ms. Time between processed and unprocessed sound.

### **Delay Right - Delay Time Right**

0 to 500 ms. Time between processed and unprocessed sound.

### **LFO Rate**

0.03-30 Hz. Speed of modulation (frequency).

### **LFOMod - LFO Rate Modulation**

Mod source and amount (-15 to +15).

### **LFO Depth**

0 to 100.

**LFO Shape**

TRI, SIN, -10 to +10. Selection of modulation waveform. Numeric values determine wave symmetry.

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies.  
EQ affects both the wet and dry signals.

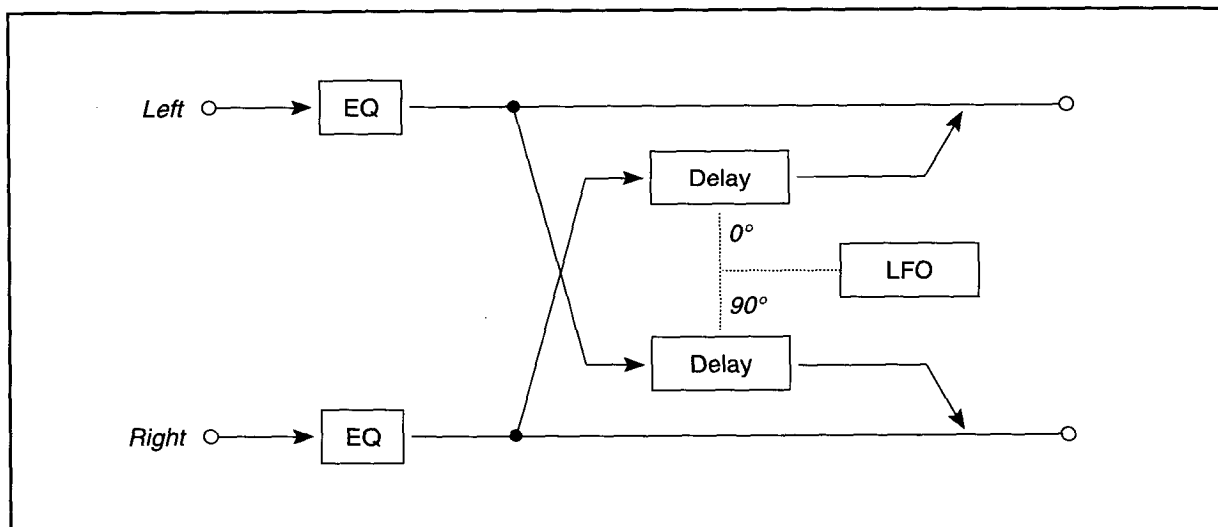
**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies.  
EQ affects both the wet and dry signals.

**CROSSOVER CHORUS - EQ**

**XOver Chorus - Crossover chorus - EQ**

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



**Footswitch**

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.

**Delay Left - Delay Time Left**

0 to 500 ms. Time between processed and unprocessed sound.

**Delay Right - Delay Time Right**

0 to 500 ms. Time between processed and unprocessed sound.

**LFO Rate**

0.03-30 Hz. Speed of modulation (frequency).

**LFOMod - LFO Rate Modulation**

Mod source and amount (-15 to +15).

**LFO Depth**

0 to 100.

**LFO Shape**

TRI, SIN, -10 to +10. Selection of modulation waveform. Numeric values determine wave symmetry.

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies.  
EQ affects both the wet and dry signals.

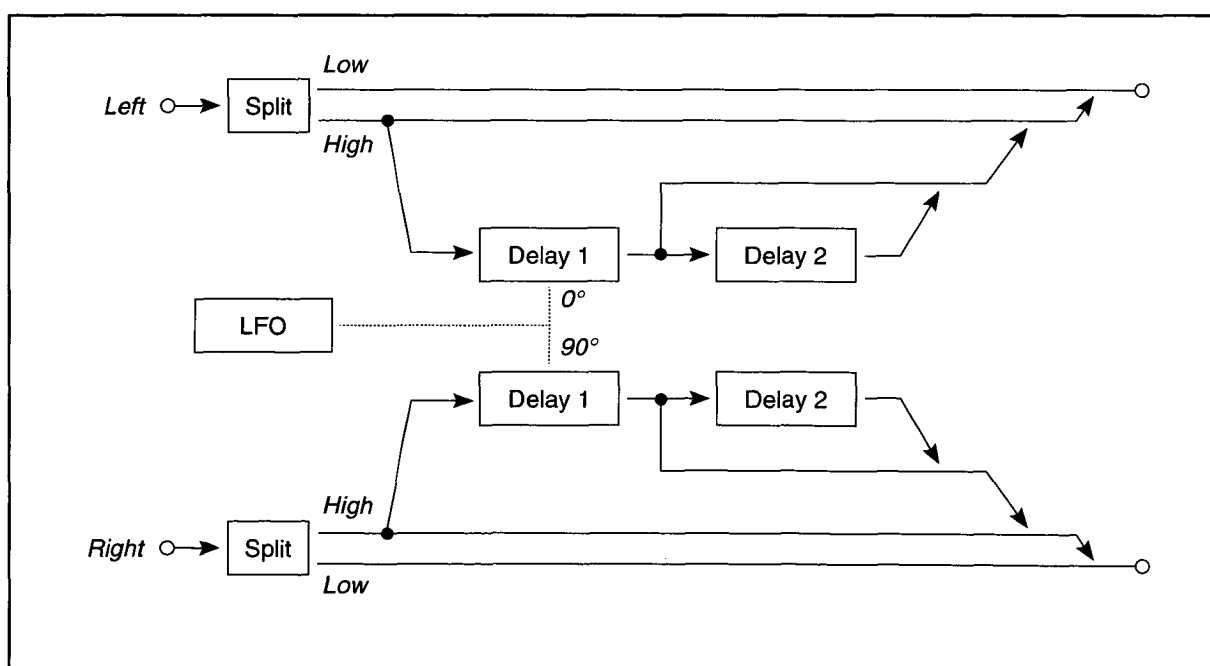
**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies.  
EQ affects both the wet and dry signals.

## HARMONIC CHORUS

**HarmonicChor - Harmonic chorus**

The harmonic chorus is a stereo chorus with 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. This is especially effective for bass and other low frequency sounds.

**Footswitch**

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on

or off.

**Delay Left - *Delay Time Left***

0 to 500 ms. Time between processed and unprocessed sound.

**Delay Right - *Delay Time Right***

0 to 500 ms. Time between processed and unprocessed sound.

**LFO Rate**

0.03-30 Hz. Speed of modulation (frequency).

**RteMod - *LFO Rate Modulation***

Mod source and amount (-15 to +15).

**LFO Depth**

0 to 100.

**DepMod - *LFO Depth Modulation***

Mod source and amount (-15 to +15).

**Split Point**

160 Hz to 10 kHz.

---

## STEREO FLANGER - EQ

This effect is achieved by using shorter delay times and adding feedback and output mix phase inversion to the chorus. Since its pronounced swirling adds color and motion, it is most effective with sounds that have many harmonics, such as lead sounds.

**Flanger 1- *Stereo flanger - EQ 1***

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

**Flanger 2 - *Stereo flanger - EQ 2***

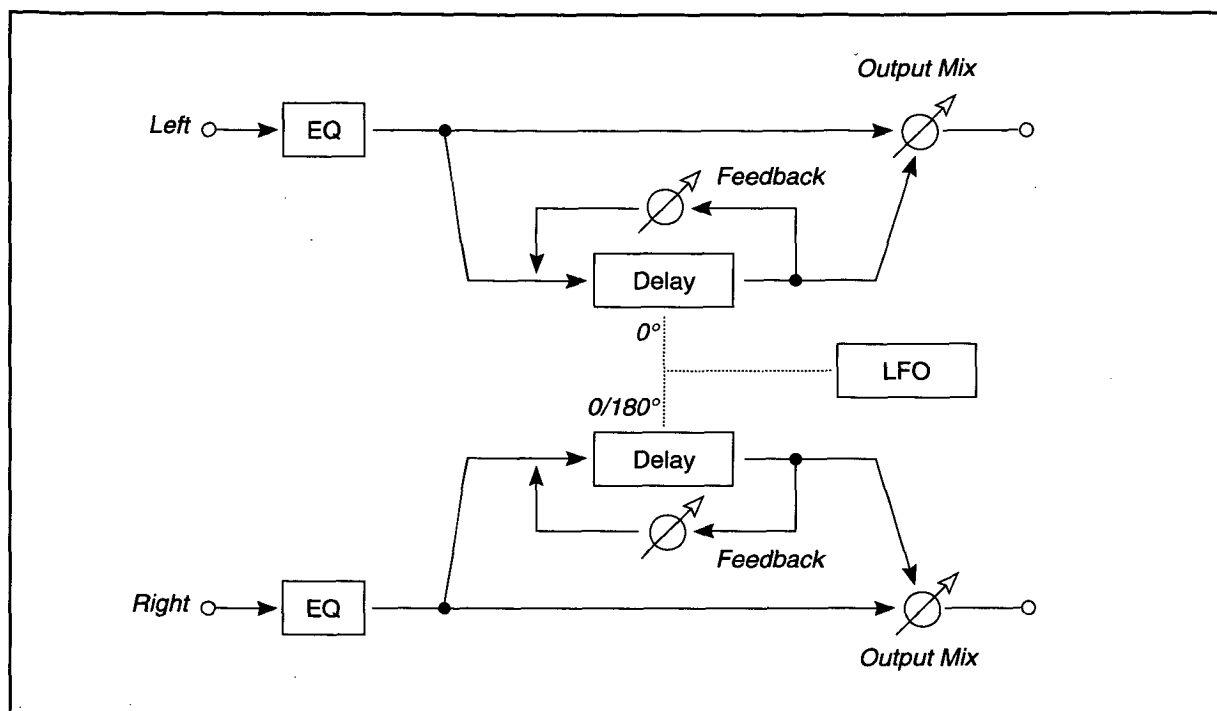
In this program, the expansive stereo swirling and swishing effect is enhanced by the two flanger circuits' phase-inverted LFOs.

**Footswitch**

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.

**Top Delay**

0 to 200 ms.

**Range**

0 to 100. LFO sweep range.

**Ramp Speed**

Manual, 1 to 100. If set to Manual, the mod source directly controls the flanger.

**SpdMod - Ramp Speed Modulation**

Mod source and amount (-15 to +15).

**Output Mix**

-10 to +10. Output balance of direct and delayed sound. Negative values produce inverted phase.

**Resonance**

-100 to +100. Amount of flanger feedback.

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.

**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies. EQ affects both the wet and dry signals.

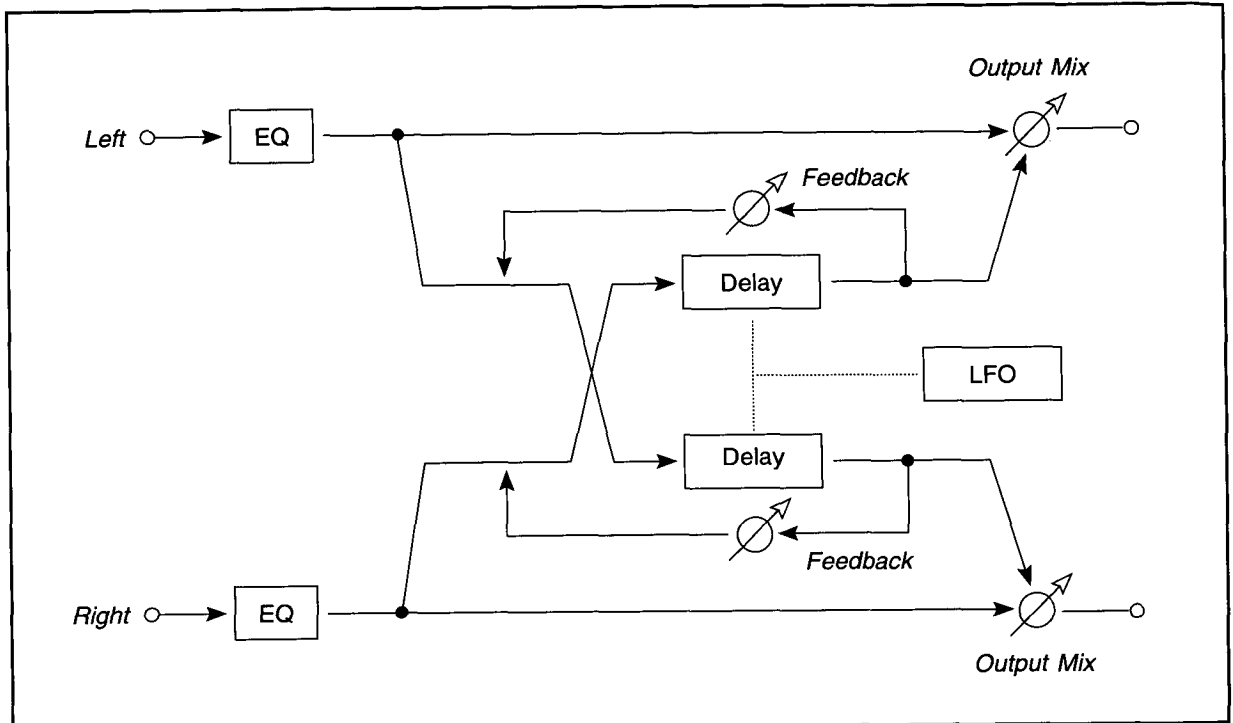


## CROSSOVER FLANGER - EQ

### XOver Flange - Crossover flanger - EQ

A flanger effect in which the feedback signal of each flanger circuit crosses over and is routed to the other flanger.

Crossover flanger uses phase-synchronous LFOs.



#### Footswitch

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.

#### Top Delay

0 to 200 ms.

#### Range

0 to 100. LFO sweep range.

#### Ramp Speed

Manual, 1 to 100. If set to Manual, the mod source directly controls the flanger.

#### SpdMod - Ramp Speed Modulation

Mod source and amount (-15 to +15).

#### Output Mix

-10 to +10. Output balance of direct and delayed sound. Negative values produce inverted phase.

**Resonance**

-100 to +100. Amount of flanger feedback.

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies.

EQ affects both the wet and dry signals.

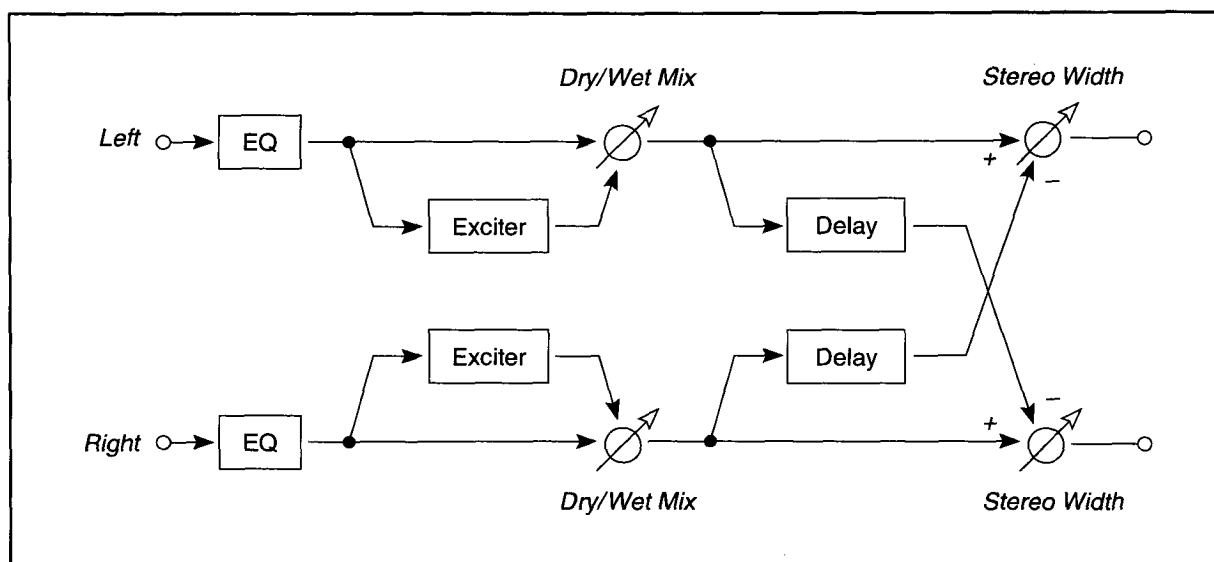
**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies.

EQ affects both the wet and dry signals.

**ENHANCER - EXCITER - EQ**

This stereo effect offers two parallel exciters with spatial delays. The exciter increases the clarity of the sound, gives it greater definition and presence, and helps bring the effected sound to the forefront.

**Enhance/Xcit - Enhancer - Exciter - EQ****Dry/Wet Mix**

DRY, 9/1,...1/9, WET. Output balance of excited and original sound.

**Excitation**

0 to 100. Amount of excitation.

**Hot Spot**

1 to 20. Central frequency emphasized by exciter.

**Stereo Width**

0 to 100. Level of inverted delay crossover.

**X-Over Delay**

1 to 100. Crossover delay time, in 32 microsecond increments.

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies.  
EQ affects both the wet and dry signals.

**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies.  
EQ affects both the wet and dry signals.

**DISTORTION - FILTER - EQ**

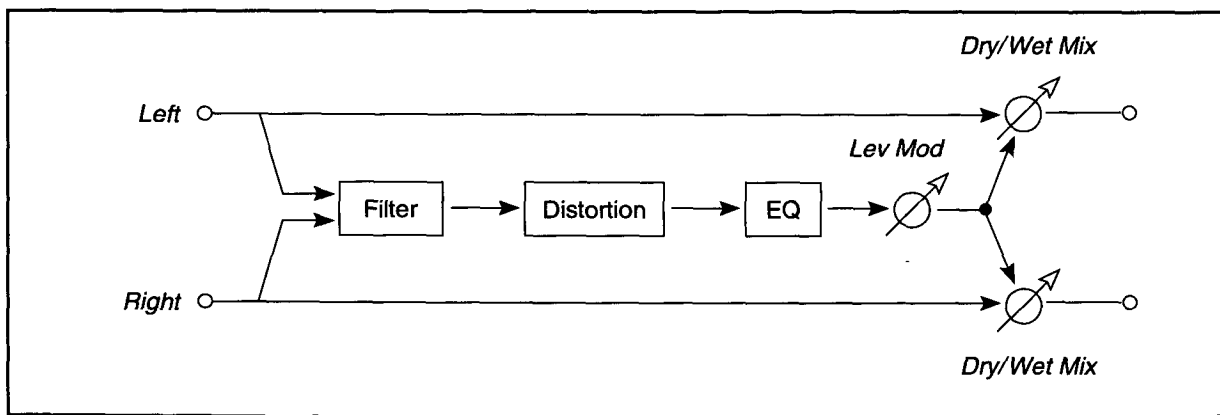
The amount of Distortion/Overdrive is related to the level of the input signal. Using MIDI Volume to change the level of a Performance with these effects will thus also change its timbre. To change the volume of a distorted/overdriven Performance without altering its timbre, use the Level modulation parameter instead.

**Distortion - Distortion - Filter - EQ**

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

**Overdrive - Overdrive - Filter - EQ**

This is an effect that simulates the overdrive generally used by guitars, and is particularly effective when applied to organs and electric pianos to create guitar-like lines and solos. It also has a "wah" effect.



**Dry/Wet Mix**

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound.

**Footswitch**

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.

**Edge**

1 to 111. Amount of drive.

**Hot Spot**

0 to 100. Controls the center frequency of the “wah” filter. Try modulating this parameter with a pedal or mod wheel for the classic “wah-wah” effect.

**HotMod - Hot Spot Modulation**

Mod source and amount (-15 to +15).

**Resonance**

0 to 100. Filter “Q” factor. This controls the amount of “wah” effect.

**Output Level**

0 to 100. Output level of the effect.

**LevMod - Output Level Modulation**

Mod source and amount (-15 to +15).

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies. EQ is applied to the wet signal only; the direct signal is unaffected.

**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies. EQ is applied to the wet signal only; the direct signal is unaffected.

---

## STEREO PHASER

The stereo phase shifter programs offer two parallel phasers. These use both time delay and phase shifting to create a more pronounced swirling and swishing sound than either chorus or flanger. They are especially effective on electronic piano and guitar sounds.

**Phaser 1 - Stereo phaser 1**

Phaser 1 uses phase-synchronous LFOs.

**Phaser 2 - Stereo phaser 2**

Phaser 2 uses phase-inverted LFOs.

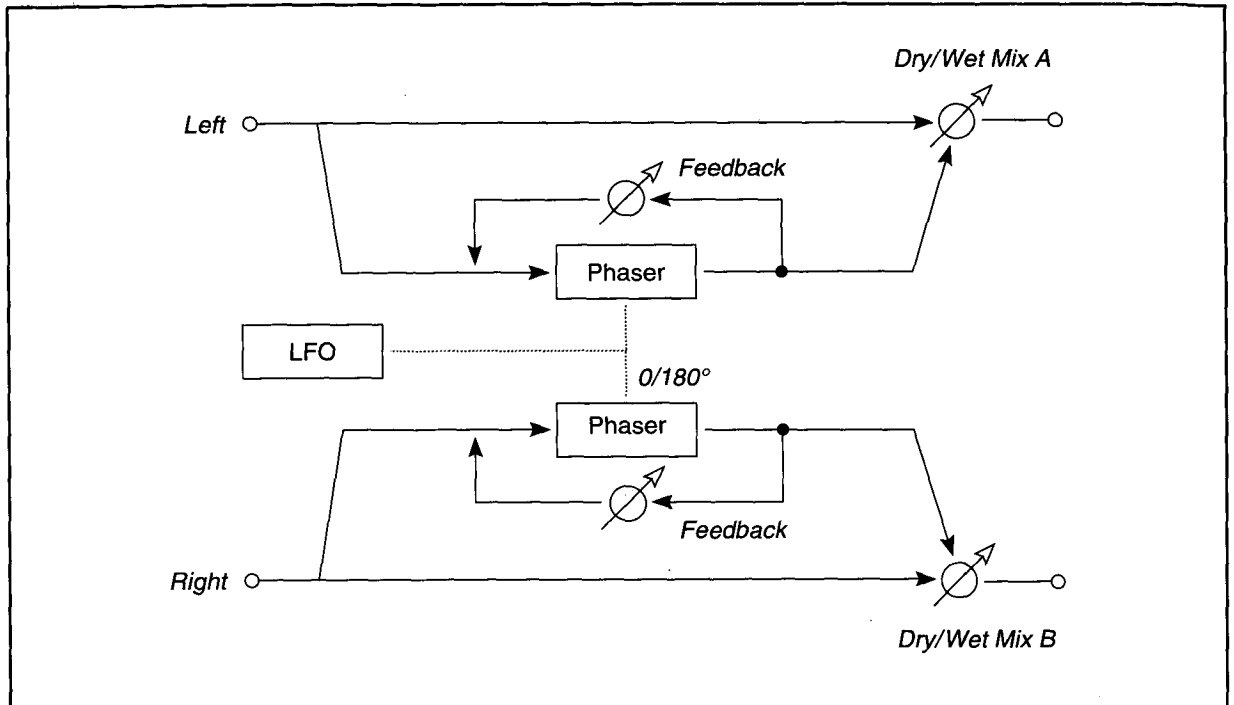
**Dry/Wet Mix**

-WET, -1/9,...,-9/1, DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound.

Negative values produce inverted phase.

**Footswitch**

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.



**Center Freq - Center Frequency**

0 to 100. Center frequency which is affected by the phase shift.

**LFO Rate**

FIXED, 0.03-30 Hz. Speed of modulation (frequency).

When LFO rate is set to FIXED, the LFO depth is disabled (set to zero internally) and the LFO rate mod source controls the phaser center. This lets you manually sweep the phase shifter center point.

**RteMod - LFO Rate Modulation**

Mod source and amount (-15 to +15).

**LFO Depth**

0 to 100.

**DepMod - LFO Depth Modulation**

Mod source and amount (-15 to +15).

**Feedback**

-100 to +100. Amount of feedback (negative values produce inverted phase).

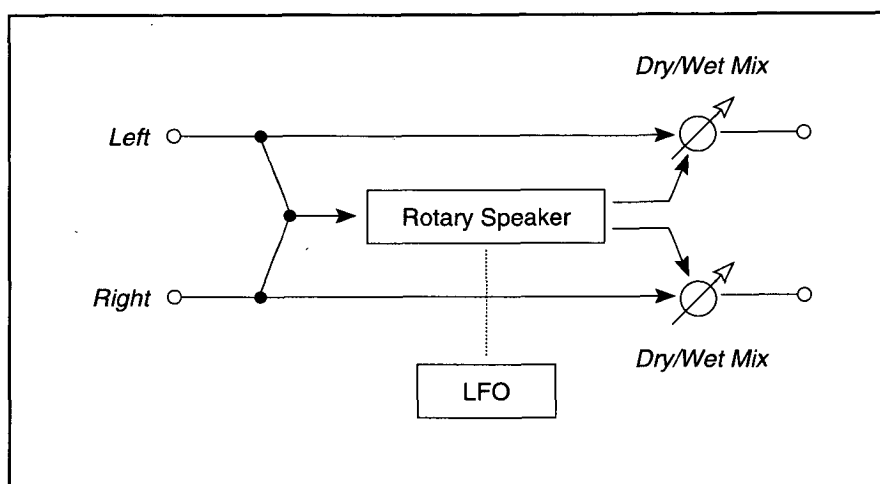
## ROTARY SPEAKER

This stereo effect duplicates the rotating speaker effect popular for organ sounds.

### Rotary Spkr - *Rotary speaker*

The "speaker" is modulated by a free running LFO; you can use a mod source to switch between the programmable slow and fast rotation speeds. The acceleration amount controls how long it takes the rotors to reach their new speed.

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



### Dry/Wet Mix

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound.

### Footswitch

OFF/ON. Enables or disables use of EFFECTS SWITCH to turn effect on or off.

### Depth

0 to 15. Depth of vibrato effect. This is equivalent to selecting top rotor horn sizes.

### Acceleration

1 to 15. The rate of change between the two different speeds.

### SpeedMod - *Rotor Speed Modulation*

Mod source.

### Slow Speed - *Rotor Slow Speed*

0.03-30 Hz.

**Fast Speed - Rotor Fast Speed**

0.03-30 Hz.

**NOTE:** Setting Rotor fast speed slower than Rotor slow speed produces an interesting distortion similar to FM.

**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.

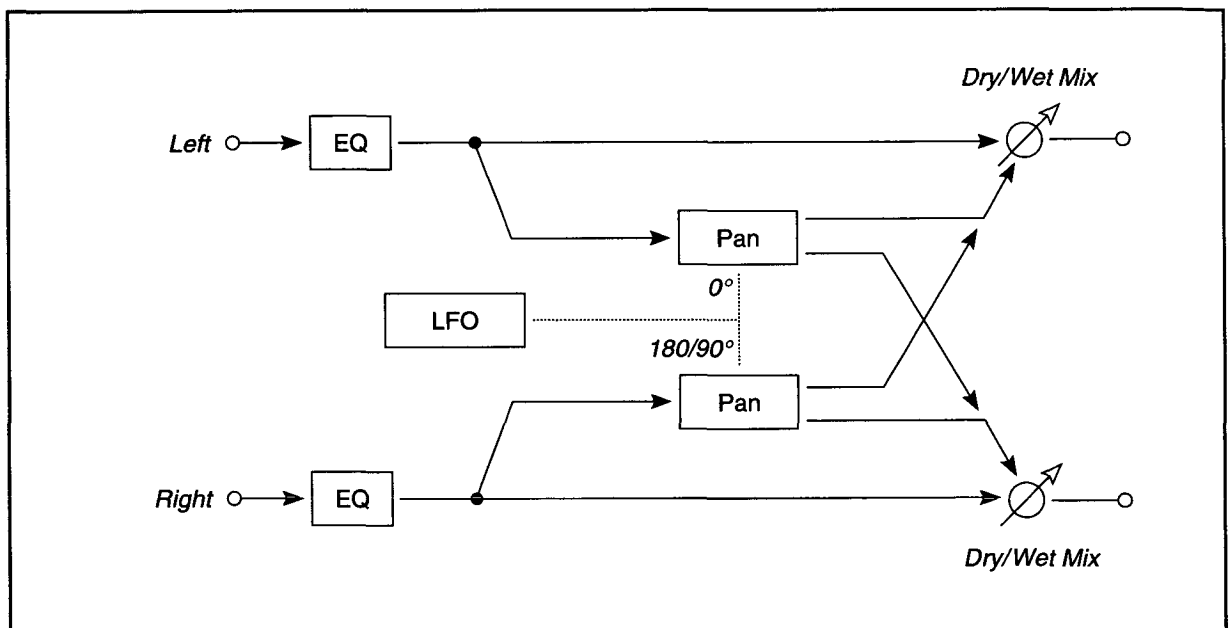
**NOTE:** This effect requires different sources to be sent to the left and right inputs for it to work.

**Stereo Mod Pan - Stereo mod - pan - EQ**

Two parallel dynamic pan effects with phase-inverted LFOs (180°). The two inputs alternate in the stereo mix.

**Quad Mod Pan - Quadrature mod - pan - EQ**

Two parallel dynamic pan effects with quadrature-phased LFOs (90°). The two inputs "chase" each other in the stereo mix.



**Dry/Wet Mix**

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound.

**MixMod - Dry/Wet Mix Modulation**

Mod source and amount (-15 to +15).

**LFO Rate**

0.03-30 Hz. Speed of modulation (frequency).

**LFO Depth**

0 to 10. The amount of crossover to the opposite side.

**DepMod - LFO Depth Modulation**

Mod source and amount (-15 to +15).

**EQ Low**

-12 to +12 dB. Control for cutting or boosting the low frequencies.  
EQ affects both the wet and dry signals.

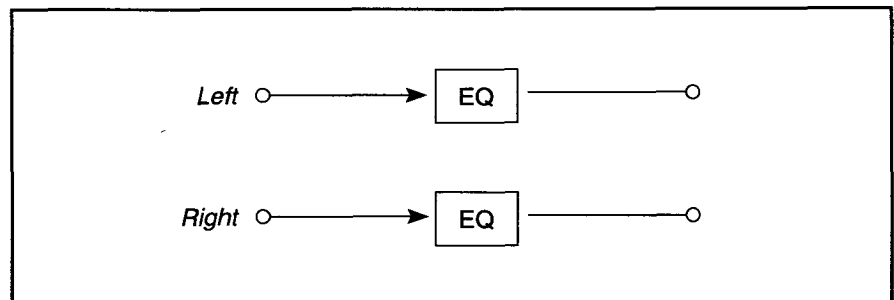
**Hi - EQ High**

-12 to +12 dB. Control for cutting or boosting the high frequencies.  
EQ affects both the wet and dry signals.

---

## STEREO PARAMETRIC EQ

This is a three-band parametric equalizer. The midrange frequency can be modulated for "wah" type effects.

**Parametric EQ - Stereo parametric EQ****High Freq - High Frequency**

1 kHz to 16 kHz. High shelving cutoff frequency.

**High Level**

-12 to +12 dB. High EQ level.

**Mid Freq - Mid Frequency**

1 to 100. Midrange filter center frequency.

**Mid Level**

-12 to +12 dB.

**Mid Width**

1 - 100. Mid frequency filter resonance.



**MidMod - *Mid Frequency Modulation***

Mod source and amount (-15 to +15).

**Low Freq - *Low Frequency***

32 Hz to 1 kHz.

Low EQ shelving cutoff frequency.

**Low Level**

-12 to +12 dB. Low EQ level.

---

**CHORUS/STEREO DELAY - EQ**

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

**Chorus>Delay - *Chorus - Stereo delay - EQ***

A mono-input/stereo-output chorus with quadrature-phased LFOs drives a stereo delay with a sample/hold feature.

**Chorus Delay - *Chorus Delay Time***

0 to 50 ms. The chorus delay time.

**LFO Rate**

0.03-30 Hz. This is the modulation speed for the chorus.

**LFO Depth**

0 to 100. This controls the depth of the chorus effect.

**ChorusFdbck - *Chorus Feedback***

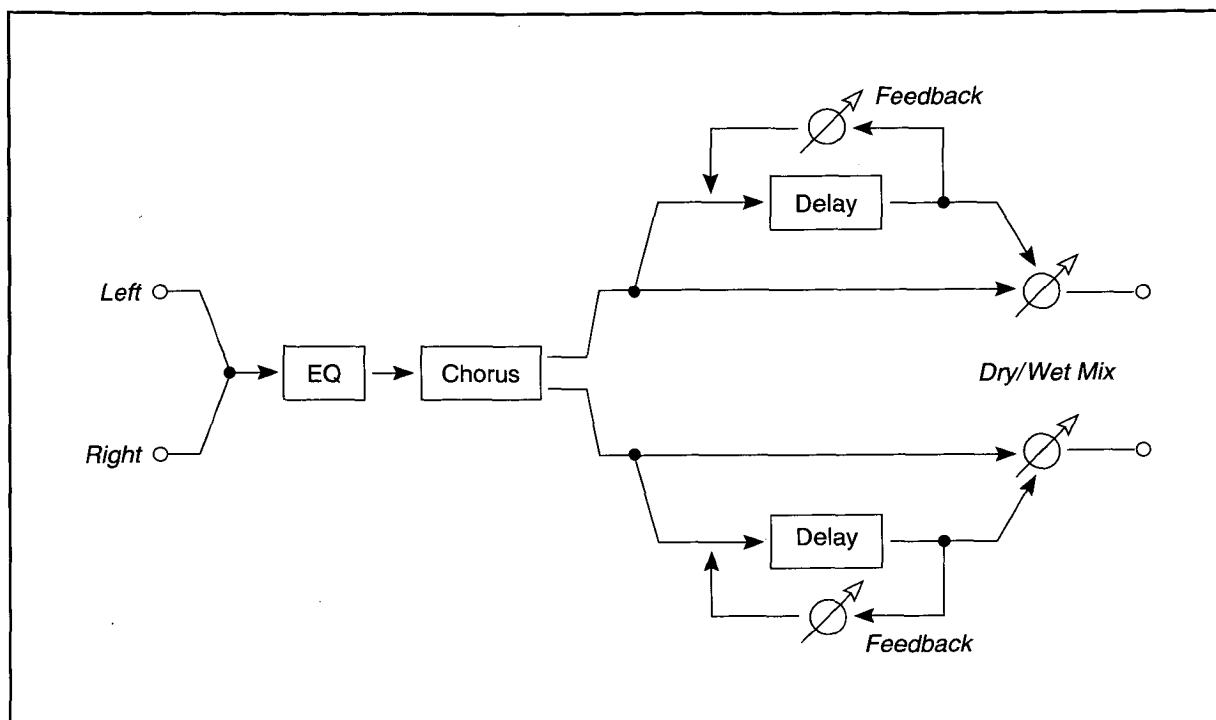
-100 to +100. Amount of chorus feedback (negative values produce inverted phase).

**Dry/Wet Mix**

DRY, 99/1,...1/99, WET. This is the output balance between the delayed and un-delayed sound (both signals are chorused).

**Delay Time- *Main Delay Time***

0 to 450 ms.



### Ftsw Sample

ON/OFF. Enables use of the Effects Switch modulator to sample and recirculate the delay line. Use MIDI Controller #12 if your controller is able to send it, or use the MIDI REMAP page to assign any other controller to the switch.

When the footswitch is pressed, whatever is in the delay line will be repeated endlessly. To clear the delay line, press the footswitch again.

A crossfade sample technique is used to minimize glitches.

### Delay Fdbck - Delay Feedback

-100 to +100. Amount of feedback (negative values produce inverted phase).

### EQ Low

-12 to +12 dB. Cuts or boosts the low frequencies of the input.

### Hi - EQ High

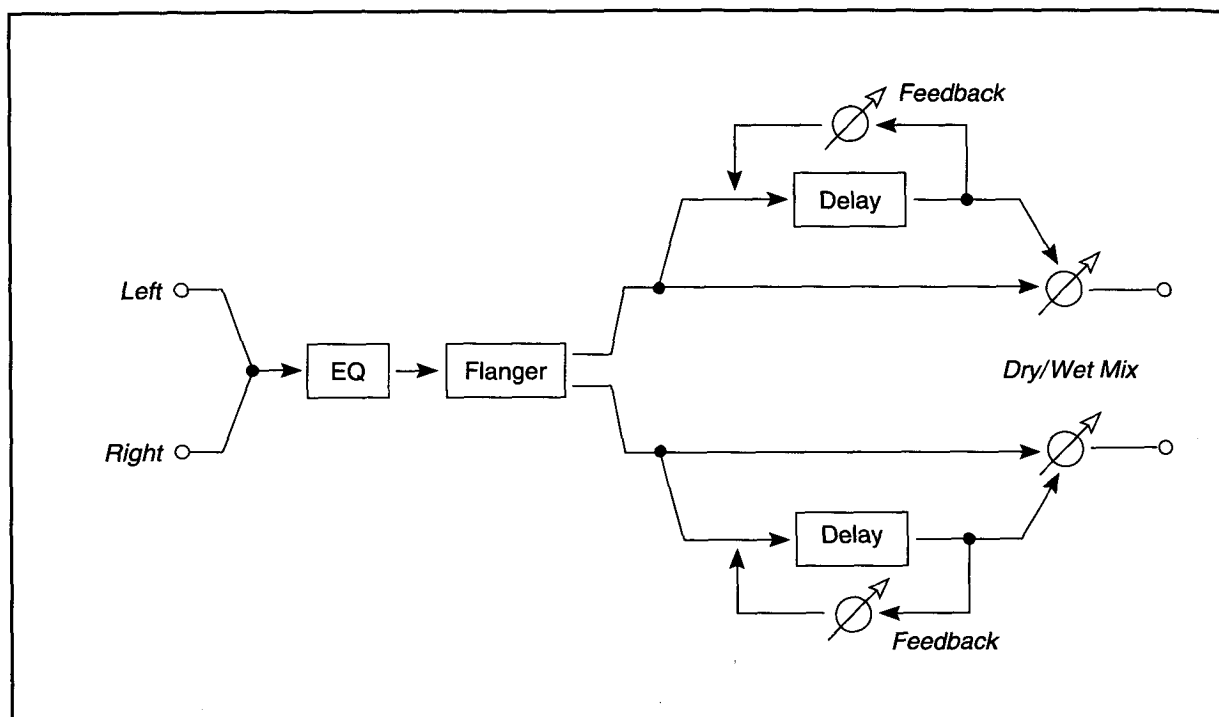
-12 to +12 dB. Cuts or boosts the high frequencies of the input.

## FLANGER/STEREO DELAY - EQ

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

### Flange>Delay - Flanger -Stereo delay - EQ

A mono-input/stereo-output flanger with quadrature-phased LFOs drives a stereo delay with a sample/hold feature.



### Flange Delay - Flanger Delay Time

0 to 50 ms. The flanger delay time.

### LFO Rate

0.03-30 Hz. This is the modulation speed for the flanger.

### LFO Depth

0 to 100. This controls the depth of the flanger effect.

### FlangeFdbck - Flanger Feedback

-100 to +100. Amount of flanger feedback (negative values produce inverted phase).

### Dry/Wet Mix

DRY, 99/1,...1/99, WET. This is the output balance between the delayed and un-delayed sound (both signals are flanged).

**Delay Time- Main Delay Time**

0 to 450 ms.

**Ftsw Sample**

ON/OFF. Enables use of the Effects Switch modulator to sample and re-circulate the delay line. Use MIDI Controller #12 if your controller is able to send it, or use the MIDI REMAP page to assign any other controller to the switch.

When the footswitch is pressed, whatever is in the delay line will be repeated endlessly. To clear the delay line, press the footswitch again.

A crossfade sample technique is used to minimize glitches.

**Delay Fdbck - Delay Feedback**

-100 to +100. Amount of feedback (negative values produce inverted phase).

**EQ Low**

-12 to +12 dB. Cuts or boosts the low frequencies of the input.

**Hi - EQ High**

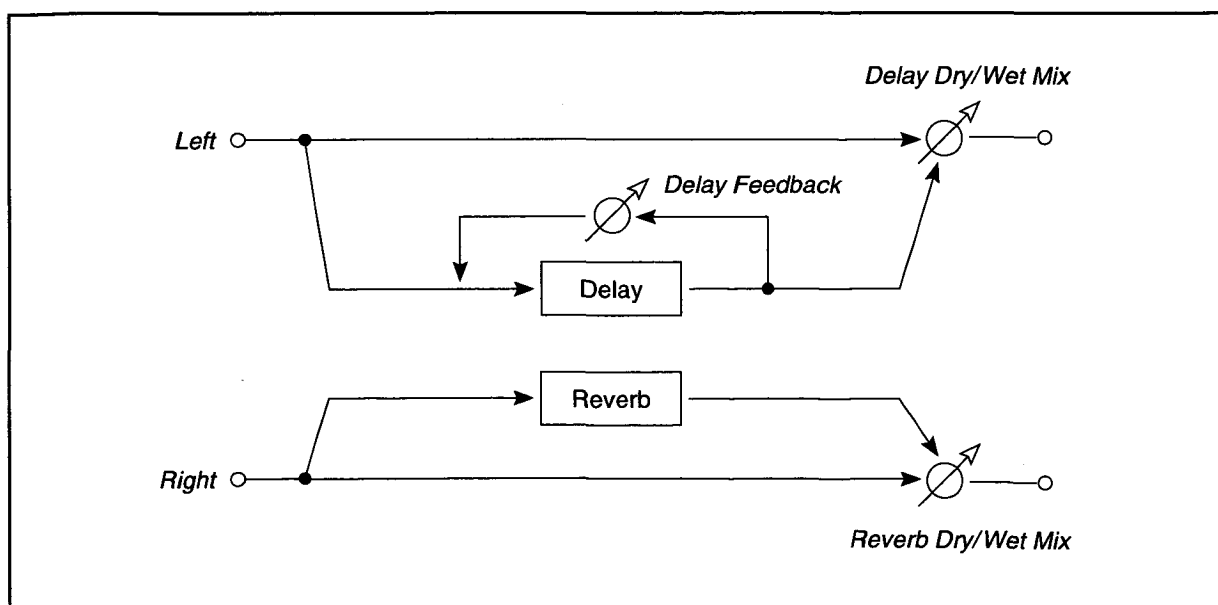
-12 to +12 dB. Cuts or boosts the high frequencies of the input.

**DUAL MONO DELAY/REVERB****Delay/Hall**

A monophonic delay in parallel with a monophonic hall reverb.

**Delay/Room**

A monophonic delay in parallel with a monophonic room reverb.



**Dly Dry/Wet - Delay Dry/Wet Mix**

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound for delay effect.

**Delay Time**

0 to 500 ms.

**Delay Fdbck - Delay Feedback**

-100 to +100. Amount of feedback for delay effect (negative values produce inverted phase).

**Rvb Dry/Wet - Reverb Dry/Wet Mix**

DRY, 99/1,...1/99, WET. Output balance of processed and unprocessed sound for reverb effect.

**Rvb Pre Delay - Reverb Pre-Delay**

0 to 150 ms for Delay/Hall, and 0 to 250 ms for Delay/Room. This is the time between the direct sound and the first early reflections.

**Rvb Decay Time - Reverb Decay Time**

0-99. Reverb decay time after pre delay.

**HiFry Damping - High Frequency Damping**

0 to 99. The greater this is, the faster the high frequencies are damped.

---

## DUAL MONO DELAY/CHORUS

**Delay/Chorus**

A monophonic delay in parallel with a monophonic chorus.

**Dly Dry/Wet - Delay Dry/Wet Mix**

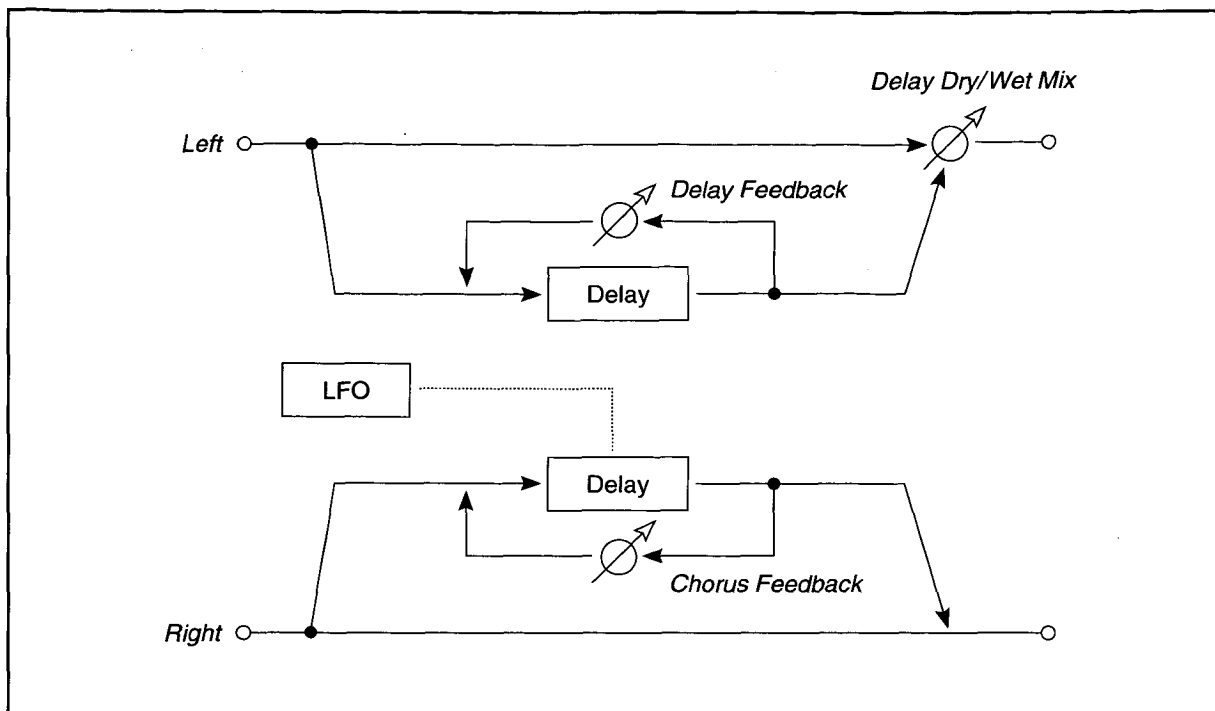
DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound for delay effect.

**Delay Time**

0 to 500 ms.

**Delay Fdbck - Delay Feedback**

-100 to +100. Amount of feedback for delay effect (negative values produce inverted phase).



### **ChorusDelay - Chorus Delay Time**

0 to 500 ms. Delay time for modulated delay effect.

### **LFO Rate**

0.03-30 Hz. Speed of modulation (frequency).

### **LFO Depth**

0 to 100.

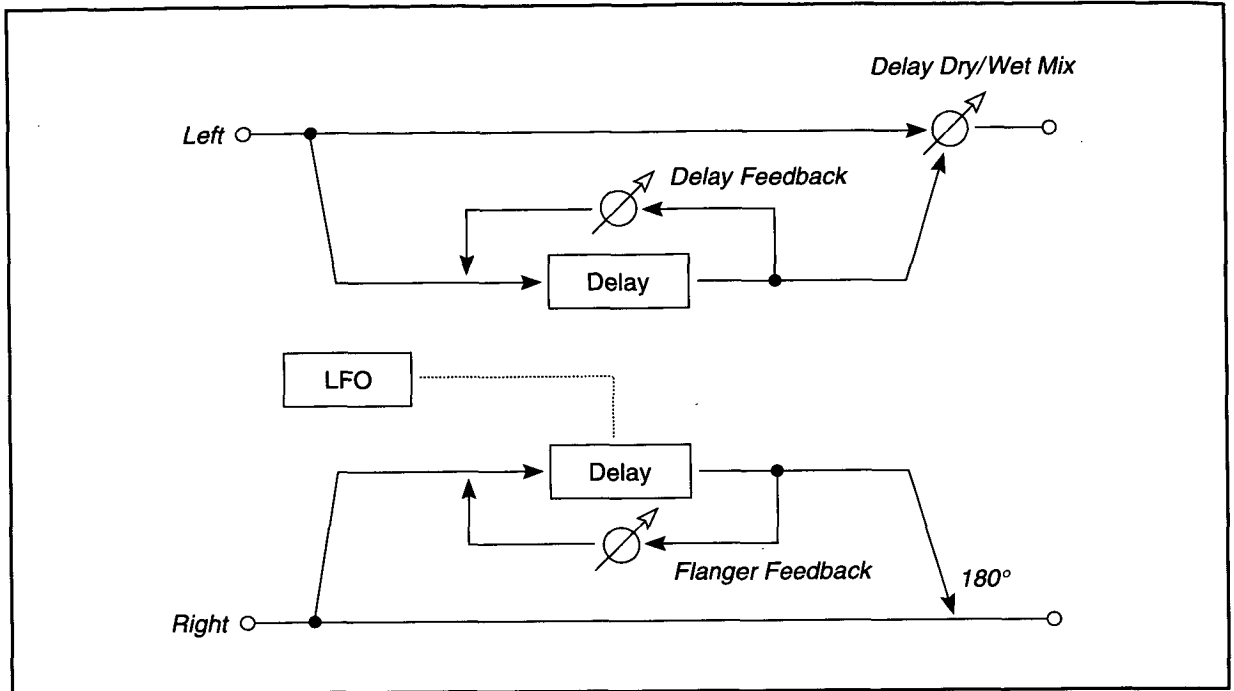
### **Chorus Fdbck - Chorus Feedback**

-100 to +100. Amount of chorus feedback (negative values produce inverted phase).

## DUAL MONO DELAY/FLANGER

### Delay/Flange - Delay/Flanger

A monophonic delay in parallel with a monophonic flanger.



#### Dly Dry/Wet - Delay Dry/Wet Mix

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound for delay effect.

#### Delay Time

0 to 500 ms.

#### Delay Fdbck - Delay Feedback

-100 to +100. Amount of feedback for delay effect (negative values produce inverted phase).

#### FlangeDlay - Flanger Delay Time

0 to 500 ms. Delay time for modulated delay effect.

#### LFO Rate

0.03-30 Hz. Speed of modulation (frequency).

#### LFO Depth

0 to 100.

#### FlangeFdbck - Flanger Feedback

-100 to +100. Amount of flanger feedback (negative values produce inverted phase).

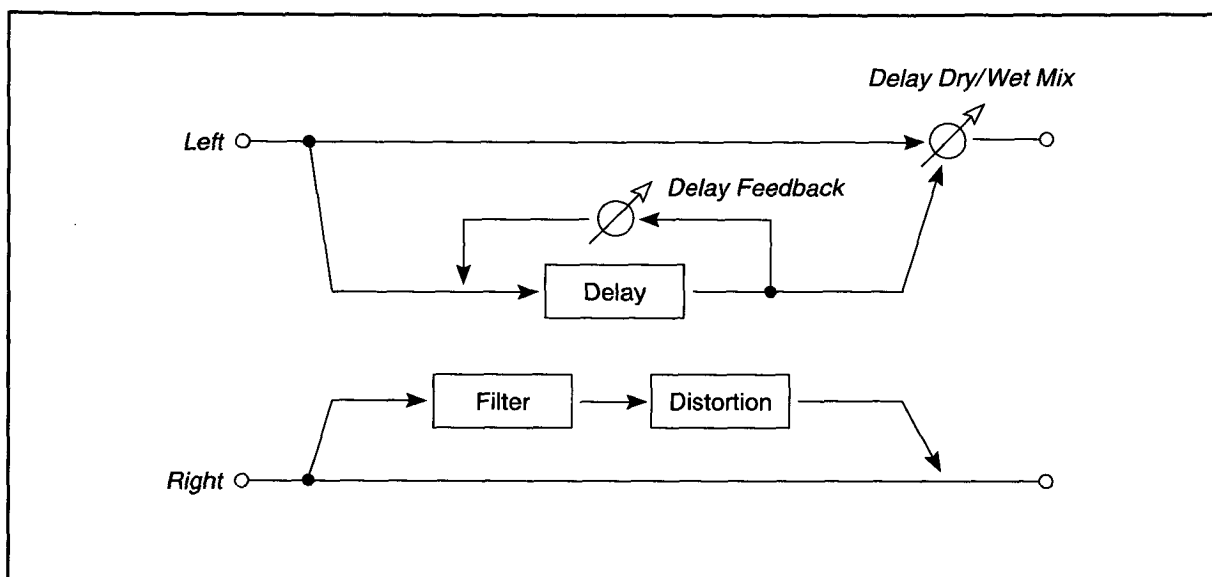
## DUAL MONO DELAY/ OVERDRIVE - DISTORTION

### **Delay/Distor** - *Delay/Distortion-filter*

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

### **Delay/ODrive** - *Delay/Overdrive-filter*

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



### **Dly Dry/Wet** - *Delay Dry/Wet Mix*

DRY, 9/1, ... 1/9, WET. Output balance of processed and unprocessed sound for delay effect.

### **Delay Time**

0 to 500 ms.

### **Delay Fdbck** - *Delay Feedback*

-100 to +100. Amount of feedback for delay effect (negative values produce inverted phase).

### **Edge**

1 to 111. Distortion drive amount.

### **Hot Spot**

1 - 100. "Wah" filter frequency.

### **Resonance**

0 to 100. "Wah" effect depth.

### **Dist Out Level** - *Distortion Output Level*

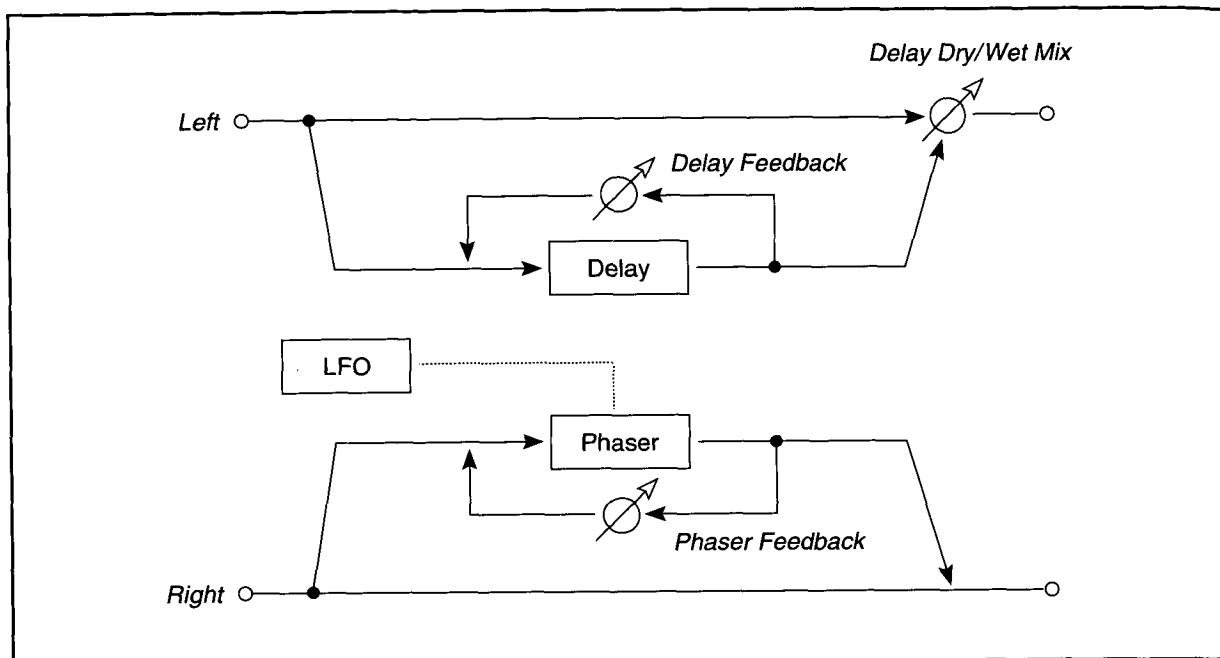
0 to 100. Distortion output level.



## DUAL MONO DELAY/PHASER

### Delay/Phaser

A monophonic delay in parallel with a monophonic phaser. This phaser has more phase shift than the stereo phaser.



#### Dly Dry/Wet - Delay Dry/Wet Mix

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound for delay effect.

#### Delay Time

0 to 500 ms.

#### Delay Fdbck - Delay Feedback

-100 to +100. Amount of feedback for delay effect (negative values produce inverted phase).

#### Phaser Center - Phaser Center Frequency

0 to 100. Center frequency which phase shift affects.

#### LFO Rate

0.03-30 Hz. Speed of modulation (frequency).

#### LFO Depth

0 to 100.

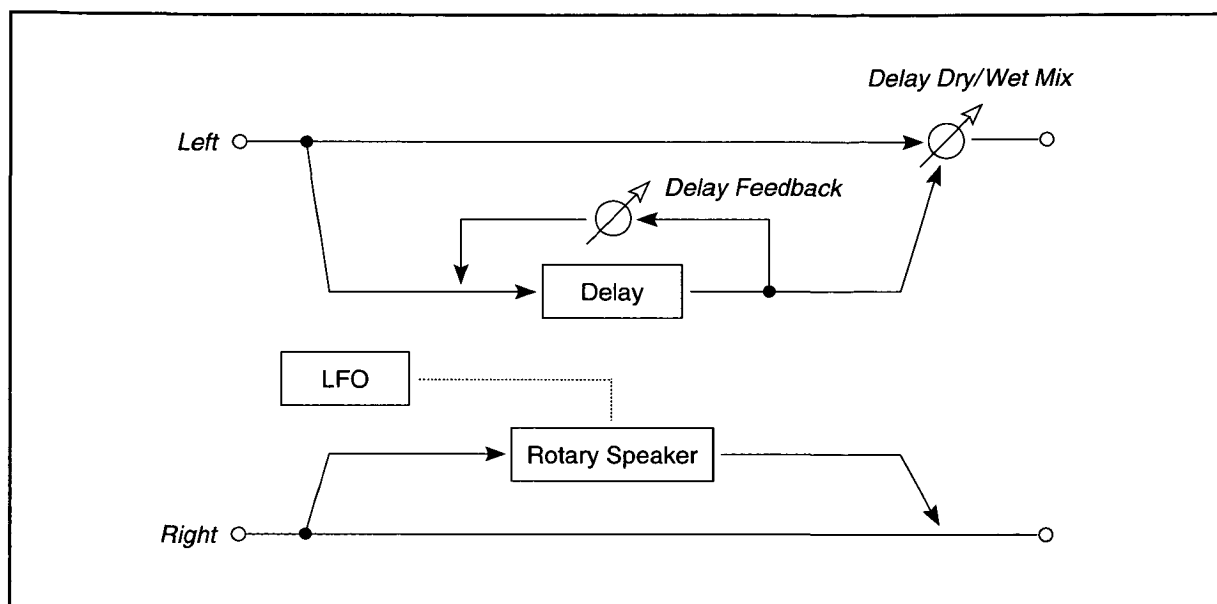
#### PhaserFdbck - Phaser Feedback

-100 to +100. Amount of feedback for phaser effect (negative values produce inverted phase).

## DUAL MONO DELAY/ ROTARY SPEAKER

### Delay/Rotary - Delay/Rotary speaker

A monophonic delay in parallel with a monophonic rotary speaker simulator. This rotary speaker has more tremolo than the stereo rotary speaker.



### Dly Dry/Wet - Delay Dry/Wet Mix

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound for delay effect.

### Delay Time

0 to 500 ms.

### Delay Fdbck - Delay Feedback

-100 to +100. Amount of feedback for delay effect (negative values produce inverted phase).

### Acceleration

1 to 15. This is the time it takes to move from the slow speed to the fast, and vice versa.

### Slow Speed - Slow Rotor Speed

0.03-30 Hz.

### Fast Speed - Fast Rotor Speed

0.03-30 Hz.

### SpdMod - Rotor Speed Modulation

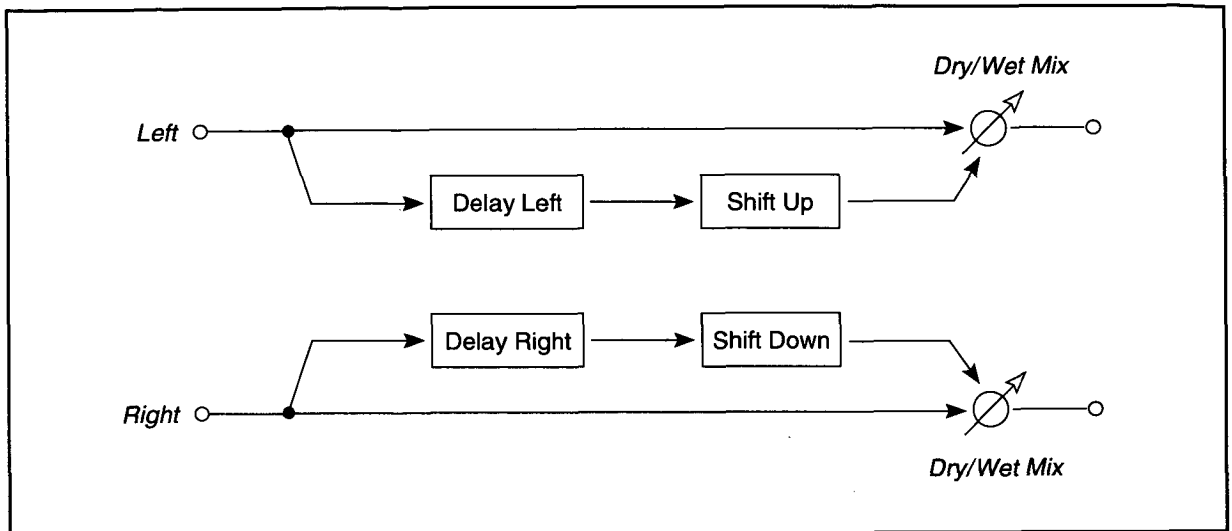
Mod source.

## STEREO PITCH SHIFTER

### Pitch Shift - Stereo pitch shifter

A stereo pitch shifter with the left channel shifted up and the right channel shifted down. The shifted signals can also be delayed with respect to the original signal.

This effect makes an excellent stereo chorus when used with small amounts of shift, and is especially useful on strings and ensemble sounds when placed after a reverb.



### Dry/Wet Mix

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound.

### MixMod - Dry/Wet Mix Modulation

Mod source and amount (-15 to +15).

### Delay Left

0 to 500 ms.

### Delay Right

0 to 500 ms.

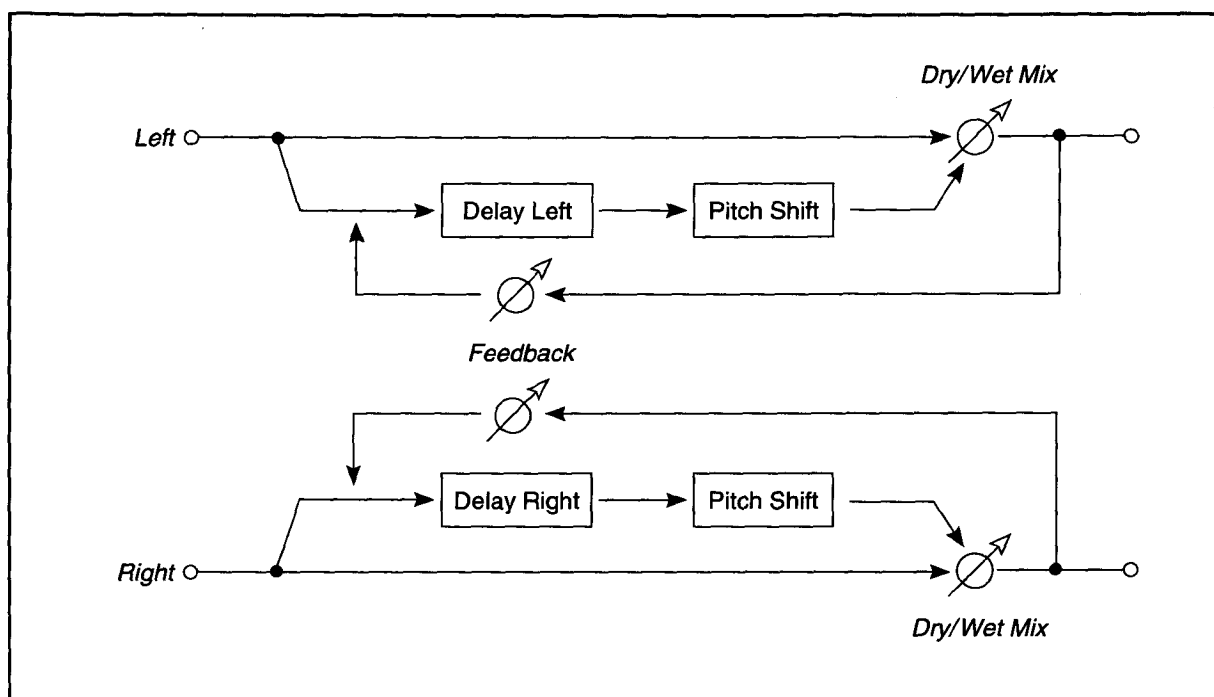
### Pitch Shift

1 to 100.

## MOD PITCH SHIFT-DELAY

### ModPitchShft - Modulatable pitch shifter - delay

This stereo pitch shifter allows the amount of shift to be modulated. The input may be shifted either up or down, and the shifted signal may also be delayed with respect to the original signal, with an adjustable feedback amount. You can use this for “whammy-bar” pitch bending and special effects.



### Dry/Wet Mix

DRY, 9/1,...1/9, WET. Output balance of processed and unprocessed sound.

### MixMod - Dry/Wet Mix Modulation

Mod source and amount (-15 to +15).

### Delay Left

0 to 490 ms.

### Delay Right

0 to 490 ms.

### Feedback

0 to 100. This is the feedback amount for the delay lines.

### Max Shift

-12 to +12. This is the maximum amount of pitch shift, in semitones.

## Shift Scaler

1 to 100%. This determines the initial amount of pitch shift without modulation, as a percentage of the Max Shift amount.

## SciMod - Shift Scaler Modulation

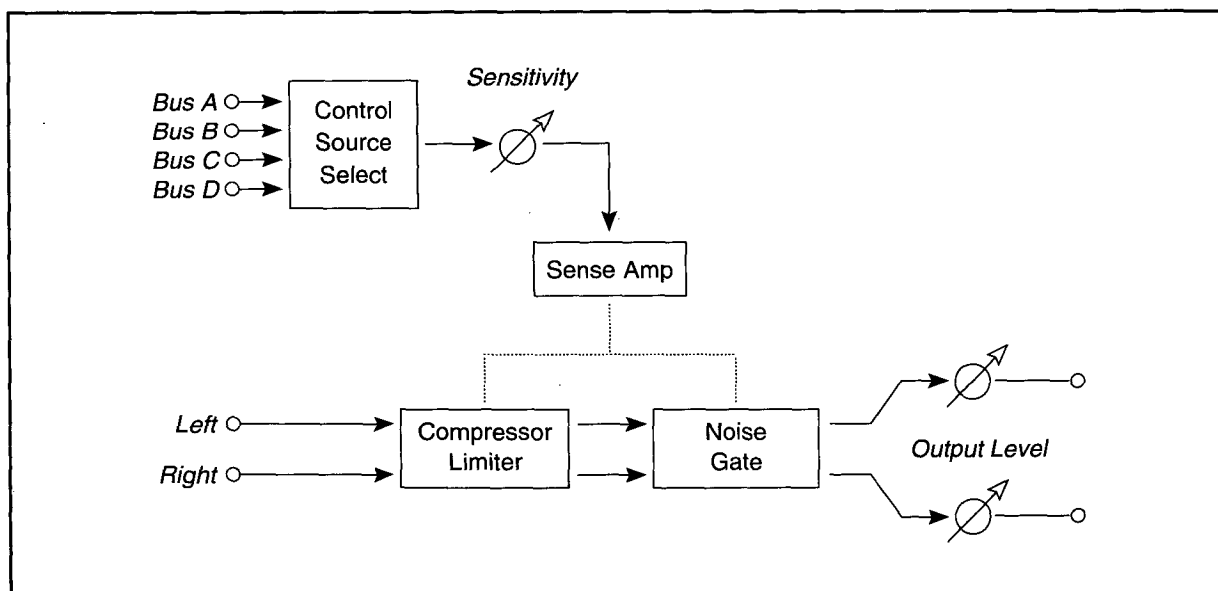
Mod source and amount (-15 to +15). If the Shift Scaler is set to 1, only positive modulation will have an effect; if it is set to 100, only negative modulation will have an effect.

# STEREO COMPRESSOR-LIMITER/GATE

## Comp-Lim/Gat - Stereo Compressor-Limiter/Gate

The compressor provides an automatically controlled volume envelope, which can be used to smooth out the level of a signal (often done with guitars), or to give a sound more "punch" (often done with drums). The ability to use a single FX Bus as the control source allows you to create side-chain effects, linking the compression of one signal to the level of another.

A gate is also provided. Signals of a certain minimum volume (the Threshold amount) "lift" the gate, and are allowed to pass through; signals under that volume are not.



## CntrlSrc - Control Source

NORMAL, BUS A+B, BUS C+D, BUS A/B/C/D. NORMAL uses the input signal to control the compression amount. To allow you to achieve side-chain effects, BUS A+B and C+D use the sum of the two FX Buses to control the compression amount, and BUS A-D use the levels from a single FX Bus.

## Sensitivity - Control Source Sensitivity

0-10. This parameter sets the input level for the Control Source.

**Comp Ratio - Compression Ratio**

0 to 100. This parameter sets the amount of compression.

**Comp Thresh - Compression Threshold**

0 to 100. This parameter sets the level at which compression will begin.

**Gate Thresh - Gate Threshold**

0 to 100. This parameter sets the level at which the gate is lifted, letting the signal through.

**Output Level**

0 to 100. This parameter sets the output level of the compressor.

---

## SMALL VOCODER

Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). The first vocoders were intended mostly for speech effects, but this is only part of the effect's capabilities. The Wavestation SR's Vocoders can modulate one or more Patches or Waves to achieve new, dynamic timbres. You can even combine Vector and/or Wave Sequence sounds in this cross-timbral modulation synthesis, and then store them as a new Performance (for more information on this subject, please see Section 8.10, *Using the Vocoders*, in the Player's Guide).

A vocoder is essentially a combination of a frequency analyzer and a dynamic EQ. The Modulator signal is divided up into a number of frequency bands, and the levels of each of these bands are measured in real time. A dynamic EQ is slaved to the analyzer, following the changes in each band of the Modulator with similar changes in the EQ of the Carrier. This causes the Carrier to assume some of the timbre of the Modulator. It is best for the Carrier to contain a wide range of frequencies, because if there is little or no material in some of the bands to begin with, the EQ will have nothing to alter, and the Vocoder's effect will be diminished.

The more frequency bands which are used, the greater the definition of the Vocoder effect. To achieve the highest quality Vocoder, the two Stereo Vocoder - Delay algorithms use both effects slots; the four Small Vocoder algorithms use the normal effects configuration, making another effect simultaneously available.

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

**Sml Vocoder1 - Small vocoder 1**

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

**Sml Vocoder2 - Small vocoder 2**

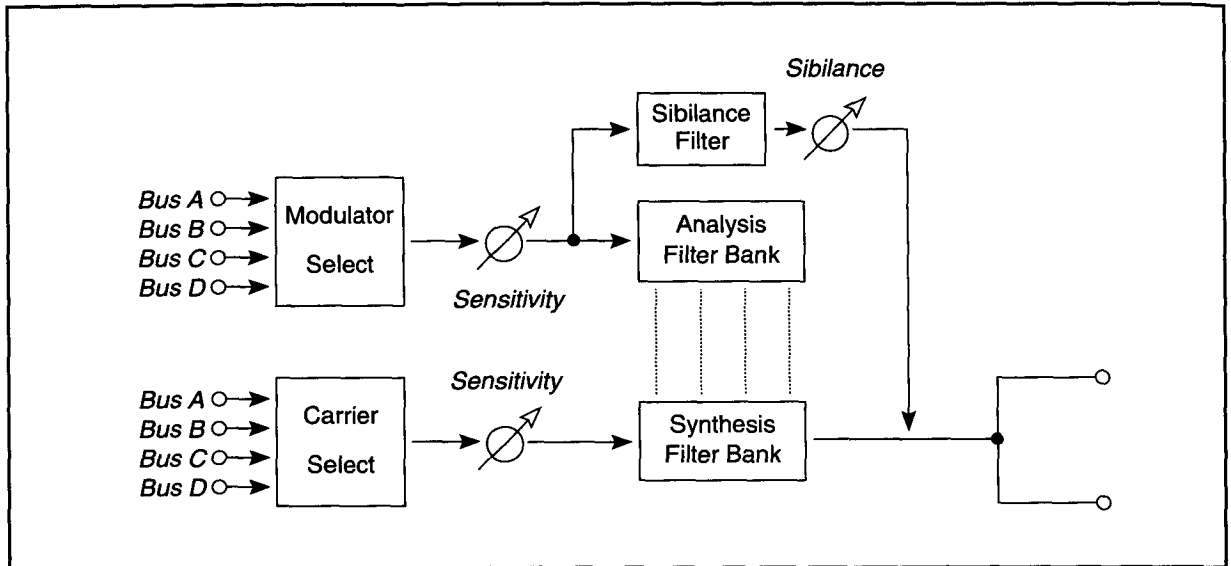
This vocoder uses mid-low to high frequency bands. It has a wider band covering the treble range, for enhanced high-end response.

**Sml Vocoder3 - Small vocoder 3**

This vocoder uses a number of low to mid-high frequency bands of even width.

**Sml Vocoder4 - Small vocoder 4**

This vocoder uses a number of mid-low to high frequency bands of even width.



**Modulator Bus**

A, B, C, D. This is the FX Bus used as the Vocoder Modulator.

**Mod Sens - Modulator Bus Sensitivity**

0 to 100. This sets the input level for the Modulator. If you hear distortion, try turning this value down.

**Carrier Bus**

A, B, C, D. This is the FX Bus used as the Vocoder Carrier.

**Carrier Sens - Carrier Bus Sensitivity**

0 to 100. This sets the input level for the Carrier. If you hear distortion, try turning this value down.

**Sibilance**

0 to 10. Controls the amount of high frequencies from the Modulator (such as vocal consonants, as in "ch" and "ss") included in the mix.

**SibMod - Sibilance Modulation**

Mod source and amount (-15 to +15). The default mod source is KEYDN, which allows you to use the Key Down time to gate the sibilance amount.

---

## STEREO VOCODER-DELAY

The two Stereo Vocoder - Delays are extremely powerful algorithms, and use *both* effects slots. When you select one of the Stereo Vocoders for Effect 1 or 2, the other Effect changes to display Stereo Vocoder as well.

Since these effects can use any of the effects buses for both the Carrier and the Modulator, the routings on the Effects Mix page work slightly differently from those of other effects. Buses A and B can only be routed through the Vocoder; if they are not used as Carrier or Modulator, they are not heard. Buses C and D, however, may be routed both through the Vocoder *and* as set by the Effects Mix page, which works with the Stereo Vocoders in a couple of special ways.

### ***Effects Mix and the Stereo Vocoders***

The Effects Mix Parallel routing functions almost as usual, allowing you to pan C and D across the stereo outputs as if FX 2 were set to NO EFFECT. The Effects Mix Series routing is somewhat more altered, so that the Wet/Dry Mix controls how much of the original sounds of Buses C and D are heard, without affecting the level of the Vocoder output. Wet means that only the Vocoder output is heard, and Dry means that the original sounds are heard at full volume, along with the Vocoder output.

This feature allows you to use buses A and B for the vocoder, and simultaneously route buses C and D directly to stereo outputs 1/2. By using buses C and/or D as the Modulator, you can also use the Effects Mix to blend in some of the Modulator's original sound. If you wish to pass through only the high frequencies of the Modulator (a typical vocoder application), use the Vocoder's Sibilance parameter instead.

For more information on the Effects Mix, please see Section 7.2 of the Player's Guide (Effects Buses and Routing), and Effects Mix in this Reference Guide. For more information on the Vocoders, see the above discussion of the Small Vocoders.

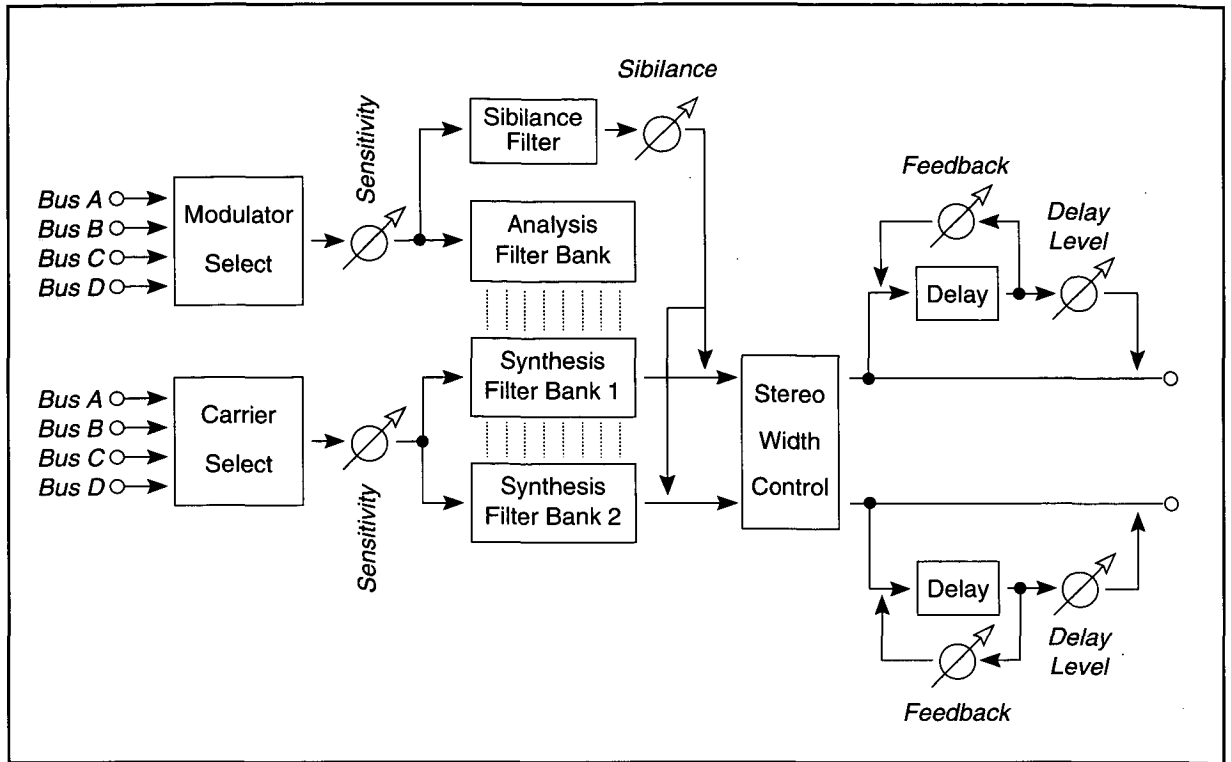
### ***SterVocoder1 - Stereo vocoder - Delay 1***

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

### ***SterVocoder2 - Stereo vocoder - Delay 2.***

This Vocoder uses a number of bands of even width, across the frequency range.





**Modulator Bus**

A, B, C, D. This is the FX Bus used as the Vocoder Modulator.

**Mod Sens - Modulator Bus Sensitivity**

0 to 100. This sets the input level for the Modulator. If you hear distortion, try turning this value down.

**Carrier Bus**

A, B, C, D. This is the FX Bus used as the Vocoder Carrier.

**Carrier Sens - Carrier Bus Sensitivity**

0 to 100. This sets the input level for the Carrier. If you hear distortion, try turning this value down.

**Sibilance**

0 to 10. Controls the amount of high frequencies from the Modulator (such as vocal consonants, as in "ch" and "ss") included in the mix.

**SibMod - Sibilance Modulation**

Mod source and amount (-15 to +15). The default mod source is KEYDN, which allows you to use the Key Down time to gate the sibilance amount.

**Stereo Width**

0 to 10. Increasing this value causes the stereo effect to become more prominent.

**Delay Time**

0 to 1000 ms.

**Delay Fdback - *Delay Feedback***

0 to 100.

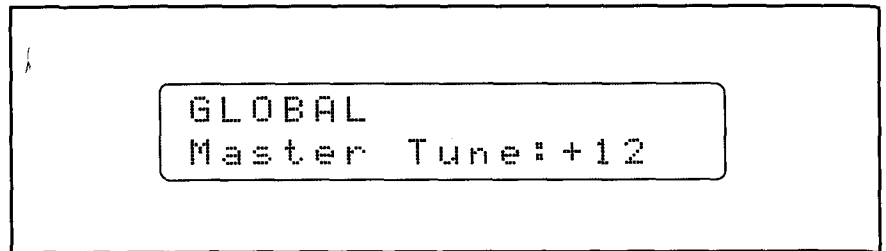
**Delay Level**

0 to 100.

## **GLOBAL**

*global parameters*

*MIDI/Global level*



This page contains system settings for the Wavestation SR as a whole.

### **Master Tune**

+/- 99. Master tune adjusts the global pitch of the Wavestation SR, in cents (a cent is 1/100 of a semitone). For a discussion of this parameter, please see section 4.11 in the Player's Guide.

### **Transpose**

+/- 24. This parameter transposes MIDI key numbers received by the Wavestation SR, in semitones. Setting Xpose to +4, for instance, will transpose incoming MIDI notes up by 4 semitones.

### **Effects**

This Effects setting allows you to temporarily override all Performance and Multiset effects programming.

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

OFF means that the effects are disabled. Routing is disabled as well; Buses A - D go to outputs 1 - 4. You might want to use this while programming, to ensure that effects aren't added to Performances under construction. When performing in reverberant rooms or with large groups, you might also want to use this feature to quickly strip out your processing in favor of a "dry" sound, without having to edit and save Performances.

### **Protect Int - Protect Internal Memory**

ON, the default, means that protection is enabled; therefore, saving is prohibited. When learning your way around, or if a stranger passes through, this setting will allow any parameter changes without fear that you will lose your program settings.

OFF means that saving is allowed.

An even better way to protect your data is to back it up by saving it to a RAM Card, or by sending MIDI System Exclusive data dumps to an external device.

---

For convenience, this parameter is also available on the WRITE page.

### **Protect Card - *Protect Card Memory***

This protection applies only to Performance RAM cards (ROM cards don't need it).

ON, the default, means that protection is on; therefore, saving is prohibited.

OFF means that saving is allowed.

In addition, RAM cards have their own Protect On/Off switches. To preserve card battery life, leave this hardware protection switch set to ON when not saving.

For convenience, this parameter is also available on the WRITE page.

### **PtchBendRnge - *Global Pitch Bend Range***

1 - 12. This allows you to set the maximum Pitch Bend range, in semitones, to match your performance style and MIDI controller. Each Patch can select this global setting or use its own bend depth parameter.

1 is a semitone, 2 a wholetone, 3 a minor 3rd, 4 a major 3rd, 5 a perfect 4th, 6 a diminished 5th, 7 a perfect 5th, 8 a minor 6th, 9 a major 6th, 10 a dominant 7th, 11 a major 7th, and 12 an octave.

### **Velocity Curve - *Velocity Response Curve***

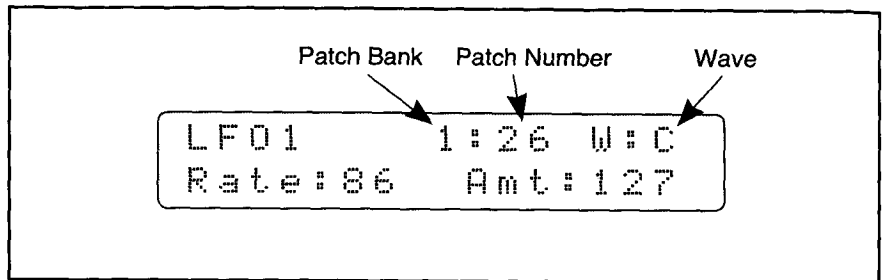
1 - 8. The Velocity Response Curve adjusts the Wavestation SR's response to match your playing style and controller. Eight curves can be selected.

Start with curve 4 and adjust up or down to achieve the desired feel, as well as to match the response of other sound sources which may be MIDI'd together. Values higher than 4 make it easier to reach the maximum velocity; values lower than 4 make it more difficult. Experiment with different settings for a few days before deciding which one works best.

## **LFO 1 (2)**

*low frequency oscillator 1 or 2*

*Edit Patch level*



There are two LFOs, each of which has its own page.

### **(Patch Bank)**

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### **(Patch Number)**

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

### **Rate**

0 - 99. This is the speed of the LFO.

**Amt - Initial Amount**

0 - 127. This is the basic depth of LFO, without modulation.

**Shape**

LFO shapes are TRIANGLE, SQUARE, SAWTOOTH, RAMP, and RANDOM.

**Dly - Delay**

0 - 99. Time from key down to the start of LFO fade-in.

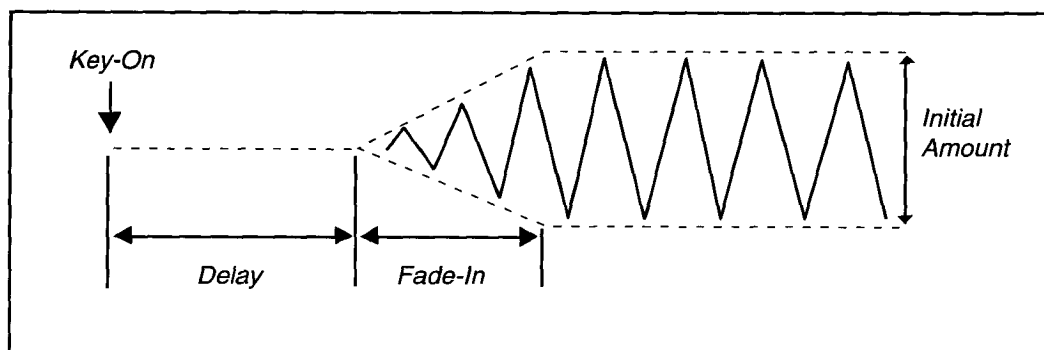
**Sync**

OFF. LFOs are free-running.

ON. The LFOs are synchronized to start at Key On. This way, the modulation always starts in the positive direction. Sync is useful for preventing the attack of note from being "swallowed" by negative LFO modulation. For instance, if an LFO is controlling volume, and it happens to be at its lowest point when the note's attack starts, then the attack would not be heard. Sync ensures that this will not happen.

**Fade-in Time**

0 - 99. The time it takes the LFO to fade in to the initial amount after the initial delay has elapsed.

**LFO Delay/Fade-in****Depth Mod - Depth Modulation Source**

This is the modulator to control the depth, or amplitude, of the LFO. Note that one LFO can modulate the other, or even modulate itself!

The normal Patch modulation sources can be used, including KEYBD (Linear Keyboard), CTRKB (Centered Keyboard), VEL (Linear Velocity), EXVEL (Exponential Velocity), LFO 1 and 2, ENV 1 (Envelope 1), AT (Aftertouch), AT+WH (Aftertouch + Mod Wheel), WHEEL, MIDI 1 and 2, and PEDAL.

For complete descriptions of these modulators, please see the entry for the PATCH MACRO page.

**DepthModAmt - Depth Modulation Amount**

+/- 127. This controls the amount of effect for the Depth modulator.

**Rate Mod - Rate Modulation Source**

This is the modulator to control the rate, or speed, of the LFO. Note that, as in Depth Mod above, the LFOs can modulate each other, or even themselves. The choices are the same as under Depth Mod.

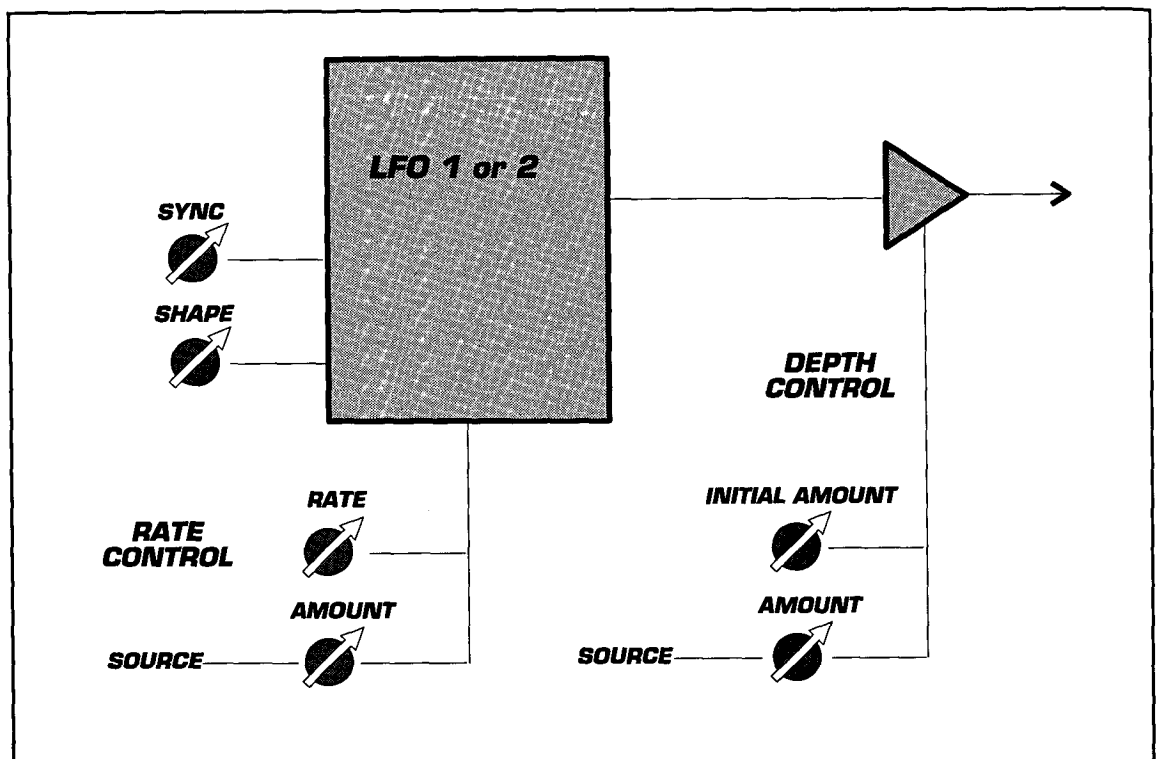
**RateModAmt - Rate Modulation Amount**

+/- 127. This is the amount of effect for the Rate modulator.

**UP/DOWN CURSORS**

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: All, A, B, C, D, All...

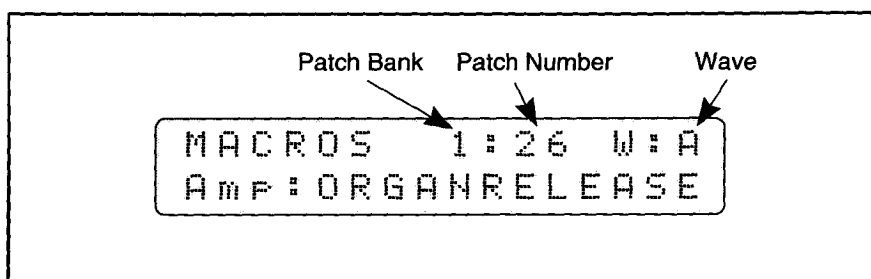
*LFO Block Diagram*



## MACROS

*patch macros*

*Edit Patch Level*



For an introduction to Patches, please see Chapter 8, "Patch Tour," in the Player's Guide.

The Macros page gives you a quick and easy grasp of the parameters in each of the Patch's synthesis modules (Pitch, Filter, Amp, and Pan), along with Envelope 1.

The macros are a great way to quickly try different processing ideas. For the sound editor, they also serve to initialize all of the parameters in the module to useful combinations which serve as starting points for custom editing.

To see what specific parameters comprise each macro, select a Macro and go to the page of the module itself (PITCH, FILTER, AMP, PAN). The parameter values will be changed to the preset Macro settings.

When you edit a macro at the parameter level, the macro description for that module becomes "USER".

### *(Patch Number and Bank)*

The number and Bank of the Patch currently being edited appear at the top of the screen. These are displayed for your convenience only, and cannot be edited on this page.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the UP and DOWN cursor buttons.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute



page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

### **Amp - Amplifier**

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 volume (Amp) envelopes of different instruments.

Amp Macros are:

DEFAULT, PIANO, ORGAN, ORGAN RELEASE, BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF (which can serve as a programmable mute).

Remember that this macro can only do its work if the 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.

### **Filtr - Filter**

The Filter macro sets a basic tone and may include modulation. You can select:

BYPASS, LOWPASS, LOWPAS/LFO, and AT SWEEP.

### **Env1 - Envelope 1**

Envelope 1 can be used as a modulator all over the Wavestation SR, and its Macros give you a number of ready-made contours. They include:

DEFAULT, PIANO, ORGAN, ORGAN RELEASE, BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF.

### **Pitch**

The Pitch macros perform various modulations on the oscillators. Choices include:

DEFAULT, ENV 1 BEND, DESCENDING, ASCENDING, AT BEND, MIDI-BEND, and AT + MIDI-BEND.

### **Pan**

The Pan Macros control the modulation of the initial Pan position, which is set by the Edit Performance page's FX Bus parameter.

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

### **Patch Modulation Sources**

In addition to the basic "analog" patch resources mentioned above, the Patch has an extensive modulation system. Each oscillator voice contains Envelope 1, LFO 1 and LFO 2, and may additionally be modulated from a number of external controllers, as described below.

**NOTE:** The Macros only affect their own module; e.g., Pitch Macros only affect settings on the Pitch page. While some of the Macros use Envelope 1 or the LFOs (such as Filter's LOWPAS/LFO), these modulators are independent, and aren't affected by the Macro. For example, LOWPAS/LFO sets up the Filter to be controlled by LFO 1, but the speed of the LFO mod-

ulation is not controlled by the macro. Instead, it depends on the settings of the LFO itself.

Patch Modulation sources include:

**KEYBD** (Linear Keyboard). Playing higher on your controller's keyboard increases the amount of modulation (for the technically minded, this directly uses MIDI note number.)

**CTRKB** (Centered Keyboard). Middle C (C4) produces no modulation; playing higher causes positive modulation, and playing lower causes negative modulation.

**VEL** (Linear Velocity). Playing harder on your controller increases the modulation amount (technically, this directly uses MIDI velocity).

**EXVEL** (Exponential Velocity). Similar to Linear Velocity, this causes modulation to increase as you play harder, but gives you greater variation when playing loudly, and less variation when playing softly. For instance, the difference between velocities of 120 and 127 may be very noticeable, whereas that between 50 and 60 may be very slight. For most playing styles, this turns out to be more "responsive" than Linear Velocity.

**LFO 1 and 2**. These are the two LFOs, which may be programmed separately for each Wave. Since the LFOs themselves can be modulated, they have the potential to be very complex. For more information, please see the entry under LFO 1 (2) in this Reference Guide.

**ENV 1** (Envelope 1). This is a complex, 4-stage envelope. For more information, please see its entry in this Reference Guide.

**AT** (Aftertouch). The Wavestation SR responds to both Channel (monophonic) and Key (polyphonic) Aftertouch.

**AT+WH** (Aftertouch + Mod Wheel). This is the sum of the MIDI Modulation wheel and Aftertouch.

**WHEEL**. This is the MIDI Modulation Wheel.

**MIDI 1 and 2**. These are the two assignable MIDI Controllers. The MIDI Remap page allows you to set them to any of the MIDI Controller numbers.

**PEDAL**. This is the MIDI Mod Pedal (Controller #4).

There are also a number of traditional fixed modulation paths, such as keyboard to pitch and velocity to envelope amount.

Note that the effects have a slightly different list of modulation sources.

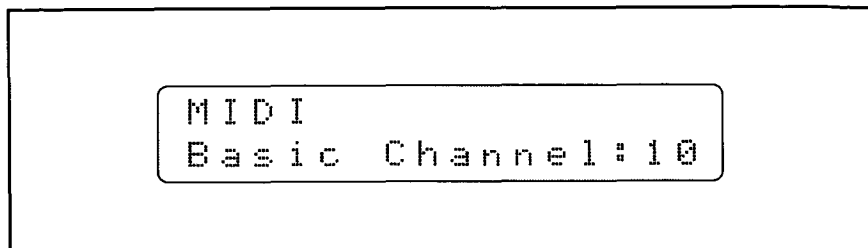
## UP/DOWN CURSORS

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: ALL, A, B, C, D, ALL...

## **MIDI**

### *global midi settings*

#### *MIDI Level*



For basic information on the MIDI page, please see Chapter 5, "Using MIDI," of the Player's Guide. See also MIDI RECEIVE and MIDI REMAP.

### **Basic Channel**

1 - 16. This is the main MIDI channel select parameter.

In PERF/POLY Mode, the Basic Channel is the only MIDI Channel received by the Wavestation SR. In MULTI Mode, the Basic Channel is the lowest-numbered received channel; for more information, see the Num-MultiChannels parameter below.

The Basic Channel is also enclosed in System Exclusive messages. SysEx messages will only be accepted if the Basic Channel enclosed in the data matches that of the Wavestation SR itself. For more information on System Exclusive, please see SYSEX DATA XMIT.

### **Perf Mode - Performance MIDI Mode**

This sets the MIDI Mode used when the PERF light is on.

OMNI. In OMNI Mode, the Wavestation SR responds to MIDI data on all 16 channels.

POLY. In POLY Mode, only data on the Basic Channel is recognized.

### **Multi Mode - Multi MIDI Mode**

This sets the MIDI Mode used when the MULTI light is on.

NORMAL. This allows the Wavestation SR to receive data on up to 16 MIDI channels simultaneously.

MONO. This is similar to NORMAL, except that each channel is monophonic (can play only a single note at a time), which is especially useful with MIDI guitar controllers.

When the MULTI light is lit, Performances are assigned to MIDI channels by the current Multiset.

**NumMultiChannels - Number of Multi Mode Channels****Num MonoChannels - Number of Mono Mode Channels**

1 - 16. These parameters set the number of MIDI channels which will be recognized in MULTI/NORMAL or MULTI/MONO Mode, respectively. The channels used begin with the current Basic Channel, up to the number of channels requested, to the limit of 16. For example, if 6 channels are requested and the base channel is set to 13, only channels 13, 14, 15, and 16 could be used. In other words, to use six Multi or Mono channels, you must set the Basic Channel to 11 or lower.

If you're using a guitar controller, this should generally be set to 6.

The NumMultiChannels parameter will only appear if the Multi MIDI Mode is set to NORMAL; the Num MonoChannels parameter, only if the Multi MIDI Mode is set to MONO.

**WaveSeqSync - Wave Sequence Sync Source**

INT. This is the default setting, so that Wave Sequences sync to an internal clock. MIDI clocks are ignored.

MIDI. When MIDI is selected, Wave Sequences sync to MIDI clocks. The number of clocks for each step is taken from the Step Duration parameter.

For best results when using a sequencer and syncing Wave Sequences to MIDI clocks, quantize all notes playing Wave Sequences to a few milliseconds before the beat. This will ensure that your sequencer will send out the notes before the clock message, so that the Wave Sequence rhythms will be right on the beat.

If Wave Sequence Sync is set to MIDI and no clocks are received, the Wave Sequences will not advance beyond their first step.

**Param - SysEx Parameters Receive and Transmit**

This controls the reception and transmission of System Exclusive parameter changes. When any parameter is edited (ENV 1 level one, for instance, or LFO 2 rate), the Wavestation SR can send out SysEx messages to be recorded by a sequencer or received by another Wavestation SR, Wavestation A/D, or Wavestation keyboard. This allows yet another way to automate real-time timbre changes, such as MIDI-synced filter sweeps. A large amount of data is sent out by this feature, so if you aren't using it, it's best to keep it set to DISABLE. This setting has no effect on SysEx data dumps.

DISABLE. The Wavestation SR's parameters are neither transmitted nor received. This is the default.

RECEIVE. The Wavestation SR will respond to, but not transmit, parameter changes.

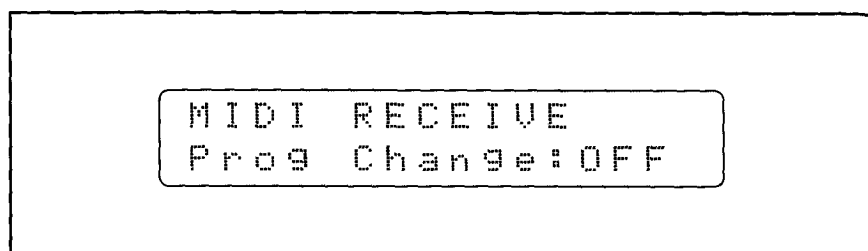
TRANSMIT. The Wavestation SR will transmit, but not respond to, parameter changes.

RECV&TRANS. The Wavestation SR will both transmit and respond to parameter changes.

## **MIDI RECEIVE**

*midi receive filtering*

*MIDI Level*



The MIDI RECEIVE page allows you to configure the Wavestation SR for your MIDI system. In most cases, the default parameters should work well. Changing parameters on this page will change them for every Performance; remember that the effects of Pitch Bend, Aftertouch, and MIDI Controllers may also be overridden within individual Patches. Also, the Sustain Pedal can be overridden within individual Performance Parts.

The first six parameters all have the same possible values: ON or OFF.

ON means that the message type is recognized.

OFF means that the message type is ignored.

### **Prog Change - Program Change**

This parameter controls the reception of Program Change messages.

### **Bank Select**

This parameter controls the reception of Bank Select messages. Turning this OFF makes it easy to browse through all of the SR's Banks from a controller which has less MIDI Banks than the SR, such as the Wavestation keyboard or the 01/W. (Make sure to turn it back on again after you're through!)

### **Aftertouch**

This parameter controls the reception of Channel or Polyphonic Aftertouch.

### **Pitch Bend**

This parameter controls the reception of Pitch Bend messages.

### **Controllers**

This parameter controls the reception of MIDI controller messages, including MIDI Volume, the Sustain (Damper) Pedal, and the Modulation Wheel.

## AllNotesOff

This parameter allows you to ignore the All Notes Off message, which is sent by some controllers when all keys are released. If you have been noticing notes cutting off unexpectedly, make sure that this parameter is set to OFF.

ON means that when an All Notes Off message is received, all voices are immediately turned off (with release, just as if a Note Off was received).

OFF means that key events will be unaffected by All Notes Off messages.

## Play Notes

This parameter allows you to use two Wavestation SRs (or an SR and the Wavestation keyboard or Wavestation A/D) side-by-side to double the number of available voices. Simply set one to respond to even numbered notes, and set the other to respond to odd-numbered notes.

In such applications the two Wavestations would typically be programmed identically (the SYSEX DATA XMIT "ALL" command allows you to easily copy an entire machine's memory). However, interesting results could be obtained by programming them differently.

ALL is normal. It means that the Wavestation SR recognizes all Note messages.

EVEN means that only the even note numbers are played.

ODD means that only the odd note numbers are played.

## ActSensCntrl - *Active Sensing Controller Reset*

Active Sensing is a portion of the MIDI spec intended to prevent bad things from happening when a MIDI cable is accidentally disconnected from a sound generator (such as notes being hung). The idea is that, once hooked up, the controller sends out messages equivalent to "Hello, I'm here....hello, I'm here....hello, I'm here" at regular intervals. If the sound generator stops seeing these messages, it assumes that the cable has been disconnected and shuts off all of its notes.

The Wavestation SR also has the capability to reset all of its controllers when Active Sensing is interrupted. If a cable is disconnected during a pitch bend, for instance, the SR can automatically return the pitch bend to zero.

Some sequencers, however, send out two or three Active Sensing messages when you stop playback. This acts kind of like an All Notes Off command, since when the messages stop coming the sound generators assume that the cable has been disconnected. If your sequencer does this, then you may not want the SR to reset its controllers automatically, so that certain settings - such as volume and pan - are preserved.

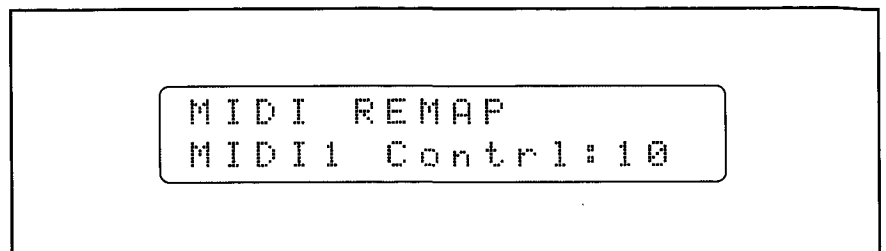
OFF is the default, so that controllers are not reset.

ON means that controllers will be reset when Active Sensing is interrupted.

## **MIDI REMAP**

*remap midi controllers and program changes*

*MIDI/GLOBAL Level*



The MIDI REMAP page allows you to specify the MIDI Controllers #1 and #2, which are used in the Patch modulation matrix. You can also specify MIDI Controllers to use as the Joystick and FX Switch modulators, and can map Program Changes to select Multisets and Multiset effects.

### **MIDI1 Contrl - Assignable MIDI Controller 1**

OFF, 1-95. This sets the MIDI controller to be used as MIDI1 in the Patch and Effects modulation matrices. OFF means that no controller is used.

For more information, please see section 6.3 of the Player's Guide.

### **MIDI2 Contrl - Assignable MIDI Controller 2**

OFF, 1-95. This sets the MIDI controller to be used as MIDI2 in the Patch and Effects modulation matrices. OFF means that no controller is used.

For more information, please see section 6.3 of the Player's Guide.

### **Map to JoyAC**

OFF, 1-95. MIDI Controller #16 is the default for this parameter.

This parameter sets the MIDI controller to be mapped to the Joystick x-axis. If your controller does not have a joystick, this enables you to use its wheels, sliders, pedals, etc. to change the Vector Position and modulate the effects using the Mod Source JOYAC.

### **Map to JoyBD**

OFF, 1-95. MIDI Controller #17 is the default for this parameter.

This parameter sets the MIDI controller to be mapped to the Joystick y-axis. If your controller does not have a joystick, this enables you to use its wheels, sliders, pedals, etc. to change the Vector Position and modulate the effects using the Mod Source JOYBD.

### **Map to FX Switch**

OFF, 1-95. MIDI Controller #12 is the default for this parameter.

This parameter sets the MIDI controller to be mapped to the FX Switch,

---

used in the effects modulation matrix as FXSW and FX TOG.

### **Change Multi w/Prog - Change Multiset with Program Change**

The MIDI Mode must be set to MULTI or MONO for this feature to function.

This parameter allows Multisets to be selected by MIDI Program Changes received on the Basic Channel. Program Changes 0-31 call up Multisets 0-31.

When Change Multi w/Prog is ENABLED, you can still play a Performance on the Basic Channel, but you cannot change that Performance over MIDI (except by calling up another Multiset).

ON means that this feature is on.

OFF means that this feature is off.

### **Change Multi FX w/Prog - Change Multiset Effects with Program Change**

The MIDI Mode must be set to MULTI or MONO for this feature to function.

This parameter enables the Multiset Effects to be changed by MIDI Program Changes received on the FX Control Channel.

ON means that this feature is on. When a MIDI Program Change is received, it normally calls up one of the Wavestation SR's Performances. In this case, however, a Program Change on the FX Control Channel will call up only the *effects* of the Performance, which will then be applied to the current Multiset. This makes it easy to change effects during a song while using the Wavestation SR as a multi-timbral module.

You can still play a Performance on the FX Control Channel with this feature enabled. Program changes will affect this Performance as well as the Effects.

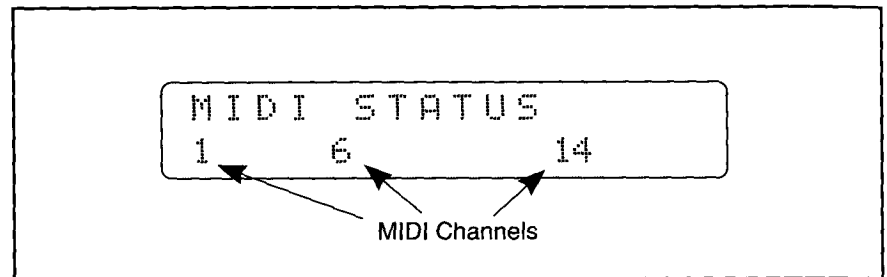
OFF means that this feature is off, and Program Changes on the FX Control Channel will simply change the Performance assigned to that channel.



## MIDI STATUS

*midi activity display*

### *MIDI Level*



The STATUS page is a graphic display of when, and on what channel, MIDI data is being received. When data is received on a particular channel, the channel's number appears briefly on the lower line.

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

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

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

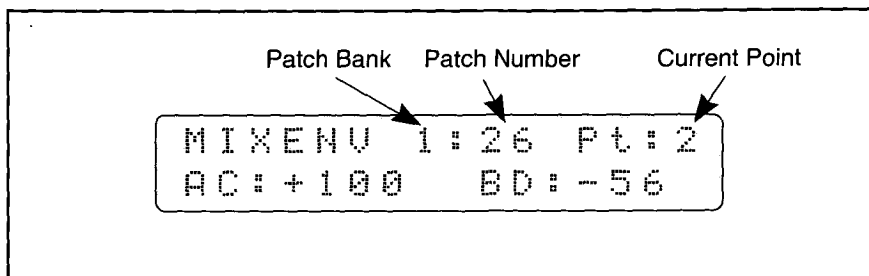
The MIDI STATUS page is a good, quick way to check if your MIDI setup is working properly. Similarly, the built-in Demo Sequences make it easy to test the audio connections of the Wavestation SR. To play the sequences, press the PERF and BANK buttons simultaneously, and then press +1/YES. If you can hear the familiar strains of the demos, then you know that your audio connections are OK.

For more information, see Section 11.3 of the Player's Guide, TROUBLE-SHOOTING.

## MIXENV

*mix envelope (vector synthesis)*

### *Edit Patch Level*



The Mix Envelope controls the volume mix between the Waves in the Patch, allowing you to create Vector Synthesis sounds.

If the Patch is in 2 oscillator mode, the B-D parameter disappears. Waves A and C continue to be affected by the Mix Envelope.

If the current Patch has only a 1-oscillator Structure, you can't access this page.

As with the Amplifier Envelope and Envelope 1, the Mix Envelope has four segments. The Mix Envelope can be set to loop over a range of points (which is, in effect, a miniature form of Wave Sequencing).

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### **Pt - Current Point**

0-4. This is the current point number. Pressing the UP cursor increments the point, and pressing the DOWN cursor decrements it. This parameter only shows up on the AC/BD, Mix Percentages, and Center Point screens.

Point 0 is the mix at the beginning of the note.

Points 1 and 2 are intermediate mix points.

Point 3 is the sustain mix. Unless you're using a loop, the mix will evolve to this point and then stay there as long as the note is held down.

Point 4 is the release mix. After the note is let up, the mix will evolve towards this point.

**AC - Mix of Waves A and C (Horizontal)**

**BD - Mix of Waves B and D (Vertical)**

-127 to +127. These parameters control the mix of the Waves at the current point.

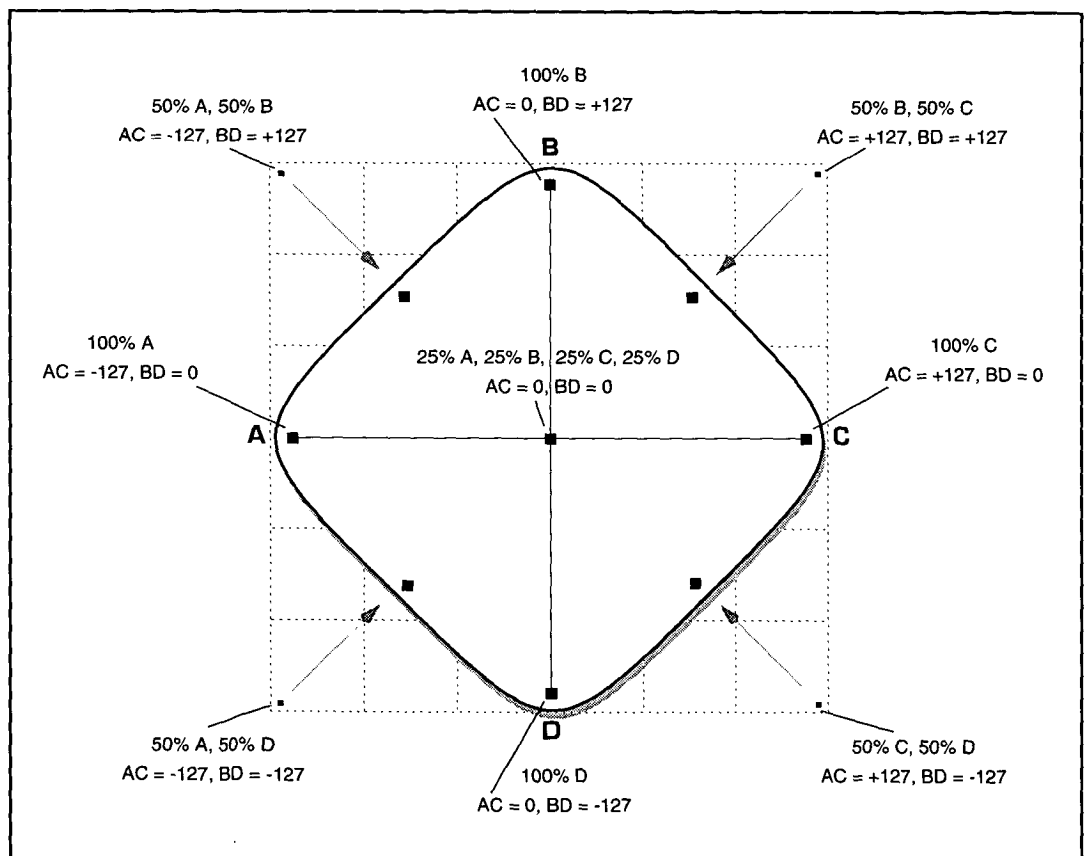
When working with a 2-oscillator structure, only the AC parameter appears. In this case, -127 produces all Wave A, +127 all Wave C, and 0 an equal mix between the two.

In a four-oscillator structure, both AC and BD appear. These move the current point around within the 2-dimensional Vector Mix, and so the two parameters interact to create the sound.

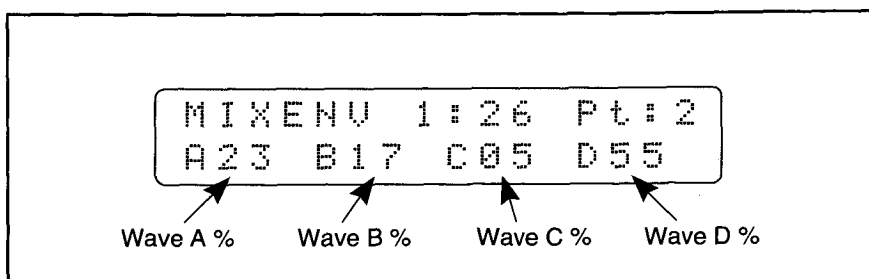
The total mix of all of the Waves is always 100%; if one Wave gets louder, another must get quieter. This means that, depending on the value of BD, a particular value of AC might have a very different effect. For example, if AC is set to 0, it means that there is an equal mix of Waves A and C - but with different settings for BD, that could be anything from 50% to 25% to 0% each.

Points outside the diamond-shaped Vector Mix area are "clipped" to points on its edge.

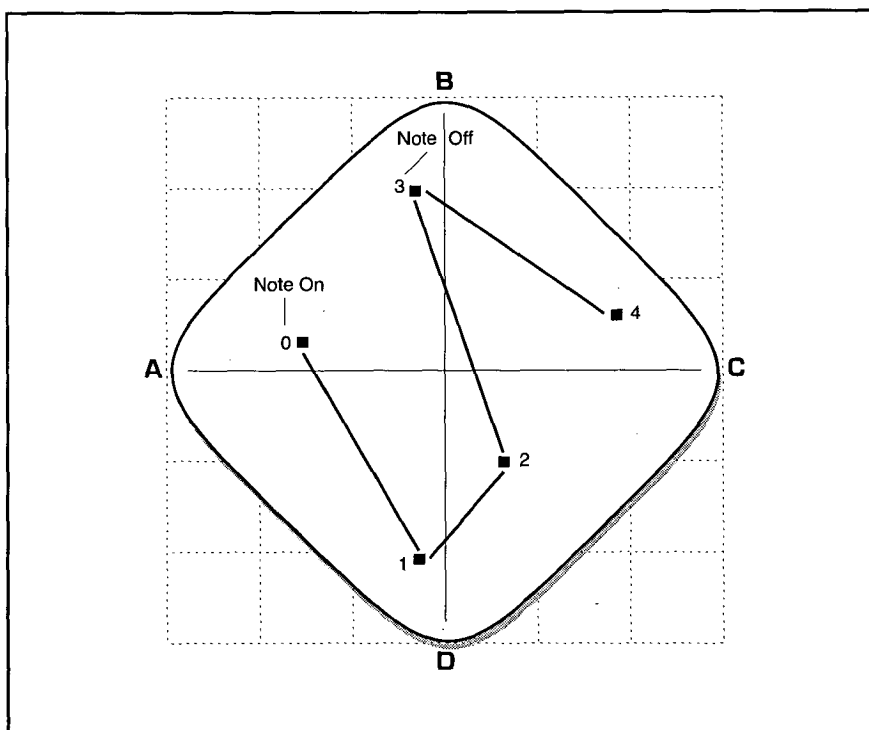
*Mix Envelope Points*



Wave Mix Percentages screen, MixEnv page

*(Wave Mix Percentages)*

This display shows the relative percentages of each of the Waves, as determined by the AC and BD settings on the previous screen. This screen cannot be edited directly.

*Mix Envelope example***Time - Times 1 - 4**

0 - 99. The duration of the selected envelope segment. The envelope times adjust the rate at which the Vector Mix develops. Greater time values mean slower envelopes.

Time 1 is the attack time (the time between points 0 and 1).

Time 2 is the decay time (the time between points 1 and 2).

Time 3 is the slope time (the time between points 2 and 3).

Time 4 is the release time (the time between Note Off and point 4).

## Loop

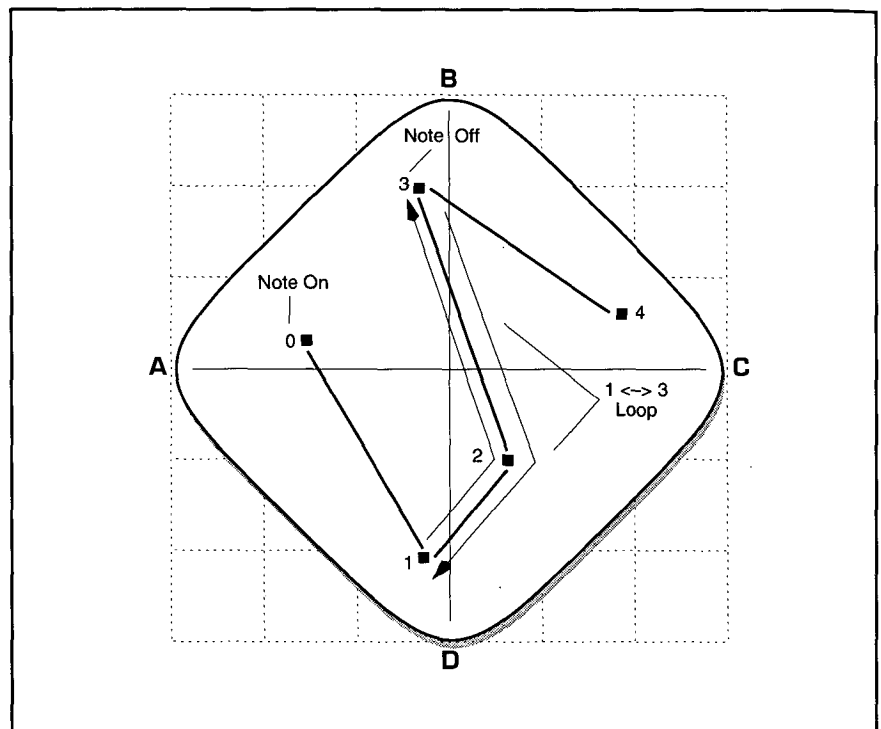
Normally, while a note is sustained, the oscillator mix will progress to and remain at point 3 (the sustain point). However, you can set a loop so that while the key is held, the mixture moves between point 3 and any of the previous points.

OFF is the default.

0 -> 3, 1 -> 3, and 2 -> 3 are forward loops. These progress from the first point to the last, and then jump immediately back to the first.

0 <-> 3, 1 <-> 3, and 2 <-> 3 are bidirectional loops. These move from the first point to the last, and then back in the opposite direction, from the last to the first.

### *Bidirectional Loop 1 <-> 3 example*



## LoopRepeats

This parameter only matters if envelope looping is on.

OFF means the loop does not repeat.

1 - 126 limit the loop to that number of repetitions.

INF (infinite) repeats continue through the amp envelope release phase.

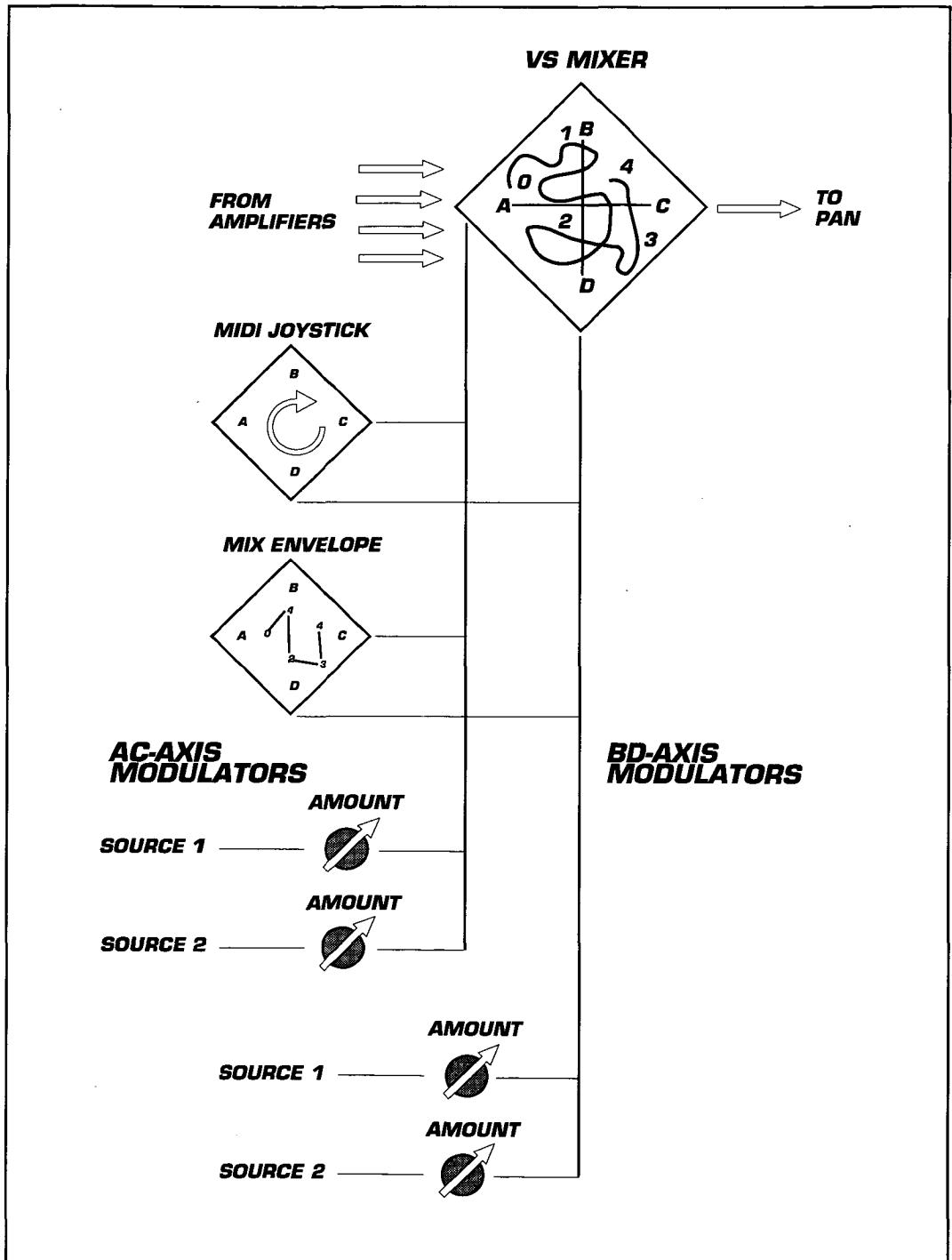
## Center Point?

Pressing YES sets the mix at the current point to equal amounts of each wave.

## UP/DOWN CURSORS

The Up and Down cursors change the current envelope Point in order, as displayed in the upper right-hand corner of the screen. The Point parameter only shows up on the AC/BD, Mix Percentages, and Center Point screens.

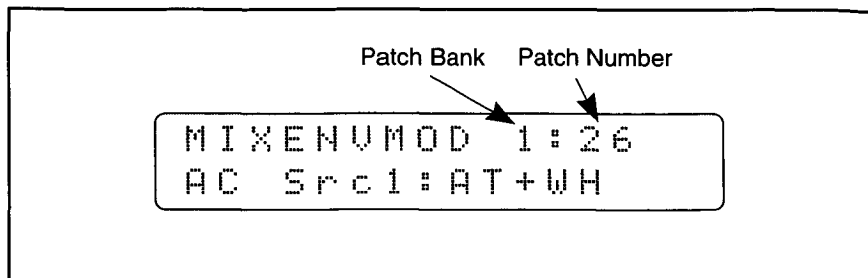
Mix Block Diagram



## MIXENVMOD

*mix envelope modulation*

### *Edit Patch Level*



Each of the two mixer dimensions can have two modulating sources in addition to the mixer envelope (and MIDI joystick).

The BD parameters appear only when the Structure is four oscillators.

If the Structure is 1 oscillator, this page doesn't appear.

Please see the Mix Block Diagram in the entry under MIX ENV.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Edit Performance page (since this is on the next level up, you can get there by holding down PAGE+ and pressing EDIT); they are displayed here for your convenience only.

### **AC Src1/2 - AC Mix Sources 1 and 2**

These are the modulation sources for the AC axis of the Vector Mix. These can be selected from all of the normal Patch modulation sources, as detailed in the entry under MACROS.

The Envelope 1 and LFO 1/2 selections use the envelope and LFOs of Wave A.

### **AC Mod1/2 Amt - AC Mix Modulation Amounts 1 and 2**

+/- 127. Each modulator can have its own level, and a normal or inverted effect.

### **BD Src1/2 - BD Mix Sources 1 and 2**

These are the modulation sources for the BD axis of the Vector Mix. These can be selected from all of the normal Patch modulation sources, as de-

tailed in the entry under MACROS.

The Envelope 1 and LFO 1/2 selections use the envelope and LFOs of Wave A.

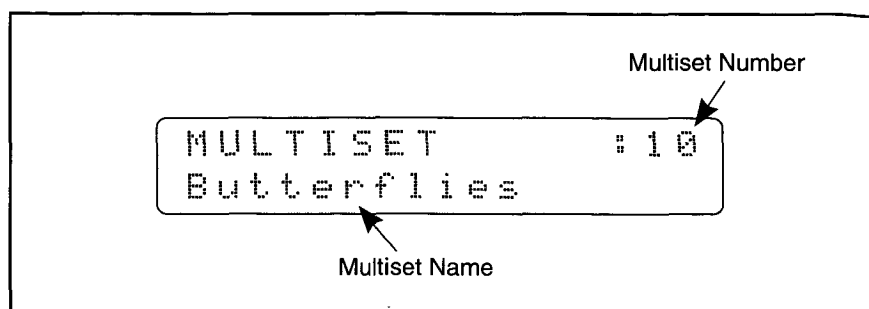
**BD Mod1/2 Amt - *BD Mix Modulation Amounts 1 and 2***

+/- 127. Each modulator can have its own level, and a normal or inverted effect.



## MULTISET

*multiset select*



Pressing the MULTI button takes you to this page, as well as setting the Wavestation SR to Multi Mode.

Pressing EDIT while on this page takes you to the EDIT MULTI page.

MULTI Mode enables the Wavestation SR to receive multi-timbrally, one Performance per channel. The Edit Multiset page provides a table assigning any Performance to any MIDI channel. Any channel may also be ignored, allowing you to reserve it for other use.

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

The Multiset serves to select an initial set of Performances and effects settings. These setups allow you to try various sound combinations without having to specifically program those selections from a sequencer. Although it is possible to change Multisets via MIDI Program Changes or System Exclusive commands, this is not always necessary - because each channel of a Multiset responds to MIDI Program Changes *independently*. This means that, in MULTI Mode, the Wavestation SR functions as up to 16 discrete synthesizers.

Multisets are stored in internal nonvolatile RAM and can be dumped via MIDI System Exclusive.

For more information, please see the description of the Edit Multiset page in this Reference Guide, and Chapter 5, Using Multisets, of the Player's Guide.

### *(Multiset Name and Number)*

0 - 31. These are the name and number of the current Multiset. Changing the Multiset sends out a MIDI System Exclusive command, which may be recorded and played back to the Wavestation SR by an external sequencer. This enables you to automate the selection of different Multisets for different songs, to change effects, MIDI Channel on/off configurations, etc.

Note that this message, like MIDI Program Changes, sends only the num-

ber of the Multiset, and not the Multiset data itself. To send the actual data (Performances selected for each channel, levels, etc.), use the Xmit Multi Dump command on the Edit Multiset page.

It is also possible to change Multisets with MIDI Program changes. When the Prog Change to Multi parameter on the MIDI REMAP page is set to ENABLE, Program Changes received on the Basic Channel change the current Multiset. Program Changes 0-31 call up Multisets 0-31.

When this feature is active, you can still play a Performance on the Basic Channel, but you cannot change that Performance over MIDI (except by calling up another Multiset).

### **EDIT button**

Pressing EDIT takes you down to the Edit Multiset level, on the EDIT MULTI page.

### **UP/DOWN CURSORS**

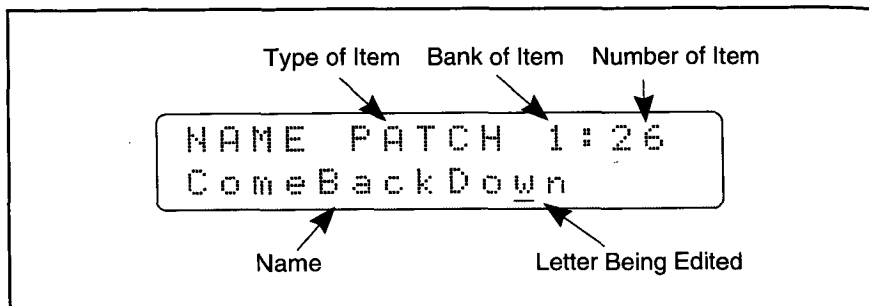
The UP and DOWN cursors, along with +1/YES and -1/NO, select the current Multiset.

## NAME CARD/MULTI/ PATCH/PERF/WAVESEQ

*all items are named in the same way*

*Name Card: Global Level*

*Name Multi, Patch, Perf, and WaveSeq: Write Level*



The NAME page functions identically in all places it is used.

To save changes to Multiset, Patch, and Performance names, you must Write them. Changes to Wave Sequence and Card names, on the other hand, don't need to be written - they are automatically saved when you exit the page.

**NOTE:** If you pull the Card out of the SR while still on the NAME page, any changes to the name will be lost.

The cursor shows the character in the name which is currently being edited. You can move this cursor around by using the left/right cursor keys.

Each name can have 15 characters (except for Wave Sequences, which can have seven). On some of the Wavestation SR's pages, the full name may be abbreviated to allow room for other text.

### *(Type of Named Item)*

The first line tells you what you are naming; this depends on how you entered the Name page.

To name a Multiset, Performance, Patch, or Wave Sequence, you must be on the appropriate Edit level and then press WRITE/COMPARE to go to the Write level; pressing PAGE+ will then bring you to the NAME page.

To name a Card, you must go to the Global level, and then to the NAME CARD page. This page also appears after you have formatted a Card.

### *(Bank and Number of Named Item)*

This displays the Bank and number of a Patch, Performance, or Wave Sequence, or the number of a Multiset. These cannot be changed from this page, and are displayed here for your convenience only.

If the data is from one of the ROM banks, you must copy the item to a RAM or CARD location before it can be named.

This parameter does not appear when naming a Card.

*(Character Field)*

To enter a letter, number, or punctuation mark, use +1/YES and -1/NO. You may find the data entry shortcuts particularly helpful here - there's a table of them below, with specific values for the NAME page.

**Key Combination Shortcuts**

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

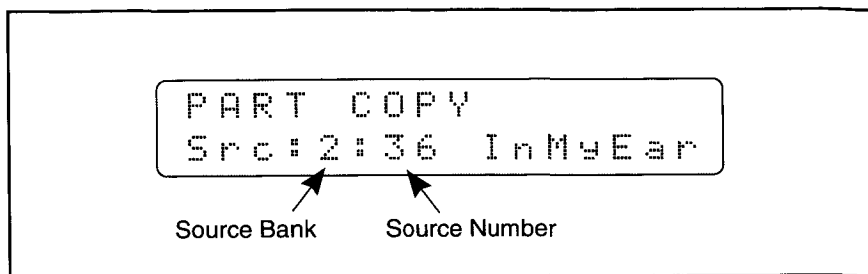
**RIGHT/LEFT CURSORS**

The Right and Left cursors move you from letter to letter in the name.

## **PART COPY**

*performance part copy*

*Edit Performance level*



PART COPY allows you to copy one Part's parameters to another. This includes all of the parameters on the EDTPERF page, such as the selected Patch, Transposition, Delay, FX Bus Routing, and so on.

### **Src - Source Performance**

The Bank, number and name of the Performance which contains the Part to be copied.

### **SrcPart - Source Part**

The number and name of the Part to be copied.

### **Dst - Destination Performance**

The Bank, number and name of the Performance which contains the Part to be copied over.

### **DstPart - Destination Part**

The number and name of the Part to be copied over.

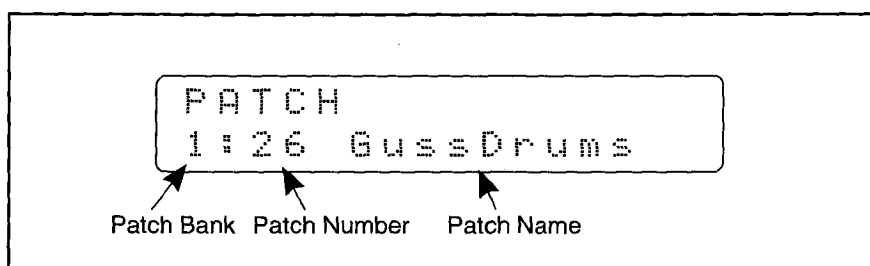
### **Copy Part?**

Pressing +1/YES copies the Part; any other keys cancel the operation.

## PATCH

### *basic patch parameters*

#### *Edit Patch level*



For an introduction to Patches, please see Chapter 8, "Patch Tour," in the Player's Guide.

Patches are the sonic backbone of the Wavestation SR. There can be up to eight Patches in a Performance. You can save 35 patches in each bank of RAM, and an additional 35 on a RAM Card. The 35 patches each in ROM4 through ROM 11 may be edited and saved to RAM banks or Cards.

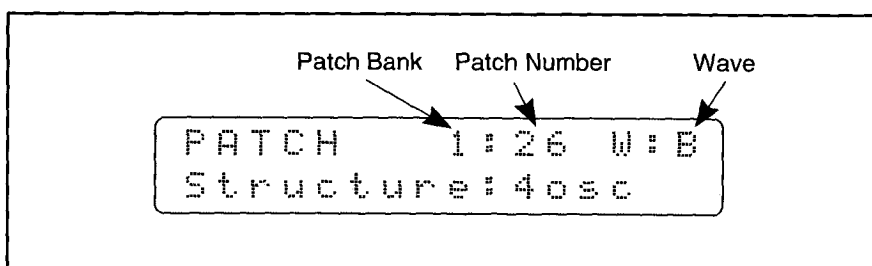
#### *(Patch Bank)*

This is the Bank of the current Patch. 1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

#### *(Patch Number and Name)*

0 - 34. These are the name and number of the current Patch.

**NOTE:** Selecting a different Patch changes the Patch used by the currently selected Part. This causes the current Performance to be edited.



## **Structure**

1, 2, or 4 osc. The Structure sets how many oscillators, or Waves, the Patch will use.

4-oscillator Patches have the richest sound, as they use all four Waves - A, B, C, and D. They also qualify for Vector Synthesis treatment through the two-dimensional dynamic mixer. Any oscillator can use Waves or Wave Sequences.

2-oscillator Patches provide Waves A and C, allowing one-dimensional,

linear mixing between them.

1-oscillator Patches use Wave A only, and do not offer dynamic mixing or hard sync. The availability of Wave Sequencing, however, ensures that even single-oscillator Patches are capable of producing interesting and innovative sounds.

### Hard Sync

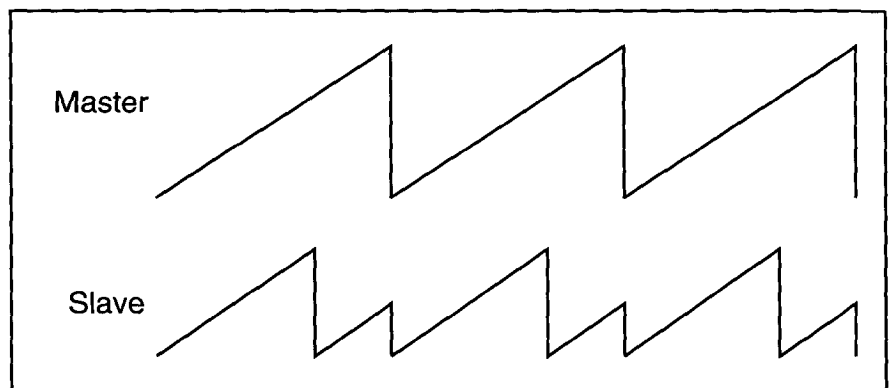
The "hard sync" function is only available if the Patch has a Structure of two or four oscillators.

OFF is the default. The oscillators are free-running.

ON means that oscillator C (and B/D, if the current Patch has a four oscillator structure) is synced to A.

Hard sync means that whenever oscillator A starts a new cycle, all the other oscillators start their cycles as well. But since the *periods* of the "slave" oscillators are usually different than the master's (because they are playing different pitches), the waves of the slave oscillators are re-shaped "in sync" with the master. The abrupt cutoff of the slave waves creates a new, harmonically-rich timbre.

*Hard Sync Diagram*



Since the overall timbre depends upon the pitch relationship between the slaves and the master oscillator, you can vary the timbre by modulating the pitch of the slaves. The pitch shift can be subtle (usually by LFO) or extreme (usually by envelope), as in the case of the classic "swept-sync" patch.

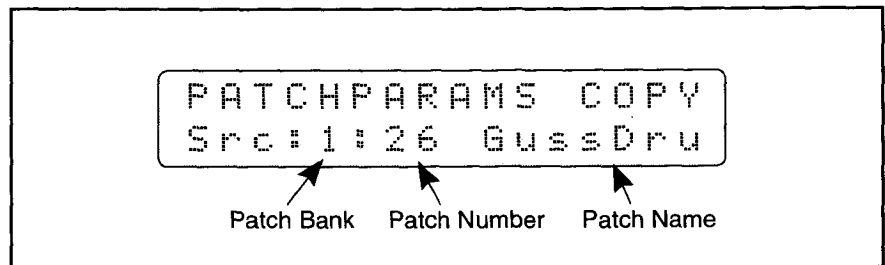
### Init Patch? - Initialize Patch

This function causes all of the Patch parameters to be reset to default values, as a starting point for programming. Pressing the +1/YES button brings up an Are You Sure???? message, to avoid accidental erasing of your data; pressing +1/Yes again initializes the Patch. Pressing any other buttons at either of these two screens cancels the initialization, leaving the Patch intact.

## **PATCH PARAMS COPY**

*patch parameters copy*

*Edit Patch level*



This function allows you to copy Patch parameters - Filter settings, for example - from one Patch to another, or from one Wave to another within the same Patch.

You can use this to duplicate any user macro you have created. For instance, you can initialize new Patches to your favorite modulation configuration, or impose a uniform envelope over different percussion waves in the same Patch.

### **Src - Source Patch**

The Bank and number of the Patch to copy from.

### **Dst - Destination Patch**

The Bank and number of the Patch to receive the parameters. This may be the same as the Source.

### **Src Page - Source Page**

This is the page from which the parameters will be copied. Pages which may be copied from include: ALL, PITCH, FILTER, AMP ENV, AMP MOD, PAN, LFO 1, LFO 2, ENV1, ENV1 MOD, MIX ENV, FX-BUS.

### **Dst Page - Destination Page**

This is the page to which the parameters will be copied.

Most pages can only be copied to the same page in the Destination; for instance, Pitch must be copied to Pitch (it wouldn't make much sense to copy the Pitch parameters to the Filter). LFOs and envelopes are exceptions to this rule; LFO1 can be copied to LFO2, and vice-versa, and ENV1 can be copied to the AMPENV, and vice-versa.

### **SrcWave - Source Wave**

ALL, A, B, C, D. If the Source Wave is set to ALL, the Destination Wave must also be ALL.



## PATCH PARAMS COPY

---

### **DstWave** - *Destination Wave*

The Wave(s) to receive the parameters.

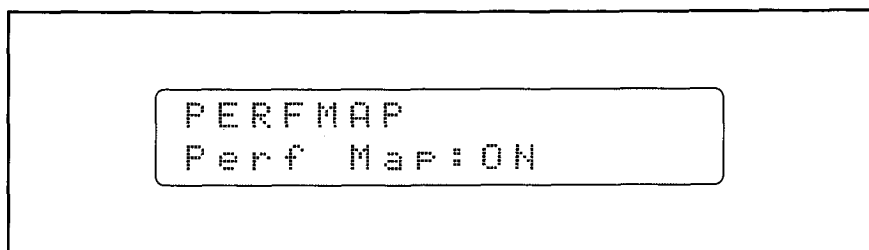
### **Copy Params?**

Pressing +1/YES copies the parameters; any other keys cancel the operation.

## PERFMAP

*performance select map*

*MIDI level*



For more information on the Performance Select Map, please see Section 5.10 of the Player's Guide, which discusses this page in depth.

The Performance Select Map allows you to assign each of the 128 MIDI Program Change commands to call up any Wavestation SR Performance. Program Change 34 might call up Performance RAM1 9, for instance, while Program Change 35 calls up CARD 49. This can be useful in configuring the Wavestation SR as a sound module in a system based around a master controller.

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

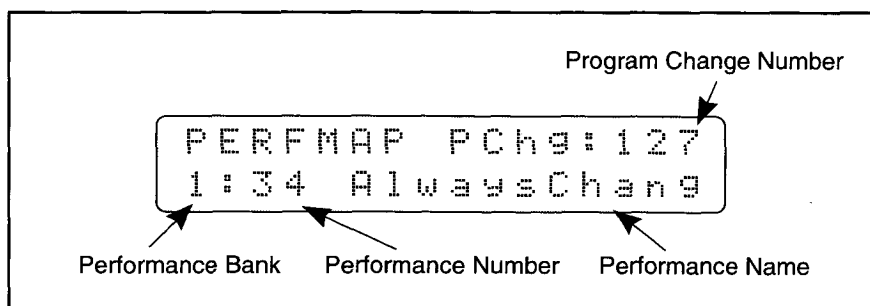
The Performance Select Map works when selecting Performances in a Multiset, as well.

### Perf Map - Performance Select Map

This parameter switches the Performance Select Map on and off.

OFF is normal and the default. This means that the map is not used, so Performances are selected as explained under section 5.8 of the Player's Guide.

ON means that the Performance Select Map is used.



### PChg - Program Change #

0 - 127. This is the current MIDI Program Change number; change it by using the UP and DOWN cursors, or simply by using your controller to send the appropriate MIDI Program Change message. Each number may be

mapped to a different Performance (or they can even all be mapped to the same Performance, if you're feeling particularly wild); this Performance is displayed on the bottom line of the screen.

### *(Performance Bank and Number)*

These are the Bank, number, and name of the Performance that will be selected by the MIDI Program Change at the upper right of the screen. The same Performance may be selected by multiple MIDI Program Changes. Change the Performance by using the +1/YES and -1/NO buttons.

### **UP/DOWN Cursors**

The Up and Down cursors select the current Performance Change number.

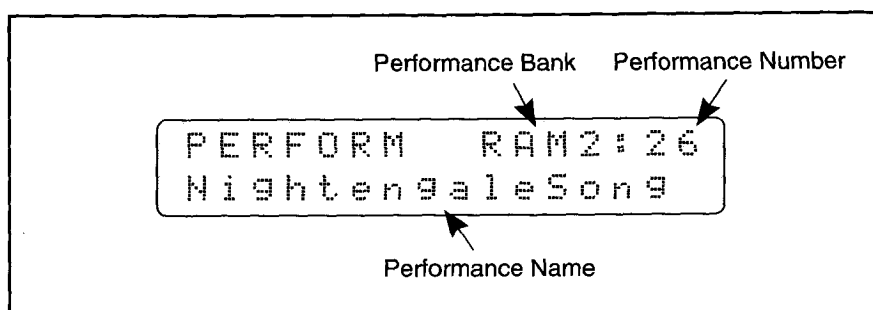
### **MIDI Program Changes**

Incoming MIDI Program Change messages can also be used to select the current Performance Change number, just like the Up and Down cursors.

## PERFORM

*performance*

*Performance level*



The PERFORM page lets you quickly select different Wavestation SR Performances. Pressing the PERF button takes you to this page, in addition to setting the Wavestation to Performance Mode.

Pressing the EDIT button while on this page takes you to the Edit Performance page.

Using the Performance page is discussed in detail in Chapter 4 of the Player's Guide, "Basic Operation."

### *(Performance Bank)*

RAM1 - 3, ROM 4 - 11, and CARD. This is the memory Bank which contains the current Performance. You can press the BANK button to cycle through the banks.

Switching the Bank selects a new Performance. The current number in the new bank is heard immediately.

A Performance in RAM1, for instance, can simultaneously use Patches from ROM4, ROM8, RAM1, RAM2, and a Card. Likewise, a RAM2 Patch can use ROM or card PCM waves, or Wave Sequences from any banks.

ROM 4 - 11. Performances in the ROM Banks are permanently installed in the Wavestation SR, and cannot be overwritten. ROM Performances use only ROM Patches and ROM waves.

RAM1 - 3. These banks are the user's work area, although they are initially filled with additional factory-programmed Performances, Patches, and Wave Sequences.

CARD. This selection uses the Performances from cards inserted into the PROG DATA slot. This can be either a RAM or a ROM card.

### *(Performance Number)*

0-49. Each bank contains 50 Performances; select them with the +1/YES and -1/NO buttons, or use the UP and DOWN cursors.

As you change the number of the current Performance, its name is displayed on the bottom line.

**BANK button**

Pressing BANK cycles through the twelve bank choices (RAM 1 through 3, ROM 4 through 11, and CARD, if inserted). Pressing BANK and -1/NO together cycles through the banks in reverse order.

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

For more information, please see Section 4.8 of the Player's Guide.

**EDIT button**

Pressing EDIT takes you to the Edit Performance page.

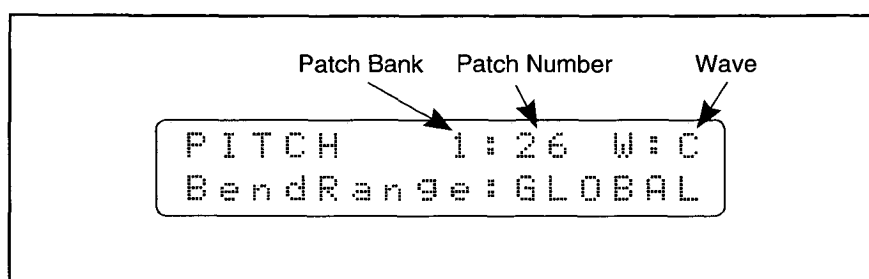
**UP/DOWN CURSORS**

The Up and Down cursors, along with +1/YES and -1/NO, change the current Performance.

## PITCH

*pitch modulation*

*Edit Patch level*



The Pitch module controls the frequency modulation of the Patch waves.

A Pitch Ramp is included, which lets you start the note flat or sharp by a velocity-controlled amount.

### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Patch page; they are displayed here for your convenience only.

### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave, or select "All" (all Waves), by using the Up and Down cursors.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

"All" means that all Waves are selected, so that you can edit the entire Patch at once. This won't appear in a 1-oscillator Patch.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard (if you have selected "All" in a multi-oscillator Patch, the "M" indicates that some or all of the Waves are muted). To mute or un-mute a wave, use the Page +/- buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

### **BendRange - Pitch Bend Wheel Range**

GLOBAL means that the current Wave(s)'s bend range will be set by the Pitch Bend Range parameter on the GLOBAL page. OFF means that Pitch Bend will not affect the current Wave(s).

1-12 set the maximum Pitch Bend wheel range, in semitones. 1 is a semitone, 2 a wholetone, 3 a minor 3rd, 4 a major 3rd, 5 a perfect 4th, 6 a diminished 5th, 7 a perfect 5th, 8 a minor 6th, 9 a major 6th, 10 a dominant 7th, 11 a major 7th, and 12 an octave. These values override the GLOBAL setting for the current Wave(s) only.

**Ramp Amt - Pitch Ramp Amount**

+/- 127. The difference between the ramp's initial pitch and the normal pitch of the key. A Ramp Amount of 127 is roughly equal to an interval of a 10th.

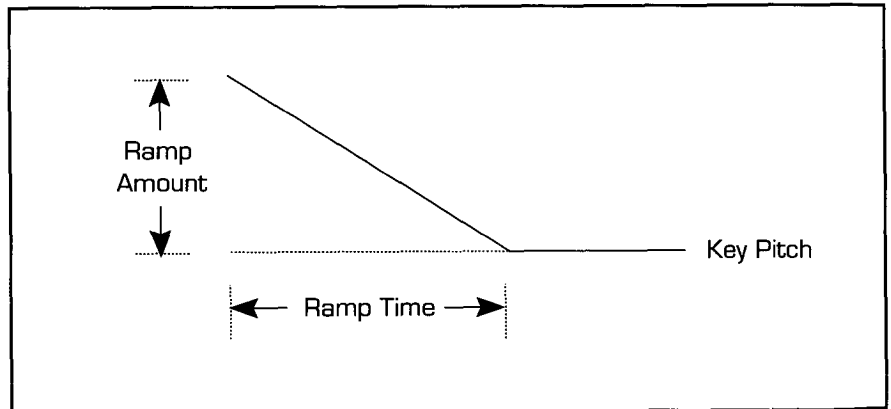
**Ramp Time - Pitch Ramp Time**

0 - 99, ON. Time for pitch to change from initial pitch to base pitch.  
ON keeps the pitch at the initial pitch value indefinitely.

**VelocityAmt - Pitch Ramp Velocity Amount**

+/- 127. This controls the sensitivity of the pitch ramp amount to velocity. 0 means there is no effect. Positive values cause harder playing to increase the effect of the ramp; negative values decrease the effect of the ramp as you play harder.

*Pitch Ramp*



**Src1/2 - Pitch Modulation Source and Amount 1/2**

The normal Patch modulation sources can be used, including KEYBD (Linear Keyboard), CTRKB (Centered Keyboard), VEL (Linear Velocity), EXVEL (Exponential Velocity), LFO 1 and 2, ENV 1 (Envelope 1), AT (Aftertouch), AT+WH (Aftertouch + Mod Wheel), WHEEL, MIDI 1 and 2, and PEDAL.

For complete descriptions of these modulators, please see the entry for the PATCH MACRO page.

Each modulator can have its own level and a normal or inverted (+/- 127) effect.

**Macro**

The Pitch Macros allow you to instantly program several useful effects, which you may then modify as you wish. If you edit the Pitch parameters

after calling up a Pitch Macro, the label changes to User.

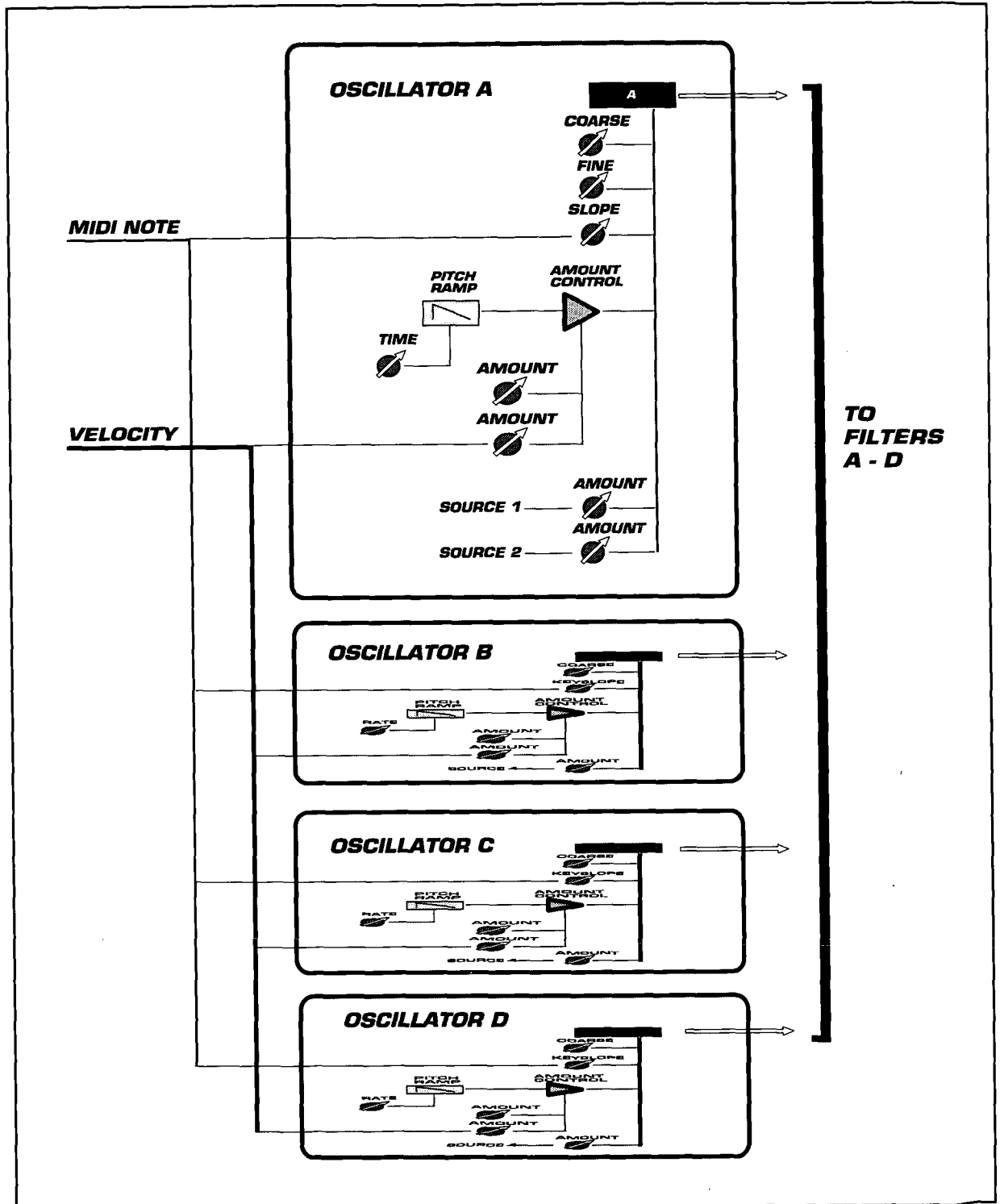
Note that calling up a Macro will cancel any previous changes to this page.

Many of the Macros include modulation routings, such as setting Source1 to LFO1. Since the Pitch Macros only affect parameters on the Pitch page, the parameters of the modulation source itself are unaffected, and you may want to fine-tune them yourself.

The Pitch Macros include DEFAULT, ENV 1 BEND, DESCENDING, ASCENDING, AT BEND (Aftertouch Bend), MIDI-BEND, and AT + MIDI-BEND.



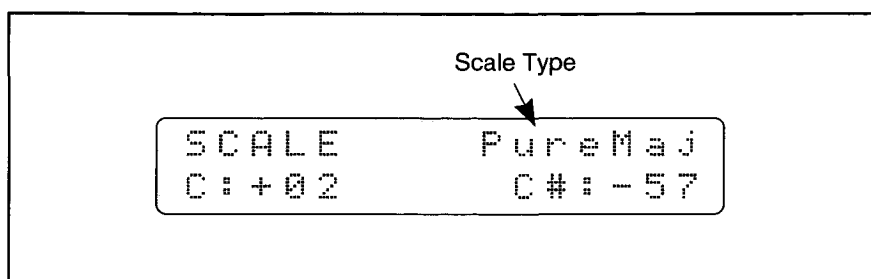
Pitch Block Diagram



## SCALE

*user scales*

*Edit Scale level*



The Wavestation SR allows you to use and design alternate tuning systems for performing historical or experimental music. There are 16 tuning tables, with 4 presets stored in ROM and 12 user-defined Scales in RAM. The User Scales may be saved to an external librarian via MIDI Sysex (see Sysex Data Transmit).

Each Part of a Performance may use a different Scale, as set on the EDTPERF page. On the same page, you may also select a tonic Key. Many alternate temperament systems are designed to produce "pure," beatless intervals for the most commonly used chords in a given key, which is usually only possible by making other, less common chords correspondingly less "pure." Thus, depending on the nature of the scale, chords not diatonic to the selected Key may sound out of tune. The Key setting does not affect the Equal Temperament scales, except when they are currently being edited.

On an acoustic keyboard instrument, changing the key of an unequal temperament generally involves re-tuning each string - not something that you can do in the middle of a concert, much less in the middle of a piece. This means that, to retain the benefits of pure intonation, the musician is restricted to a playing in a small set of closely related keys. The Wavestation SR, however, can be instantly re-tuned to a different Key (or Scale, for that matter). Simply set up a group of Performances with similar sounds and Scales, but different Scale Keys. Then, as your music modulates from key to key, you may use program changes to alter the Scale Key appropriately. In this way, the intervals may be made to remain consistently pure, regardless of key (try doing *that* on a harpsichord!).

**NOTE:** Although you may always edit any of the Scales, you will only hear the immediate results of your editing on the Parts of the current Performance which are set to play the Scale. It is possible to set different Parts to play different Scales, but to avoid confusion during editing it is advisable to set all Parts to play the Scale to be edited.

Also, detuning of Waves (on the WAVES page) and Parts (on the EDT PERF page), and the use of Chorus, Flanger, and Pitch Shift effects may obscure the effect of a Scale.

*(Scale)*

The current Scale is shown in the upper right of the screen. The UP and DOWN cursors cycle through the available Scales. Changing the Scale on this page also changes the Scale of the current Part.

The ROM tables are:

EqTemp1 (Equal Temperament 1). This is the default, most widely used keyboard tuning.

EqTemp2 (Equal Temperament 2). Similar to Equal Temperament 1, this scale includes random detuning useful for simulations of acoustic instruments.

PureMajor. This produces a modified just intonation appropriate for major keys.

PureMinor. This scale is a modified just intonation suitable for minor keys.

The 12 User scales may be modified and overwritten. Some of them have already been set to useful intonations by the factory.

**C, C#, D, D#, E, F, F#, G, G#, A, A#, B (Step Adjustment)**

You can fine-tune each of the twelve steps in a Scale. Although the steps are given note names for the sake of simplicity, they actually represent the scale degrees of the Key which has been set on the Edit Performance page. The "C" parameter is the tonic note of that Key. If the Part's Scale Key were set to F, for instance, the display's C would represent the Scale's tonic note F, the display's D would represent the Scale's G, and so on.

Each scale degree may be offset by +/- 99 cents (one equal-tempered semitone is defined as 100 cents). When a Scale has been edited, the light on the WRITE/COMPARE button will be turned on.

**UP/DOWN CURSORS**

The Up and Down cursors change the current Scale, as described above.

**Microtonal Scales using Wave Slope**

If you are interested in experimenting with microtonal scales, try using the Slope parameter on the Waves page to produce more (or less) than 12 equal subdivisions per octave. Remember that each Wave in a Patch may be set to a different slope, so if you wish to set an entire Performance to play in a particular microtonal scale, you must make sure to edit every Wave of every Patch used in that Performance.

When using Slope to create a microtonal scale, it is best to leave the Part Detail Scale set to Equal Temperament 1.

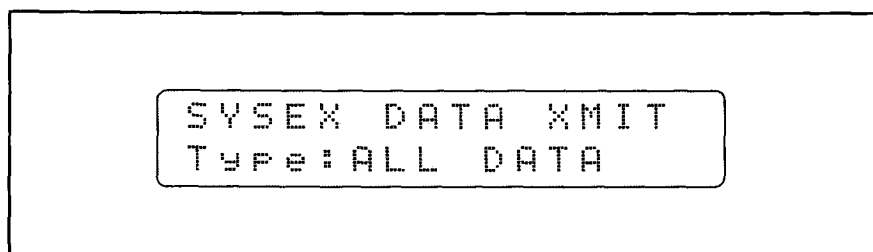
A Slope of 0.75 will produce three subdivisions for each whole-step (18 subdivisions per octave), for the Tripartate scale.

A Slope of 0.5 will produce two subdivisions for each half-step (24 subdivisions per octave), for the quarter-tone scale.

## SYSEX DATA XMIT

*system exclusive data transmit*

*MIDI level*



This page allows you to store Wavestation SR voice and setup data in a MIDI sequencer or librarian, or transfer this information between 2 or more members of the Wavestation product family (including the Wavestation SR, the Wavestation keyboard, and the Wavestation A/D). For more technical details, please refer to Appendix 3, "MIDI System Exclusive Format."

**NOTE:** The Basic Channel number is embedded in the System Exclusive data. For SysEx dumps to work properly between two Wavestation SRs (or an SR and the Wavestation keyboard or Wavestation A/D), they must be set to the same Basic Channel. For bulk dumps from a computer or other MIDI storage device to work properly, the Wavestation SR's Basic Channel must be the same as when the dump was originally made.

If you are using two or more Wavestation SRs in the same setup, you may wish to maintain different sets of Performances on each instrument. In this case, giving each of the Wavestation SRs its own Basic Channel will make sure that it only receives its own SysEx messages, and not those meant for any other unit.

The System Exclusive (SysEx) page is generally used for sending Wavestation SR data to another Wavestation or to a MIDI bulk storage device. The Wavestation SR also responds to dump requests.

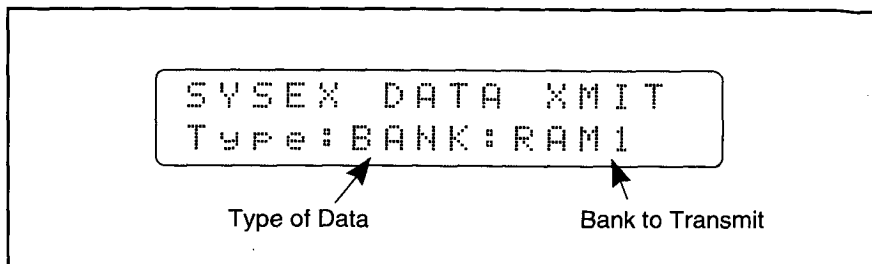
The Wavestation SR's complete System Exclusive implementation also allows convenient remote operation with a computer-based editor.

### *Type of Data*

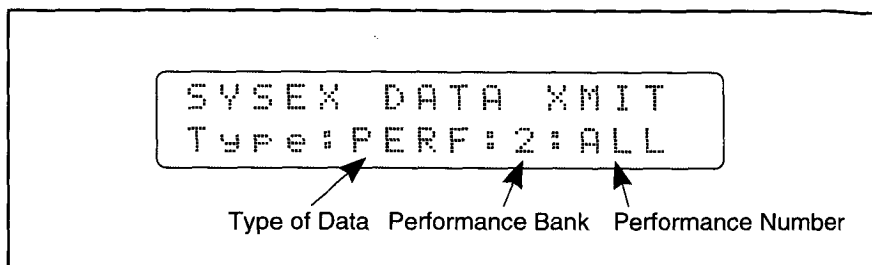
You can transmit a number of different types of data. Some of these have additional parameters, such as the Bank to be transmitted, or the Bank and number of a Performance; these can be changed simply by cursoring to the right and using the +1/YES and -1/NO buttons.

After selecting the type of data which you want to send, cursor over to the right to go to the Transmit Data command.

**ALL DATA.** Sends all data in the Wavestation SR's internal RAM, including all the data types listed below - but not from the CARD bank. To send RAM Card data, you must use the separate Bank command, below.

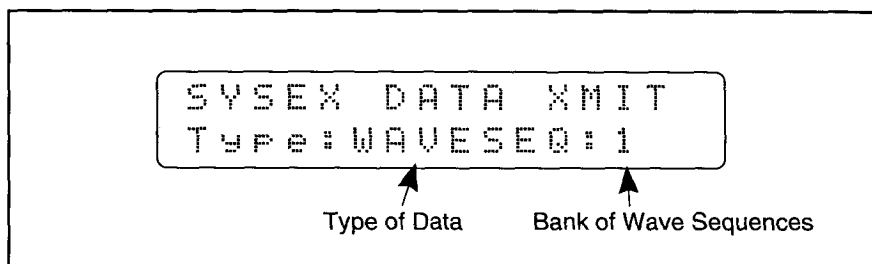


**BANK.** This sends all of the Performances, Patches, and Wave Sequences in the selected Bank. You can select either RAM1, 2, or 3, or CARD.



**PERF.** You can select the Bank of the Performance to be sent, and either a single Performance (0-49) or ALL of the Performances in the Bank.

**PATCH.** You can select the Bank of the Patch to be sent, and either a single Patch (0-34) or ALL Patches in the Bank. This uses the same parameters as the PERF transmit, shown above.



**WAVE SEQ.** Select the Bank of Wave Sequences to be transmitted.

**MULTISETS.** There is one set of 32 Multi-Mode Setups.

**GLOBAL DATA.** There is one set of global data, which includes such set-up information as the MIDI Basic Channel, current MIDI mode, Global page transposition, and so on.

**SCALES.** There is one set of twelve user scales.

**PERFMAP.** There is one Performance Select Map.

### **Transmit Data?**

Pressing +1/YES sends out the selected data type; pressing any other keys cancels the operation. While the Wavestation SR is transmitting, the top line displays the flashing message, "XMITTING MIDI SYSEX." A bar graph shows you the progress of the transmission.

Success, or any problem with the SysEx transfer, is reported.

## Receiving SysEx

The Wavestation SR does not have to be on any particular page to *receive* MIDI System Exclusive dumps. As soon as it begins to receive a SysEx dump, all notes are turned off, and the screen displays the message, "RECEIVING MIDI SYSEX." SysEx dumps can take a little while - the ALL dump, which contains the largest amount of data, takes about 65 seconds. If all goes well, the screen will briefly display the message, "SYSEX TRANSFER SUCCESSFUL."

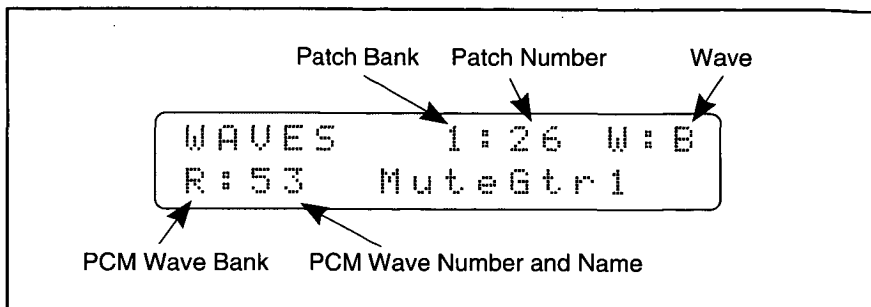
To receive dumps of ALL, BANK, PATCHES ALL, PERFORMANCES ALL, or WAVE SEQUENCES, memory protect must be turned off for the relevant banks (Internal and/or Card, as appropriate). If a memory protect setting prevents a SysEx transfer, the message, "SYSEX WRITE PROTECT ERROR" will appear. All other data types (including single Patches or Performances) will work regardless of the memory protect setting, because they write into the edit buffer instead of the main memory.

If a message is not received correctly, the screen will display the message "SYSEX CHECKSUM ERROR." This message will remain on the screen until any of the buttons are pressed. SysEx dumps contain a large amount of data, and it is possible for small parts of it to become garbled. Normally, simply re-transmitting the data is all that is needed. If this does not work, try using another MIDI cable, as the first one might be faulty. It is also possible that the stored data itself has become corrupted...which is why it's always good to keep *several* backups of all important data.

## WAVES

*pcm waves*

### *Edit Patch level*



PCM waves are the source material for Patches. PCM stands for Pulse Code Modulation, which is a standard way of storing digitally sampled sound.

There can be up to four PCM waves in a Patch. They can be short transients, multi-sampled sounds, single (or several) cycle waveforms, or Wave Sequences. The large number of PCM sounds available, and the dynamic nature of Wave Sequences, allow a variety of harmonically rich timbres far beyond the capabilities of old-style analog synthesis.

#### *(Patch Bank)*

This is the Bank of the Patch which you are currently editing.

1 - 3 are RAM1 - RAM3, 4 - 11 are ROM4 - ROM11, and C is Card.

#### *(Patch Number)*

0 - 34. This is the number of the Patch which you are currently editing. To change either the Patch Bank or number, you must go to the Patch page; they are displayed here for your convenience only.

#### **W - Wave**

This is the Wave which you are currently editing. You may change the current Wave by using the UP and DOWN cursor buttons. "All" (all Waves) cannot be selected on this page.

If A, B, C, or D is selected, the individual Wave's parameters are modified. In 2-oscillator Patches, only Waves A and C are available; in 1-oscillator Patches, only Wave A appears.

If the letter "M" is flashing in front of the Wave letter, the current Wave is muted and will not be heard. To mute or un-mute a wave, use the Page + / - buttons to go to the Wave Mute page, and set the Waves as desired. Mutes are also automatically cleared when you exit the Edit Patch level.

**(PCM Wave Bank)**

This is the Bank which contains the Wave. Waves numbered 32 and up are PCM waveforms, for which there are only two possible Banks; R stands for ROM, and C for CARD (if a PCM Card is inserted).

Waves 0-31 are Wave Sequences, and can be from RAM 1 - 3, ROM 4 - 11, or CARD. Incrementing above Wave 31 in any of the ROM or RAM Banks will bring you to the ROM PCM Wave Bank. If you have both PCM and Program Cards inserted and are playing a CARD Wave Sequence, incrementing above Wave 31 will bring you to the PCM CARD Bank.

**(PCM Wave Number)**

PCM Waves 0 - 31 are Wave Sequences, and appear with an asterisk (\*) before their names.

PCM Waves 32 - 515 are ROM waves, including multi-samples, attack transients, and single- or multiple-cycle waveforms. If there is a PCM Card inserted, additional PCM waves will be available in the CARD Bank (see "PCM Wave Bank" above).

If the selected PCM wave is a Wave Sequence, pressing EDIT while on this parameter will take you to the Edit Wave Sequence level.

**Level**

0 - 99. This is the master level for the PCM wave selection. This amount scales the settings of the Amp Envelope.

**Semi - Tuning in Semitones**

+/- 24. The oscillator base pitch in semitones.

0 = A-440 tuning

12 = one octave up, and so on.

**Fin - Fine Tuning**

+/- 99. The Fine Tuning amount offsets the base pitch in cents (1/100 semitone).

**Tune Slope - Tuning Slope**

+/- 2.00. The Tuning Slope allows you to adjust the way in which the wave's pitch changes as you play higher or lower on your MIDI controller. The slope is centered around middle C (C4).

Tuning 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.

+1.00 produces the standard intonation, with 12 divisions per octave.

+2.00 means the pitch changes two octaves over only a single octave of MIDI input.

+0.50 means that an octave of pitch is spread out over two octaves of MIDI input. This allows you to play the quarter-tone scale.

0.00 makes all notes play at middle C (C4).

A negative slope inverts the pitch tracking, so that as you play higher on



your controller the pitch gets lower, and vice versa. 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 EDIT SCALE page.

### Mute Wave?

Pressing +1/YES will Mute the current Wave, making it temporarily silent. This lets you hear the Patch's Waves in isolation or in different combinations.

When a Wave has been muted, an "M" will flash in front of the Wave letter on all of the Patch pages. If you have selected "All" Waves in a multi-oscillator Patch, an "M" indicates that some or all of the Waves are muted.

To turn off soloing, simply return to this parameter (which will now display "Un-Mute Wave?") and press "+1/YES." Mutes will also be canceled when you move to a higher Level, such as PERF or MULTI.

### UP/DOWN CURSORS

The Up and Down cursors change the current Wave in order, as displayed in the upper right-hand corner of the screen: All, A, B, C, D, All...

### EDIT button

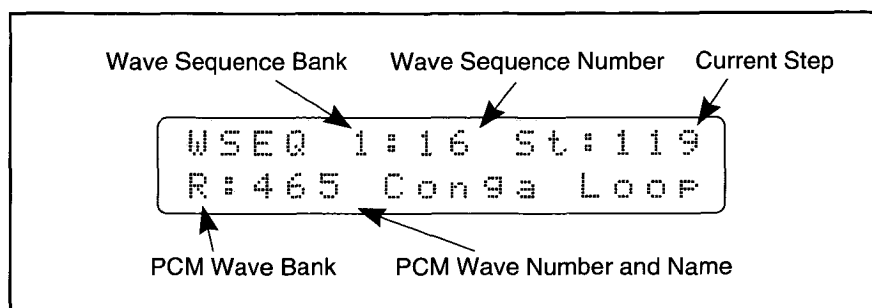
If the current Wave is a Wave Sequence, the EDIT led will be lit, and pressing EDIT will take you to the Edit Wave Sequence level.

If the current Wave is not a Wave Sequence, pressing EDIT won't do anything.

## WSEQ

*wave sequence*

### *Edit Wave Sequence level*



For an introduction to Wave Sequences, please see Chapter 10, "Wave Sequence Tour," in the Player's Guide.

Wave Sequences are a special type of sound source material for Patches. These are a series of PCM waves linked together and played one after another, and are capable of creating very sophisticated dynamic textures.

**NOTE:** All Wave Sequence edits are automatically saved, and therefore WRITE and COMPARE do not apply.

Wave Sequence Step memory is 500 steps per bank; a single sequence can hold up to 255 steps. Typically a sequence might have 10 - 20 steps.

To make more efficient use of step memory, you can set loops over any range of steps.

To clear a Wave Sequence, use the WS UTILITY page's Init Wave Seq function.

### *(Current Wave Sequence)*

The top line displays the Bank and number of the current Wave Sequence. These cannot be changed from this page, and are displayed here for your convenience only. You can select another Wave Sequence on the Waves page; to get there from here, press the EXIT key combination (MIDI/GLOBAL and PAGE- together).

If the Wave Sequence bank is in one of the ROM banks, no editing is allowed - you must copy it to a RAM or CARD location first.

Wave Sequences are always selected from the first 32 PCM "wave locations" in each bank, and appear with an asterisk (\*) before their names.

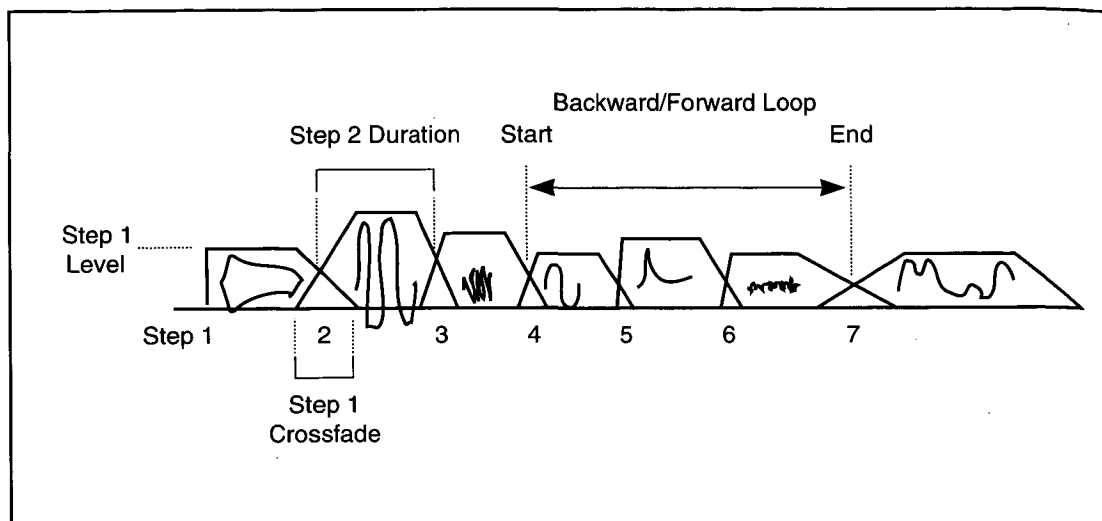
### **St - Current Wave Sequence Step**

The current Wave Sequence Step is displayed in the upper right of the screen, and may be changed by using the UP and DOWN Cursors. The number of steps in a Wave Sequence is variable; the last step in each Wave Sequence is listed as the END.

You can have up to 255 steps in a single Wave Sequence (up to a total of

500 per bank).

*Wave Sequence Diagram*



*(PCM Wave Bank)*

This is the Bank of the PCM wave to be played during this step.

R is ROM, and C is Card. The RAM Banks don't contain any PCM waves (although they do contain Wave Sequences).

*(PCM Wave Number and Name)*

32-515. This is the PCM wave to be played during this step.

**Dur - Step Duration**

The length of time that the step will play.

1 - 499, or GATE. (GATE means "while the key is held.")

When using the internal clock, each unit of duration is equal to about 24 milliseconds. With rhythmic Wave Sequences using 24 clocks per quarter note, this tempo is about 105 beats per minute.

If the duration exceeds the actual length of a sampled transient, there will be silence during the end of the step.

If the duration is set to Gate, the sequence plays up until this step, and then does not proceed until the key is released.

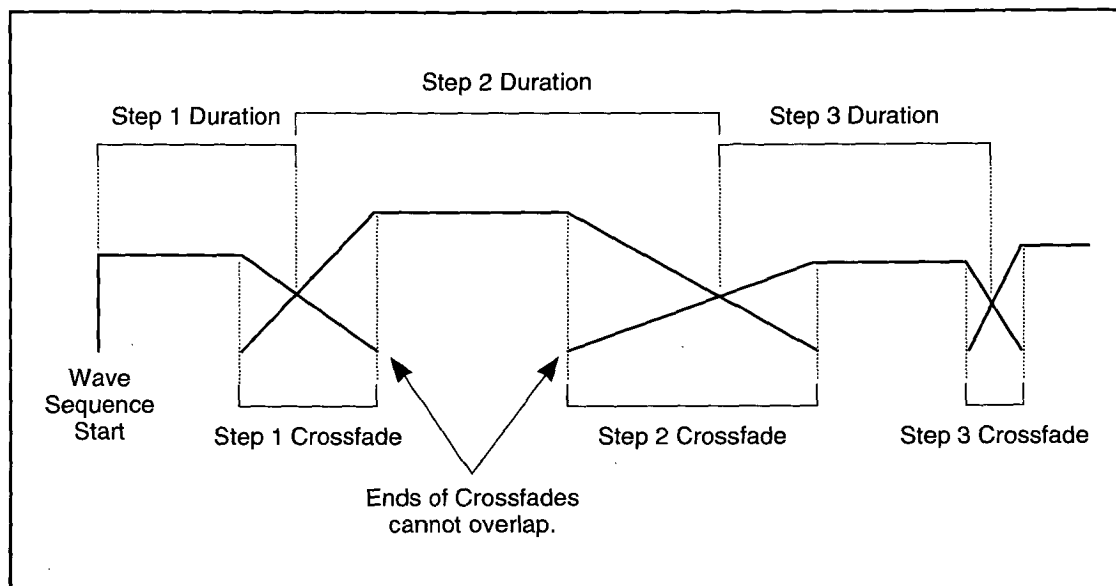
If the MIDI page's Wave Seq Sync parameter is set to MIDI, the duration is controlled by MIDI, and the Step Duration sets the number of MIDI Clocks that the step will be played. There are 24 MIDI Clocks per quarter note, so an eighth-note duration is equal to 12 steps, a sixteenth note 6 steps, and so on.

**Xfd - Step Crossfade Time**

0 - 998. The amount of overlap between the end of this step and the start of the next step. These are the same time units used by the Duration parameter above, and are equal to about 24 milliseconds each.

**Lev - Step Level**

0 - 99. The step loudness.

**Wave Sequence Duration and Crossfade****Semi - Step Semitone Tuning**

+/- 24. The oscillator base pitch in semitones.

0 = A-440 tuning.

12 = one octave up, and so on.

**Fin - Step Fine Tuning**

+/- 99. Offsets the base pitch in cents (1/100 semitone).

**Insert Step?**

Pressing +1/YES at this command will add a step to the Wave Sequence before the current step. The default wave number for the new step is one greater than that of the step *before* the current step, except for insertions to the first step (see below).

A special feature is included to make it easy to insert waves that have consecutive numbers. If you insert at the first step of the Wave Sequence, the inserted PCM wave's number will be one less than that of the old first step.

This shortcut is useful for working with the sets of "time-sliced" ROM waves that are included in the Wavestation SR, such as the Sax series, waves 364-379. For instance, to insert a string of time-sliced PCM waves, you might begin by inserting the last wave of the time-slice as the first step in the Wave Sequence. Then, you would simply insert repeatedly, until the entire string has been entered.

The Wavestation SR can hold a total of 500 Wave Sequence steps per Bank, and each individual Wave Sequence can be up to 255 steps. If you try to insert when a Bank or Wave Sequence is completely full, a message appears: "CAN'T INSERT - NO MORE STEP MEMORY."

### **Delete Step?**

Pressing +1/YES deletes the highlighted step; any other key does nothing, leaving your Wave Sequence intact.

### **Solo Step?**

Pressing +1/YES solos the current step. This means that the Wave Sequence does not progress as normally; the current step is simply heard for its programmed duration, and then stops.

When Solo is on, an "S" will flash next to the step number.

As you change the current Step with the UP and DOWN Cursors, the solo travels along; this way, you can quickly browse through each of the PCM waves.

When Solo is turned on, this command changes to "Un-Solo Step;" pressing +1/YES will then turn the Solo function off.

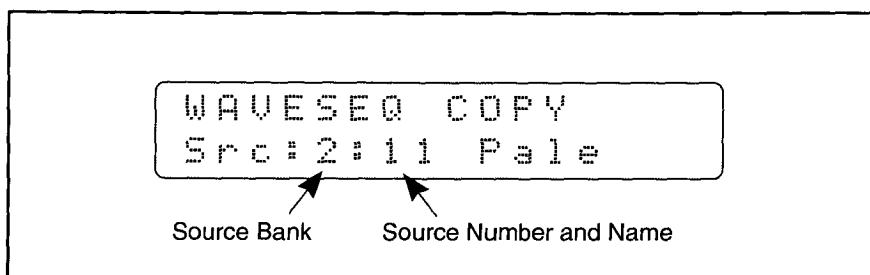
### **UP/DOWN CURSORS**

The Up and Down cursors change the current Wave Sequence Step, as displayed in the upper right-hand corner of the screen.

## WAVESEQ COPY

*wave sequence copy*

*Edit Wave Sequence level*



**NOTE:** During the copy operation, both the original and new versions of the destination wave sequence are remembered. The new version is temporarily stored in the available wave sequence step memory. To leave room for this, the number of steps that the destination will contain after the copy operation cannot exceed that of the available steps in the destination bank. If a specified copy would exceed the available step memory, it is not allowed, and the message, "NOT ENOUGH FREE MEMORY FOR COPY" appears.

### **Src - Source**

There are really 2 parameters here: the Bank and the number of the Wave Sequence to be copied.

The first parameter is the Bank. 1 -3 are RAM 1 - 3, 4 - 11 are ROM 4 - 11, and C is CARD.

Each Bank can contain 32 Wave Sequences (numbered 0-31); as you change the number, the name of the Wave Sequence is displayed at the right.

### **Dst - Destination**

This is the Bank, number, and name of the Wave Sequence which the Source will be copied over.

As with the Source parameter above, you can independently adjust the Bank and number of the Destination.

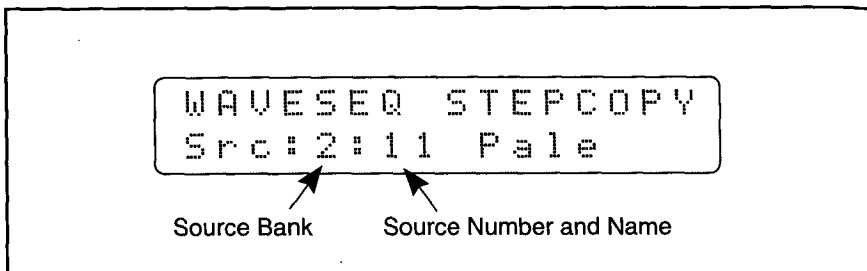
### **COPY WAVE SEQ?**

Pressing +1/YES copies the Wave Sequence; any other keys cancel the operation.

# WAVSEQ STEPCOPY

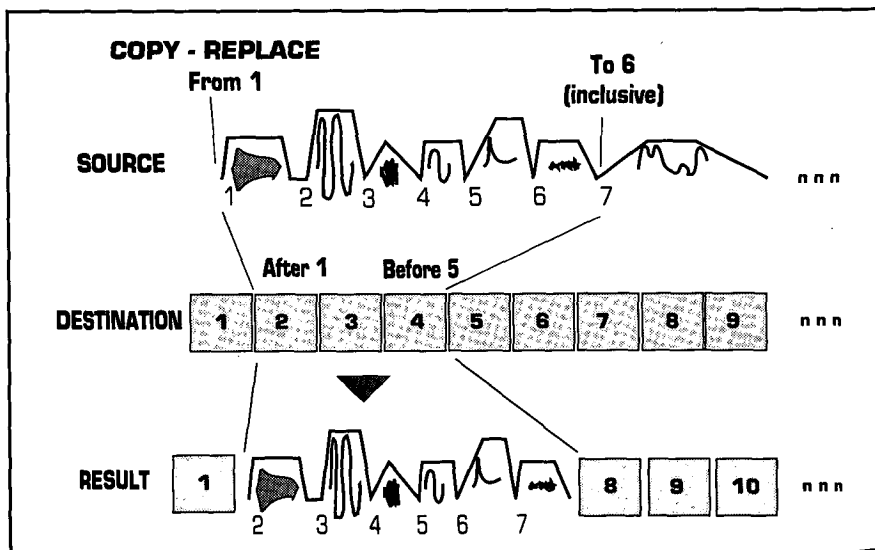
*wave sequence step copy*

*Edit Wave Sequence level*

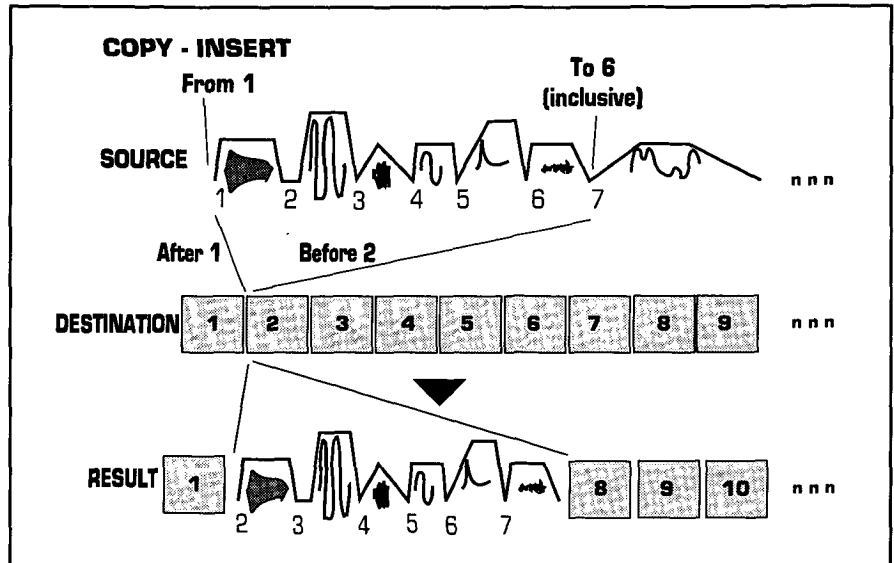


**NOTE:** During the copy operation, both the original and new versions of the destination wave sequence are remembered. The new version is temporarily stored in the available wave sequence step memory. To leave room for this, the number of steps that the destination will contain after the copy operation cannot exceed that of the available steps in the destination bank. If a specified copy would exceed the available step memory, it is not allowed, and the message, "CAN'T COPY WSEQ - NO MORE STEPS" appears.

Copying can *replace* steps in the Destination sequence with new steps. For example, copying From step 1, To step 6 (inclusive) to After step 1, Before step 5 would replace steps 2, 3, and 4 in the Destination Wave Sequence with steps 1-6 from the Source Wave Sequence.



Copying can also *insert* multiple steps into a Destination sequence. For example, copying From step 1, To step 6 (inclusive) to After step 1, Before step 2 would insert steps 1-6 from the Source Wave Sequence between steps 1 and 2 in the Destination Wave Sequence, as shown below.



**Src - Source**

There are really 2 parameters here: the Bank and the number of the Wave Sequence containing the range to be copied.

The first parameter is the Bank. 1 -3 are RAM 1 - 3, 4 - 11 are ROM 4 - 11, and C is CARD.

Each Bank can contain 32 Wave Sequences (numbered 0-31); as you change the number, the name of the Wave Sequence is displayed at the right.

**Src FromStep - Source "From" Step**

First step of range to be copied.

**Src To Step - Source "To" Step**

Last step of the desired source range to be copied.

**Dst - Destination**

This is the Bank, number, and name of the Wave Sequence which the steps will be copied into.

As with the Source parameter above, you can independently adjust the Bank and number of the Destination.

**Dst AfrStep - Destination "After" Step**

This is the number of the step that the copied steps will follow in the destination Wave Sequence.

The After step is always at least one less than the Before step. If the Destination is an empty Wave Sequence or the Before step is set to END, the After step shows "---". Setting the Destination After step to END appends the Source steps.

**Dst BefrStep - Destination "Before" Step**

The step that follows the copied steps.



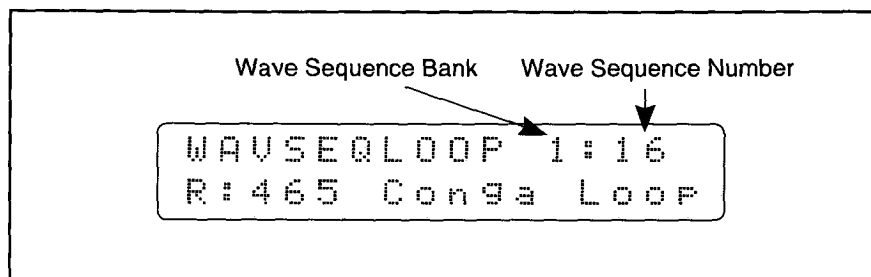
**COPY STEPS?**

Pressing +1/YES copies the Wave Sequence; any other keys cancel the operation.

## WAVESEQLOOP

*wave sequence loop*

*Edit Wave Sequence level*



A Wave Sequence can loop over a range of steps so that it plays continuously while the note is held. The Wave Sequence steps at which the loop starts and ends, the number of times that the loop repeats, and the direction of the loop are all programmable.

### *(Current Wave Sequence)*

The top line displays the Bank and number of the current Wave Sequence. These cannot be changed from this page, and are displayed here for your convenience only. You can change the Wave Sequence on the Waves page; to get there from here, press the EXIT key combination (MIDI/GLOBAL and PAGE- together).

If the Wave Sequence is from a ROM bank, no editing is allowed - you must copy it to a RAM or CARD location first.

Wave Sequences are always selected from the first 32 PCM "wave locations" in each bank, and appear in Waves lists with an asterisk (\*) before their names.

### **Strt - Loop Start Step**

The loop start must be before the loop end.

### **End - Loop End Step**

The last step of the Wave Sequence loop cannot exceed the number of steps in sequence.

### **Dir - Loop Direction**

FWD means that the loop restarts from its start point each time that it repeats. In this case, the first step crossfades with the end of the loop.

B/F (Backward/Forward) causes the loop to play from the first step to the last step, and then to turn around and proceed through the steps in reverse direction, from the last step back to the first step.

**Rept - Repeats**

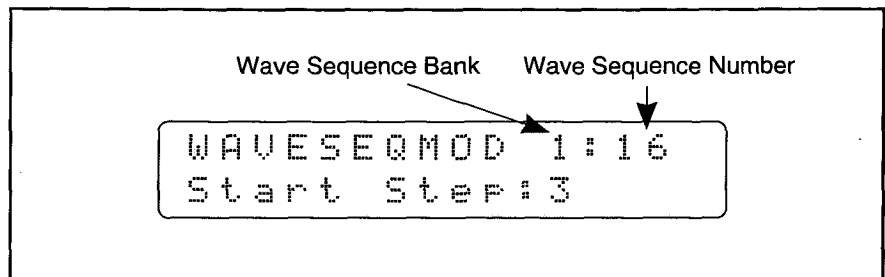
If repeats are OFF, the sequence plays through all of its steps, and then stops sounding.

1 - 126. If there is a set number of repeats, the loop repeats until count is finished and then plays on to the END, even if the key has been released.

If repeats are INF, the sequence loops throughout the amp envelope's release phase.

## WAVESEQMOD

*wave sequence modulation*



The number of the step on which the Wave Sequence starts, and the progression from step to step within the sequence, may be controlled by various modulation sources.

### (Current Wave Sequence)

The top line displays the Bank and number of the current Wave Sequence. These cannot be changed from this page, and are displayed here for your convenience only. You can change the Wave Sequence on the Waves page; to get there from here, press the EXIT key combination (MIDI/GLOBAL and PAGE- together).

If the Wave Sequence is from a ROM bank, no editing is allowed - you must copy it to a RAM or CARD location first.

### Start Step

The Wave Sequence step on which playback will normally start. For some modulation setups, you may want to set this to the middle of the Wave Sequence, or the end, as discussed below.

### Src - Mod Source

The normal Patch modulators can be used, including KEYBD (Linear Keyboard), CTRKB (Centered Keyboard), VEL (Linear Velocity), EXVEL (Exponential Velocity), LFO 1 and 2, ENV 1 (Envelope 1), AT (Aftertouch), AT+WH (Aftertouch + Mod Wheel), WHEEL, MIDI 1 and 2, and PEDAL.

For complete descriptions of the modulation sources, please see the entry for the PATCH MACROS page.

Depending upon your choice of a modulation source, the Wave Sequence can be modulated in two different ways.

Looking more closely at the modulation sources, we should first distinguish between *static* and *dynamic* controllers. The static controllers, Keyboard Note and Velocity, are specific values which occur at the beginning of the note and do not change throughout its duration. Because of this, these modulators only alter the start step of the Wave Sequence, which will vary around the set Start Step according to the depth and polarity of the Modulation Amount. Once started, the Wave Sequence then plays normally until its end or Note Off.

In contrast, the dynamic controllers, including ENV1, the LFOs, MIDI Controller 1 and 2, Mod Pedal, Aftertouch, Aftertouch + Mod Wheel, and Mod Wheel, *do* change values through the duration of the note. When using these controllers the normal progress of the Wave Sequence (as set by its step Durations) is suspended. Instead, the Wave Sequence stays at the Start Step until it is moved by the modulator. The value of the modulator then directly controls which step of the Wave Sequence is played, and the durations of each step are thus determined by the modulator's rate of change. Using physical controllers, such as Aftertouch or the Mod wheel, you can manually step through the sequence in real time.

For example, assume that the Start Step is 13 and you have selected the Mod wheel for modulation, with a positive Mod Amount. The Mod wheel is fully lowered (off). You play a key and hear step 13's wave for as long as you hold the key (if step 13 happens to be a transient-only waveform, it will play through and then be silent). Raise the Mod wheel, and the Wave Sequence will progress to step 14, then to 15, and so on. Lowering the Mod wheel again will move backwards through the steps. The distance that you have to move the Mod wheel before hearing a change depends on the Mod Amount.

So that you can spontaneously adjust the start step for each note, controller movement before a Note On is recognized. For example, with no keys held down, you can move the Mod wheel up all the way, and the next Note On will play the new, modulated point.

Remember that dynamic modulation sources halt the normal progression of the Wave Sequence (even if the Mod Amount is set to 0). Because of this, if you are not using dynamic modulation it is best to keep this field set to the static controllers, Keyboard Note or Keyboard Velocity.

### *(Modulation Amount)*

This is the depth of Wave Sequence modulation; in other words, the distance which you can modulate away from the original step.

Positive modulation increments the step number while negative modulation decrements it.

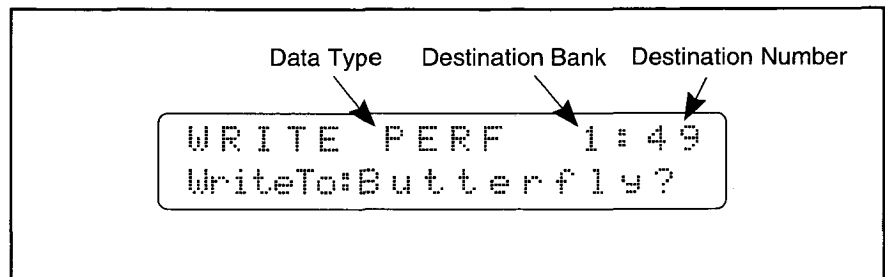
If you construct a Wave Sequence so that the waves at the beginning are bright, and the waves towards the end are more muted, you can use negative modulation to create an effect similar to the Sample Start Point Modulation feature found on some samplers. Normal playing occupies the middle, more-or-less stable range of the sample or wave sequence. Increased modulation moves the playing range towards the beginning of the Wave Sequence, where the loud and bright attacks are. This technique is an efficient way to achieve realistic expression.

If the Mod Source is set to a dynamic controller, and this field is set to 0, only the start step of the Wave Sequence will be played.

## WRITE PERF/PATCH/MULTI/SCALE

*write performance, patch, multiset, or scale*

*Write level*



Pressing the WRITE/COMPARE button brings you to this page.

The Wavestation SR keeps separate memory *buffers* for Multisets, Performances, Patches, and Scales, so you can edit one of each at the same time without needing to Write. You must Write before starting to edit a second item of any type, however, or the changes to the first one will be lost.

### **Comparing Saved and Edited Versions**

Once you are on the WRITE page, pressing the WRITE/COMPARE button again toggles between the saved and edited versions of the data. Pressing the button once switches to the saved data, displays the message, "Playing Saved," and turns the WRITE/COMPARE LED off. Pressing the button again changes back to the edited data and displays, "Playing Edited," turning the LED back on again. You can switch back and forth as many times as you like.

### **(Data Type)**

The type of data to be written - PERF, PATCH, MULTI, or SCALE - is displayed at the top of the screen. The data to be written is the same as you were editing when you pressed WRITE. Since WAVE SEQUENCES are automatically saved, this page does not apply to them.

Exiting the WRITE page (or completing the Write operation) returns to the page active prior to entering WRITE.

The Data Type cannot be edited from this page.

### **(Destination Bank)**

This is the Bank to which the data will be written; it only appears for Performances and Patches. It defaults to the Bank in which the data was previously stored; you can change it by cursoring right to the Destination parameter.

### **(Destination Number)**

This is the number (in the selected Bank, if applicable) to which the data will be written. The corresponding name is shown on the bottom line of

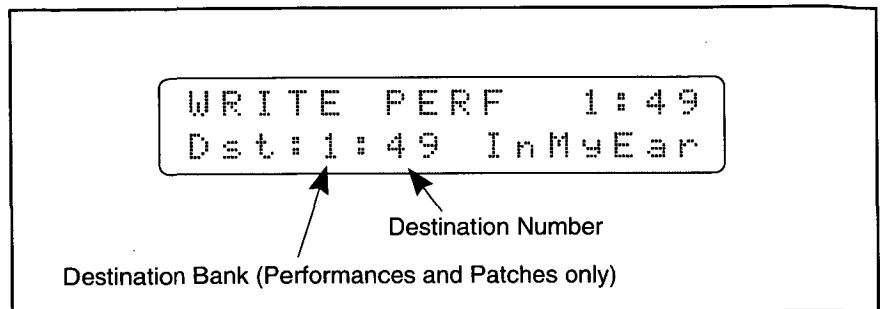
the display. The number defaults to the position in which the data was previously saved; to select another number, cursor right to the Destination parameter.

### **Write To (Name)?**

This command shows the first 10 characters of the name of the item to be overwritten, as determined by the Destination parameters on the next screen.

Pressing +1/YES writes the data to the selected memory location; pressing any other key cancels the write, leaving your data intact.

*Destination screen, Write page*



### **Dst - Destination Bank and Number**

This is the memory location into which the data will be written, as shown in the Write To parameter. For Performances and Patches, both Bank and number are shown; for Multisets and Scales, there is only a single number.

You can scroll through the Banks by pressing the BANK button, or by selecting the Bank parameter and using +1/YES and -1/NO.

### **Protect Int - Protect Internal Memory**

Located here for convenience, this duplicates the setting on the GLOBAL page.

ON, the default, means that protection is enabled; therefore, writing is prohibited. When learning your way around, or if a stranger passes through, this setting will allow any parameter changes without fear that you will lose your program settings.

OFF means that writing is allowed.

An even better way to protect your data is to back it up by saving it to a RAM Card, or by sending MIDI System Exclusive data dumps to an external device.

### **Protect Card - Protect Card Memory**

Located here for convenience, this duplicates the setting on the GLOBAL page.

This protection applies only to Performance RAM cards (ROM cards don't need it).

ON, the default, means that protection is on; therefore, saving is prohibited.

OFF means that saving is allowed.

***RAM Card Memory Protect Switch***

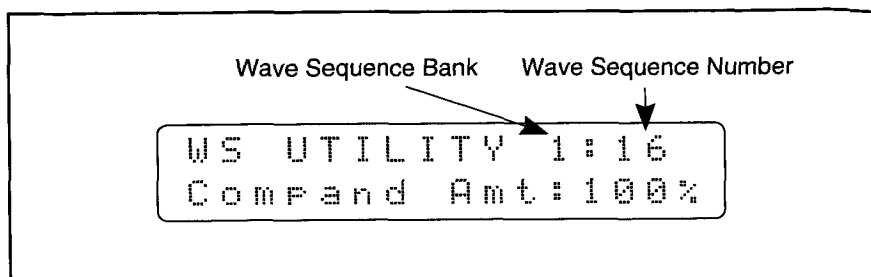
In addition to the global memory protection, RAM cards have their own Protect On/Off switches. To preserve card battery life, leave this hardware protection switch set to on when not saving, and especially when the card is not inserted into the Wavestation SR.



## WS UTILITY

*wave sequence utility*

*Edit Wave Sequence level*



The Wave Sequence Utility page allows you to compress or expand the durations and crossfade times of all steps in the current Wave Sequence, or initialize the sequence to get a blank slate for programming.

### *(Current Wave Sequence)*

The top line displays the Bank and number of the current Wave Sequence. These cannot be changed from this page, and are displayed here for your convenience only. You can change the Wave Sequence on the Waves page; to get there from here, press the EXIT key combination (MIDI/GLOBAL and PAGE- together).

If the Wave Sequence is from a ROM bank, no editing is allowed - you must copy it to a RAM or CARD location first.

Wave Sequences are always selected from the first 32 PCM "wave locations" in each bank, and appear in Waves lists with an asterisk (\*) before their names.

### **Compand Amt - Compress/Expand Amount**

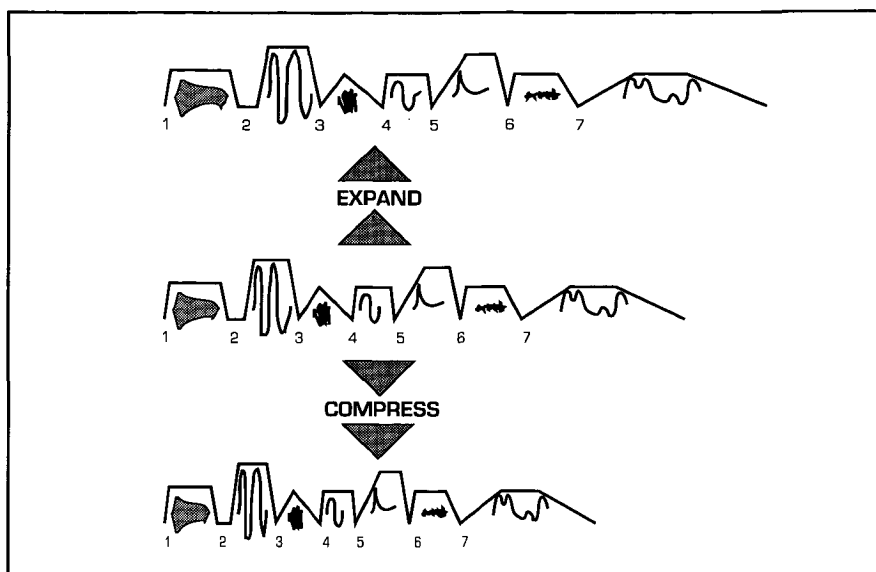
You can scale the durations and crossfade times of all steps in the current Wave Sequence by 1 - 200%. Using this overall time adjustment is much easier than having to individually adjust all of the step durations.

Values below 100% compress all times; values above 100% expand them.

Note that the compression or expansion applies only to Wave Sequence time parameters. It has no effect on the original attack or decay times of the PCM waves themselves; percussive waves will still have fast, percussive attacks (although these may be obscured by long crossfade times), and transient-only waves will still die out even if their step durations have increased.

### **Compand by (Percentage)?**

Pressing +1/YES compresses or expands the Wave Sequence by the selected amount; pressing any other key cancels the operation.

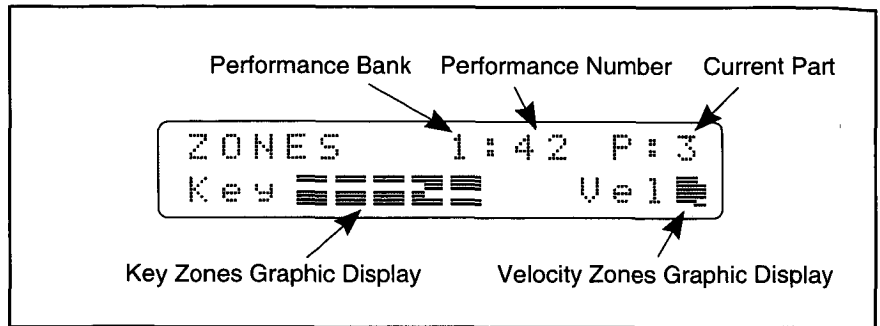
*Wave Sequence Time Scaling Illustration***Init Wave Seq? - Initialize Wave Sequence**

This function erases all of the Wave Sequence steps and modulation settings, as a starting point for programming. Pressing the +1/YES button brings up an Are You Sure? message, to avoid accidental erasing of your data; pressing +1/Yes again initializes the Wave Sequence. Pressing any other buttons at either of these two screens cancels the initialization, leaving the Wave Sequence intact.

## ZONES

*key and velocity zones*

*Edit Performance level*



For an introduction to Performances and Key and Velocity Zones, please see Chapter 6, "Performance Tour," in the Player's Guide.

While the EDIT PERF page sets the sound of the Part, the ZONES page determines where and how the Part is played by the controller. Each Part may respond to its own separate key and velocity ranges, called zones.

These key and velocity zones can be entered over MIDI, or with the standard data entry controls. You can also use automatic functions to set up all the Parts into layers, splits, velocity switches, etc.

Since up to eight layers are available, virtually any arrangement of layering and splitting is possible - there is no reason to be constrained to simple, traditional splits and layers. The same is true of velocity; you can arrange for complex velocity switching by assigning each Part to a different velocity range, or create velocity layering by overlapping zones. Remember also that all zoning parameters, including splits and velocity switching, are kept intact when the Performance is used in a Multiset.

### *(Performance Bank and Number)*

The Bank and number of the Performance being edited. These may not be changed on this page, and are displayed only for your reference.

### **P - Part**

1 - 8. There are eight Parts in a Performance. The current Part may be changed by using the UP and DOWN cursors.

### **Key - Key Zones Graphic**

This graphic shows the keyboard zones for each of the eight Parts, over a standard 5-octave range. Each block represents a single octave.

### **Vel - Velocity Zones Graphic**

This is a display of the velocity zones for each of the eight Parts.

**Low - Key Low**

C-1 to G9. This is the lowest note on which the Part will sound. The default is the lowest MIDI note, C-1 (middle C is C4).

The key limits can be entered over MIDI or with the +1/YES and -1/NO buttons.

**Hi - Key High**

C-1 to G9. This is the highest note on which the Part will sound. The default is the highest MIDI note, G9.

The key limits can be entered over MIDI or with the +1/YES and -1/NO buttons.

**VelLo - Velocity Low Limit**

1 - 127. This is the softest velocity at which the Part will sound. The default is 1.

The velocity limits can be entered over MIDI or with the +1/YES and -1/NO buttons.

**Hi - Velocity High Limit**

1 - 127. This is the hardest velocity at which the Part will sound. The default is the highest MIDI velocity, 127.

The velocity limits can be entered over MIDI or with the +1/YES and -1/NO buttons.

**Solo Part?**

Soloing allows the current Part to be heard by itself. Pressing "+1/YES" will solo the current Part, and return you to the Key and Velocity Zones graphics.

When a Part is soloed, an "S" will flash in front of the Part number.

To un-solo a Part, simply return to this parameter (which will now display "Un-Solo Part?") and press "+1/YES." Solos will also be canceled when you move to a higher Level, such as PERF or MULTI.

**Layer All Parts?**

Pressing +1/YES on this prompt sets the key and velocity ranges for each Part to their limits.

**Split All Parts?**

The SPLIT function creates zones of equal ranges, depending on how many Parts in the current Performance have Patches assigned to them. For example, if there are four Parts, each gets a quarter of the full range. The lowest Part number is the bass-most range, and the highest Part number is the treble-most range.

SPLIT assumes a five-octave keyboard.

**Vel Sw All Parts? - Velocity Switch All Parts?**

Pressing +1/YES will distribute all of the Parts over the velocity range of

## ZONES

---

1-127. The lowest numbered Part will be assigned to the lowest velocity range, and the highest numbered Part to the highest velocity range. If there are only two active Parts, the Velocity Switch point defaults to 100; otherwise, the velocity range is divided into equal parts.

### **Vel Lr All Parts? - *Velocity Layer All Parts?***

This is similar to VEL SW, except that instead of forming discrete velocity zones, the zones overlap. All Parts are set to a maximum velocity of 127, so that only the minimum values are different. The lowest numbered Part is assigned to the entire velocity range, and subsequent Parts are assigned increasingly higher minimum velocities. 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.

### **UP/DOWN CURSORS**

The Up and Down cursors change the current Part, as displayed in the upper right-hand corner of the screen.

## APPENDIX 1: COMPATIBILITY

The Wavestation SR is *completely* compatible with Program data created for the Wavestation keyboard, as well as that created for the Wavestation EX keyboard and Wavestation A/D rack-mount model. The Wavestation SR, A/D, and EX add several features not present in the original keyboard version, however, and this means that you have to be slightly careful when transferring program data from one of these newer models to the original keyboard.

The Wavestation SR boasts several other extra features which don't appear in other members of the Wavestation family. This appendix addresses these differences, and how they are handled when data is transferred to another Wavestation instrument.

### **Extra Multisets**

The original Wavestation keyboard, along with the EX and A/D models, featured 16 Multisets; the Wavestation SR provides 32. The SR's Multisets are also more sophisticated than those of the rest of the Wavestation family; each Multiset can now be given a 15-character name, and each channel has its own FX Bus parameter, allowing independent control over panning and effects routing.

If you use System Exclusive to transfer the SR Multisets to a Wavestation keyboard, EX, or A/D, all of the extra Multisets and Multiset parameters will be ignored. Only the first 16 Multisets are transferred, without names or channel FX Bus parameters.

### **Extra PCM waves**

The Wavestation SR has the same PCM sound ROM as the Wavestation A/D and Wavestation EX keyboard, which is double that of the original Wavestation keyboard (original Wavestations may be upgraded to the EX model by installation of the optional EXK-W expansion kit). This means that the SR has a large number of additional PCM waveforms which are not included in the original keyboard; any wave numbered over 396 is part of this expanded PCM. When transferring a Patch which uses these waves to an unexpanded Wavestation keyboard, the wave numbers will be "clipped" to 396 (Pulse31), and that Patch will therefore not sound the same. If you really want to play a sound which uses the expanded PCM on an unexpanded Wavestation keyboard, you will have to re-create the sound using waves numbered 396 or below.

When a Wave Sequence using expanded waves is transferred to an unexpanded Wavestation keyboard, the steps with expanded waves play PCM from the normal, non-expanded ROM (the number of the wave played is equal to the number of the original wave minus 365). These steps are also transposed up 6 octaves, so it's easy to hear the change. Again, if you want to play such a Wave Sequence from an unexpanded Wavestation keyboard, you'll do best to re-program it using similar waves from the non-expanded PCM.

**Extra Banks**

The Wavestation SR has three RAM banks, which is the same number as the Wavestation A/D, but one more than the Wavestation keyboard. Also, the Wavestation SR has 8 ROM banks; all other Wavestations have only one, equivalent to the SR's ROM11. SysEx dumps of Performances, Patches, and Wave Sequences from banks ROM 4 - 10 and RAM 3 will not be recognized by the Wavestation keyboards. The Wavestation A/D will accept dumps from RAM3, but not from the additional ROM banks.

Additionally, if you use Patches or Wave Sequences from ROM 4 - 10 in RAM1, RAM2, RAM 3, or CARD Bank Performances (or Patches) and then transfer them to a Wavestation keyboard or Wavestation A/D by using a Card or SysEx dump, the references to the extra ROM banks will be changed as shown in the table below.

Wavestation SR Bank	Wavestation A/D Bank	Wavestation Keyboard Bank
RAM1	RAM1	RAM1
RAM2	RAM2	RAM2
RAM3	RAM3	ROM
ROM4	RAM3	RAM1
ROM5	RAM3	RAM2
ROM6	RAM3	CARD
ROM7	RAM1	RAM1
ROM8	RAM2	RAM2
ROM9	ROM	ROM
ROM10	CARD	CARD
ROM11	ROM	ROM
CARD	CARD	CARD

If a Performance in the RAM2 Bank uses a Patch from RAM3, for instance, after being transferred to a keyboard it will use the similarly numbered Patch from the ROM Bank. On a Wavestation A/D, it will use the similarly numbered Patch (or Wave Sequence) from RAM3.

Similarly, ROM 4 - 10 Performances used in Multisets and the Performance Select Map will be changed when received via a SysEx dump by a Wavestation keyboard or Wavestation A/D. Please also note that the original Wavestation keyboard (as opposed to the EX) will not recognize the Performance Select Map SysEx dump; if you wish to transfer the map, use the SysEx ALL dump instead. This will transmit the Performance Select Map, along with all program data, global and MIDI settings, and scales.

**Extra effects**

The Wavestation SR's Stereo Mod Pitch Shift/Delay, Compressor - Limiter/Gate, and Vocoder effects are not present in the original Wavestation keyboards (however, these extra effects *are* featured in the EX keyboard and the Wavestation A/D). If a Performance which uses these effects is transferred to an unexpanded keyboard, they will appear as effect #0, NO EFFECT, and will pass the signal on to the outputs unprocessed. As long as these effects are not edited, they will still be intact if transferred back to

a Wavestation SR. Editing or changing the effects on the keyboard, however, will erase the original data.

The Distortion/Overdrive effects are slightly enhanced in the Wavestation SR (and in the Wavestation EX keyboard and A/D rack-mount model), with the addition of a modulation source and amount on the output level. These parameters will not appear on unexpanded keyboards, but the effects will otherwise function normally.

### **Miscellaneous System Exclusive transfers**

The Wavestation keyboard offers a number of features for use as a MIDI controller. Although the Wavestation SR doesn't offer these features (it's a rack-mount module, after all), it still stores values for their parameters to maintain compatibility with the keyboard. Thus, the settings for the Wavestation keyboard's Damper Pedal and MIDI TRANSMIT page are still sent in the SysEx GLOBAL dump, and the Part Xmit Chan and Prog Change Xmit are still sent in the PERFORMANCE dump and stored in memory and on Cards - even though they do not appear on the display of the Wavestation SR.

The Wavestation SR's GLOBAL page Local Xpose parameter is the same as the Wavestation keyboard's MIDI page Key Offset Amount parameter, and *not* the same as the Wavestation EX's own Local Xpose, which is not referenced by the SR. This is because the Wavestation SR deals entirely with MIDI notes, whereas the keyboard deals with notes both from MIDI and its own keyboard.

The parameters for the MIDI REMAP page will be recognized by the Wavestation A/D, but not by the original Wavestation keyboard or the Wavestation EX.



## APPENDIX 2: MIDI RECEIVED DATA

### 1.0 Channel Messages

#### 1.1 Key off

Status	1000nnnn	(8n) n=channel number
Note No.	0kkkkkkk	k=0 ~ 127
Velocity	0vvvvvvv	Ignored

#### 1.2 Key on/off

Status	1001nnnn	(9n) n=channel number
Note No.	0kkkkkkk	k=0 ~ 127
Velocity	0vvvvvvv	(v≠0) Key on 00000000 (v=0) Key off

#### 1.3 Control Change

Status	1011nnnn	(Bn)n=channel number
Controller no.	0ccccccc	
Controller Value	0vvvvvvv	
c=1	Modulation Wheel	v= 0 ~ 127
c=4	Foot Control	v= 0 ~ 127
c=6	Data Entry (msb)	v= 0 ~ 127 (Note 1, 2)
c=7	Volume	v= 0 ~ 127
c=10	Pan MSB	v= 0 ~ 127 (Note 3)
c=12	FX Controller	v= 0 - 63: off, 64 - 127: on
c=16	Joy Stick (X-axis)	v= 0 ~ 127
c=17	Joy Stick (Y-axis)	v= 0 ~ 127
c=38	Data Entry (lsb)	v= 0 ~ 127 (Note 1, 2)
c=42	Pan LSB	v= 1 ~ 6 (Note 5)
c=64	Sustain Switch	v= 0 - 63: off, 64 - 127: on
c=100	Registered Parameter # lsb	v= 0 ~ 1 (Note 2, 4)
c=101	Registered Parameter # msb	v= 0 (Note 2, 4)

Note 1: Only received with registered parameter select

Note 2: Only received on the basic channel if in MULTI mode.

Note 3: Pans between Buses A (0) and B (127). Modulated values are not displayed. Ignored when current pan is outside of the range A - 99/1 - 1/99 - B.

Note 4: Pitch bend range, Master fine tune.

Note 5: Selects additional FX Bus values. 0 is ignored; 1 selects normal A-B panning; 2 selects C; 3 selects C+D; 4 selects D; 5 selects ALL; 6 selects PATCH in PERF Mode, PERF in MULTI Mode.

In addition to the controller numbers listed above, controllers 1 - 95 may be used as MIDI1 and MIDI2 in the modulation matrix, or remapped to the Joy Stick X and Y axes or the FX Switch on the MIDI REMAP page.

### 1.4 Program Change

Status	1100nnnn	(Cn) n=Channel no
Patch Number	0pppppppp	p= 0 ~ 127 Program number within current bank.

### 1.5 Program Bank Select

Status	1011nnnn	(Bn) n=Channel no.
Controller no.	00100000	Bank Select LSB
Controller Value	0 - 5	0 = RAM1/RAM2 1 = ROM11/CARD 2 = RAM3/ROM4 3 = ROM5/ROM6 4 = ROM7/ROM8 5 = ROM9/ROM10

### 1.6 Channel (mono) Pressure (After Touch)

Status	1101nnnn	(Dn) n=Channel number
Value	0vvvvvvvv	v=0 ~127

### 1.7 Polyphonic (key) Pressure (After Touch)

Status	1010nnnn	(An) n=Channel Number
Note No.	0kkkkkkk	k=0~127
Value	0vvvvvvvv	

### 1.8 Pitch Bend Change

Status	1110nnnn	(En)
Value LSB	0uuuuuuuu	
Value MSB	0vvvvvvvv	

### 1.9 All notes off

Status	1011nnnn	(Bn) n=channel number
	01111011	(7B) All notes off
	00000000	

Note: Only recognized if not in OMNI mode and the All Notes Off parameter is enabled.

### 1.10 Reset All Controllers

Status	1011nnnn	(Bn) n=channel number
	01111001	(79) Reset All Controllers
	00000000	

Note: Only recognized if not in OMNI mode and the All Notes Off parameter is enabled.

## 2.0 System Messages

### 2.1 Real Time Messages

Timing Clock

Status                    11111000        (F8)

Used for Wave Sequence Sync function.

Active Sensing

Status                    11111110        (FE)

If active sensing is ever received, then a data byte must be received every 300 ms. Otherwise all voices will be turned off. If the MIDI RECEIVE page's Active Sense Controller Reset function is ON, then controllers will also be reset to default values.

### 2.2 System Exclusive Messages

Please refer to APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT.

## APPENDIX 3: MIDI TRANSMITTED DATA

Note that messages are transmitted using running status whenever possible. If more than 500 milliseconds have passed without status being refreshed, then the next message will be sent with a status byte.

### 1.0 Channel Information

#### 1.1 Control Change

```
Status          1011nnnn (Bn)n=channel number
Controller no.   0ccccccc -
Controller Value 0vvvvvvv
Controller no.
    c=6 Data Entry (msb)    v= 0 ~ 127 (Note 1, 2)
    c=7 Volume              v= 0 ~ 127
    c=10 Pan MSB            v= 0 ~ 127 (Note 4)
    c=38 Data Entry (lsb)   v= 0 ~ 127 (Note 1, 2)
    c=42 Pan LSB            v= 1 ~ 6 (Note 5)
    c=100 Registered Parameter # lsb
                                v= 0 ~ 1 (Note 2, 3)
    c=101 Registered Parameter # msb
                                v= 0 (Note 2, 3)
```

Note 1: Only sent with registered parameter select

Note 2: Only sent on the basic channel

Note 3: Pitch bend range, Master fine tune.

Note 4: Pans between Buses A (0) and B (127). Modulated values are not displayed. Ignored when current pan is outside of the range A - 99/1 - 1/99 - B.

Note 5: Selects additional FX Bus values. 0 is ignored; 1 selects normal A-B panning; 2 selects C; 3 selects C+D; 4 selects D; 5 selects ALL; 6 selects PATCH in PERF Mode, PERF in MULTI Mode.

#### 1.2 Program Change

```
Status          1100nnnn (Cn) n=Channel no.
Program Number  0ppppppp p= 0 ~ 99 Program number
                                within current bank.
```

### **1.3 Program Bank Select**

Status	1011nnnn	(Bn) n=Channel no.
Controller no.	00000000	Bank Select MSB
Controller Value	0	Always 0
Controller no.	00100000	Bank Select LSB
Controller Value	0 - 5	0 = RAM1/RAM2 1 = ROM11/CARD 2 = RAM3/ROM4 3 = ROM5/ROM6 4 = ROM7/ROM8 5 = ROM9/ROM10

## **2.0 System Messages**

### **2.1 System Real Time Messages**

Active Sensing	
Status	11111110 (FE) Sent when idle every 300 ms

### **2.2 System Exclusive Messages**

Please refer to APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT.

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

This system exclusive format contains data for the entire Wavestation product family, including the Wavestation SR, the Wavestation A/D, the Wavestation EX, and the original Wavestation keyboard. Data used for the Wavestation A/D or keyboard versions, but not referenced by the Wavestation SR, is printed in *italic type*.

### 1.0 Header Format

The following is a description of the Wavestation system exclusive header. This format is common for all Wavestation system exclusive messages.

These bytes are excluded from the computation of the checksum.

```
11110000 (F0) System Exclusive status byte
01000010 (42) Korg ID
0011nnnn (3n) Format ID, n = channel number
00101000 (28) Wavestation device ID
0mmmmmmmm Message type
```

### 1.1 Message Type Codes

The following table contains a list of the message types in hex.

41	Parameter Change Message
42	Parameter Change Message Expanded
43	Parameter Change Message SR Expanded
40	Single Patch Dump
49	Single Performance Dump
4C	All Patch Dump (within bank)
4D	All Performance Dump (within bank)
50	All Data Dump (system, patch, performance, wave sequence, multiset, performance map, scales)
51	System Setup Dump
54	All Wave Sequence Dump
5A	Micro Tune Scales Dump
5C	System Setup Dump Expanded
55	Multi Mode Setup Dump
5D	Performance Map Dump
5E	Multi Mode Setup Dump Expanded
5F	Performance Map Dump Expanded
60	Performance Map Dump SR Expanded
61	System Setup Dump SR Expanded
62	Multi Mode Setup Dump SR Expanded
23	Data Load Completed
24	Data Load Error
11	Patch Write Command
1A	Performance Write Command
21	Write Complete Message
22	Write Error Message

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

---

5B	Multi Mode Setup Select
63	Multi Mode Setup Select SR Expanded
06	Multi Mode Setup Dump Request
07	Performance Map Dump Request
08	Micro Tune Scales Dump Request
0C	Wave Sequence Data Dump Request
0E	System Setup Dump Request
0F	All Data Dump Request
10	Single Patch Dump Request
19	Single Performance Dump Request
1C	All Patch Dump Request
1D	All Performance Dump Request

### 1.2 Binary data format

All 8 bit binary data is transmitted as two bytes in the following format:

```
0000LLLL Low 4 bits of the data
0000HHHH High 4 bits of the data
```

So that a byte is reconstructed as follows:

```
HHHLLLLL
```

This is referred to as Nibble data.

## 2.0 Transmit and Receive Messages

The following messages are both transmitted from the Wavestation and received by the Wavestation.

### 2.1 Data Messages

#### 2.1.1 Single Patch Data

The following message contains a dump of a single patch. On reception the patch is placed in the edit buffer. To transfer a patch to a RAM location use the patch write command.

```
F0 42 3n 28 Wavestation sysex header
01000000 (40) Single Patch Dump
0000xxxx (0x) Bank number (0..11)
0xxxxxxx Patch number
Nibble data Patch structure (section 5.2)
0ccccccc Checksum
11110111 (F7) End of exclusive
```

### 2.1.2 Single Performance Data

The following message contains a dump of a single performance. On reception the performance is placed in the edit buffer. To place the performance in memory use the performance write command.

F0 42 3n 28	Wavestation sysex header
01001001 (49)	Single Performance Dump
0000xxxx (0x)	Bank number (0..11)
0xxxxxxx	Performance number
Nibble data	Performance structure (section 5.1)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.3 All Patch Data

This message contains all 35 patches within the bank specified.

F0 42 3n 28	Wavestation sysex header
01001100 (4C)	All Patch Dump
0000xxxx (0x)	Bank number (0..11)
Nibble data	35 patch structures (section 5.2)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.4 All Performance Data

This message contains all 50 performances within the bank specified.

F0 42 3n 28	Wavestation sysex header
01001101 (4D)	All Performance Dump
0000xxxx (0x)	Bank number (0..11)
Nibble data	50 performance structures (section 5.1)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.5 System Setup Parameter Data

This message is always accompanied by the System Setup Expanded and System Setup SR Expanded data (as described below).

F0 42 3n 28	Wavestation sysex header
01010001 (51)	System Setup Dump
Nibble data	System structure (section 5.8)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.6 System Setup Parameter Expanded Data

This message always accompanies the System Setup data (as described above).

F0 42 3n 28	Wavestation sysex header
01011100 (5C)	System Setup Expanded Dump
Nibble data	System Expanded structure (section 5.9)
0ccccccc	Checksum
11110111 (F7)	End of exclusive



## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

---

### 2.1.7 System Setup Parameter SR Expanded Data

This message always accompanies the System Setup data (as described above).

F0 42 3n 28	Wavestation sysex header
01100001 (61)	System Setup SR Expanded Dump
Nibble data	System Setup SR Expanded Structure (section 5.10)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.8 Wave Sequence Data

F0 42 3n 28	Wavestation sysex header
01010100 (54)	Wave Sequence Dump
0000xxxx (0x)	Bank number (0..11)
Nibble data	Ws_block structure (section 5.6)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.9 Multi Mode Setup Data

In this data, references to RAM3 and ROM 4-10 are changed to ROM11 for compatability with the keyboard. This message is always accompanied by the Multi Mode Setup Expanded and Multi Mode Setup SR Expanded data (as described below).

F0 42 3n 28	Wavestation sysex header
01010101 (55)	Multi Mode Setup Dump
Nibble data	Multiset_block structure (section 5.3)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.10 Multi Mode Setup Expanded Data

In this data, references to RAM3 are allowed, but references to ROM 4-10 are changed to ROM11 for compatability with the Wavestation A/D. This message always accompanies the Multi Mode Setup and Multi Mode Setup SR Expanded data (as described above).

F0 42 3n 28	Wavestation sysex header
01011110 (5E)	Multi Mode Setup Expanded Dump
Nibble data	Multi Mode Setup Expanded structure (section 5.4)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### 2.1.11 Multi Mode Setup SR Expanded Data

In this data, references to RAM3 and ROM 4-10 are allowed. This message always accompanies the Multi Mode Setup and Multi Mode Setup Expanded data (as described above).

F0 42 3n 28	Wavestation sysex header
01100010 (62)	Multi Mode Setup SR Expanded Dump
Nibble data	multiset_sr_extended_block structure (section 5.5)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.12 Performance Map Data**

In this data, references to RAM3 and ROM 4-10 are changed to ROM11 for compatability with the keyboard. This message is always accompanied by the Performance Map Expanded and Performance Map SR Expanded data (as described below).

F0 42 3n 28	Wavestation sysex header
01011101 (5D)	Performance Map Dump
Nibble data	Performance Map_block structure (section 5.11)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.13 Performance Map Expanded Data**

In this data, references to RAM3 are allowed, but references to ROM 4-10 are changed to ROM11 for compatability with the Wavestation A/D. This message always accompanies the Performance Map Data(as described above).

F0 42 3n 28	Wavestation sysex header
01011111 (5F)	Performance Map Dump Expanded
Nibble data	Performance Map_block structure (section 5.12)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.14 Performance Map SR Expanded Data**

In this data, references to RAM3 and ROM 4-10 are allowed. This message always accompanies the Performance Map Data (as described above).

F0 42 3n 28	Wavestation sysex header
01100000 (60)	Performance Map SR Expanded Dump
Nibble data	Performance Map_block structure (section 5.13)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.15 Micro Tune Scale Data**

F0 42 3n 28	Wavestation sysex header
01011010 (5A)	Micro Tune Scale Dump
Nibble data	Mtune_block structure (section 5.7)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.16 All Data**

This message is always accompanied by the Multi Mode Setup Expanded and Multi Mode Setup SR Expanded data, the Performance Map Expanded and Performance Map SR Expanded data, the System Setup Expanded and System Setup SR Expanded data, and the RAM3 Performance, Patch, and Wave Sequence data.

F0 42 3n 28	Wavestation sysex header
01010000 (50)	All Data Dump
Nibble data	All_data structure (section 5.14)
0ccccccc	Checksum
11110111 (F7)	End Of exclusive

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

---

### 2.1.17 Parameter Change Messages

The normal parameter change messages include parameters numbered 0 - 379.

F0 42 3n 28	Wavestation sysex header
01000001 (41)	Parameter Change Message
0LLLLLLL	LSB of parameter number (section 5.12)
0HHHHHHH	MSB of parameter number
0xxxxxxx	Parameter value in 7 bit ASCII (16 characters max) (7F = space)
.	.
00000000 (00)	ASCII null termination
11110111 (F7)	End of exclusive

### 2.1.18 Parameter Change Messages Expanded

The expanded parameter change messages include parameters numbered 380 - 406. They are otherwise completely the same as the normal parameter change messages.

F0 42 3n 28	Wavestation sysex header
01000010 (42)	Parameter Change Message Expanded
0LLLLLLL	LSB of parameter number (section 5.12)
0HHHHHHH	MSB of parameter number
0xxxxxxx	Parameter value in 7 bit ASCII (16 characters max) (7F = space)
.	.
00000000 (00)	ASCII null termination
11110111 (F7)	End of exclusive

### 2.1.19 Parameter Change Messages SR Expanded

The SR expanded parameter change messages include parameters numbered 407 and greater. They are otherwise completely the same as the normal parameter change messages.

F0 42 3n 28	Wavestation sysex header
01000011 (43)	Parameter Change Message SR Expanded
0LLLLLLL	LSB of parameter number (section 5.12)
0HHHHHHH	MSB of parameter number
0xxxxxxx	Parameter value in 7 bit ASCII (16 characters max) (7F = space)
.	.
00000000 (00)	ASCII null termination
11110111 (F7)	End of exclusive

### 2.1.20 Multi-Mode Setup Select

Sent whenever the current Multiset is changed between 0-15 (use SR Expanded for 16-31). On reception it will change the current multi setup.

F0 42 3n 28	Wavestation sysex header
01011011 (5B)	Multi Mode Setup Select
0xxxxxxx	Multi Mode Setup number
11110111 (F7)	End of exclusive

### 2.1.21 Multi-Mode Setup Select SR Expanded

Sent whenever the current Multiset is changed between 16-31 (use normal select for 0-15). On reception it will change the current multi setup.

F0 42 3n 28	Wavestation sysex header
01100011 (63)	Multi Mode Setup Select SR Expanded
0xxxxxxx	Multi Mode Setup number (true number)
11110111 (F7)	End of exclusive

## 2.2 Status messages

Status messages are transmitted after reception of data messages. They indicate the receive status of the data. When received they will display an appropriate message.

### 2.2.1 Data Load Error

This message is transmitted whenever a message is received and the checksum failed.

F0 42 3n 28	Wavestation sysex header
00100100 (24)	Data Load Error message type
11110111 (F7)	End of exclusive

### 2.2.2 Data Load Complete

This message is transmitted whenever a data message is received successfully.

F0 42 3n 28	Wavestation sysex header
00100011 (23)	Data Load Complete message type
11110111 (F7)	End of exclusive

## 3.0 Transmit Only Messages

### 3.1 Status messages

Status messages are transmitted after reception of data messages. They indicate the receive status of the data.

#### 3.1.1 Write Complete

F0 42 3n 28	Wavestation sysex header
00100001 (21)	Write Complete message type
11110111 (F7)	End of exclusive

#### 3.1.2 Write Error

F0 42 3n 28	Wavestation sysex header
00100010 (22)	Write Error message type
11110111 (F7)	End of exclusive

### 3.2 Device ID Message

11110000 (F0)	System Exclusive
01111110 (7E)	Non Real Time message
0000xxxx (0X)	Channel number
00000110 (06)	Inquiry message
00000010 (02)	ID reply

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

---

01000010 (42)	KORG ID
00101000 (28)	Wavestation family code (LSB)
00000000 (00)	(MSB)
00000010 (02)	Member code (LSB)
00000000 (00)	(MSB)
0xxxxxxx (xx)	Minor software version (LSB)
0xxxxxxx (xx)	(MSB)
0xxxxxxx (xx)	Major software version(LSB)
0xxxxxxx (xx)	(MSB)
11110111 (F7)	End of exclusive

### 4.0 Receive Only Messages

#### 4.1 Request Messages

##### 4.1.1 Single Patch Dump Request

F0 42 3n 28	Wavestation sysex header
00010000 (10)	Single Patch Dump Request
0000xxxx (0x)	Bank number (0..11)
0xxxxxxx	Patch number
11110111 (F7)	End of exclusive

##### 4.1.2 Single Performance Dump Request

F0 42 3n 28	Wavestation sysex header
00011001 (19)	Single Performance Dump Request
0000xxxx (0x)	Bank number (0..11)
0xxxxxxx	Performance number
11110111 (F7)	End of exclusive

##### 4.1.3 All Patch Dump Request

F0 42 3n 28	Wavestation sysex header
00011100 (1C)	All Patch Dump Request
0000xxxx (0x)	Bank number (0..11)
11110111 (F7)	End of exclusive

##### 4.1.4 All Performance Dump Request

F0 42 3n 28	Wavestation sysex header
00011101 (1D)	All Performance Dump Request
0000xxxx (0x)	Bank number (0..11)
11110111 (F7)	End of exclusive

##### 4.1.5 All Data Request

F0 42 3n 28	Wavestation sysex header
00001111 (0F)	All Data Dump Request
11110111 (F7)	End of exclusive

##### 4.1.6 System Setup Dump Request

F0 42 3n 28	Wavestation sysex header
00001110 (0E)	System Setup Dump Request
11110111 (F7)	End of exclusive

#### 4.1.7 Wave Sequence Data Dump Request

F0 42 3n 28	Wavestation sysex header
00001100 (0C)	Wave Sequence Dump Request
0000xxxx (0x)	Bank number (0..11)
11110111 (F7)	End of exclusive

#### 4.1.8 Performance Map Dump Request

F0 42 3n 28	Wavestation sysex header
00000111 (07)	Performance Map Dump Request
11110111 (F7)	End of exclusive

#### 4.1.9 Multi Mode Setup Dump Request

F0 42 3n 28	Wavestation sysex header
00000110 (06)	Multi Mode Setup Dump Request
11110111 (F7)	End of exclusive

#### 4.1.10 Micro Tune Scales Dump Request

F0 42 3n 28	Wavestation sysex header
00001000 (08)	Micro Tune Scales Dump Request
11110111 (F7)	End of exclusive

### 4.2 Commands

#### 4.2.1 Patch Write Command

F0 42 3n 28	Wavestation sysex header
00010001 (11)	Patch Write Command
0000xxxx (0x)	Bank number (0..11)
0pppppppp (pp)	Patch number (0-34)
11110111 (F7)	End of exclusive

#### 4.2.2 Performance Write Command

F0 42 3n 28	Wavestation sysex header
00011010 (1A)	Performance Write Command
0000xxxx (0x)	Bank number (0..11)
0pppppppp (pp)	Performance number (0-49)
11110111 (F7)	End of exclusive

### 4.3 Device Inquiry Message

11110000 (F0)	System Exclusive
01111110 (7E)	Non Real Time
0000xxxx (0x)	Channel number
00000110 (06)	Inquiry message
00000001 (01)	Inquiry request
11110111 (F7)	End of exclusive

## 5.0 Data Structure Tables

```

typedef char byte; /* 8 bits, signed */
typedef short word; /* 16 bits, signed */
typedef unsigned char ubyte; /* 8 bits, unsigned */
typedef unsigned short uword; /* 16 bits, unsigned */
typedef unsigned long ulong; /* 32 bits, unsigned */
typedef unsigned char boolean; /* Boolean TRUE or FALSE */

```

### 5.1 Performance Data Structure

```

typedef struct
{
    char Perf_Name[NAME_SIZE]; /* Performance name - up to 16
                                characters */
    byte Fx_Perf_Block[21]; /* Leave space for effects
                             parameters */
    part Parts[8]; /* This is where the PART
                   blocks start, of which 8 can be
                   appended to the performance */
} performance;

typedef struct
{
    byte Bank_Num; /* Bank number this PART is playing */
    byte Patch_Num; /* Patch number this PART is playing */
    ubyte Level; /* Volume for this part */
    byte Output; /* OUTPUT CHAN FOR THIS Part */
    ubyte Part_Mode; /* KEYBOARD ASSIGN MODE
                     (Polyphonic,UNI) */

    /* bit 6-7 */
    /* Bank Expansion */
    /* 00= Use normal bank num */
        if Bank_Num = 0 --> RAM1
        if Bank_Num = 1 --> RAM2
        if Bank_Num = 2 --> ROM11
        if Bank_Num = 3 --> CARD */
    /* 01= Use expanded banks as below:
        if Bank_Num = 0 --> ROM4
        if Bank_Num = 1 --> ROM5
        if Bank_Num = 2 --> RAM3
        if Bank_Num = 3 --> ROM6 */
    /* 10= Use expanded banks as below:
        if Bank_Num = 0 --> ROM7
        if Bank_Num = 1 --> ROM8
        if Bank_Num = 2 --> ROM9
        if Bank_Num = 3 --> ROM10 */
    /* 11= **** reserved for future use */

    /* bit 5-4 */
    /* 00= **** reserved for future use */
    /* 01= Local play mode*/
    /* 10= MIDI play mode*/
    /* 11 = Both */

    /* bit 3-2 */

```

```

/* 00= **** reserved for future use */
/* 01= polyphonic*/
/* 10= unison re-trigger*/
/* 11= unison legato*/

/* bit 1-0 */
/* 00= low note*/
/* 01= high note*/
/* 10= last note*/
/* 11 = **** reserved for future use */

ubyte    Lo_Key;      /* Lower note of keyboard range*/
ubyte    Hi_Key;      /* Upper note of keyboard range*/
ubyte    Lo_Vel;      /* Lower limit of velocity range*/
ubyte    Hi_Vel;      /* Upper limit of velocity range */
byte     Trans;       /* Transpose value in semitones */
byte     Detune;      /* Detune value in cents*/
ubyte    Tunetab;     /* Micro tuning table for this PART */
ubyte    Micro_Tune_Key; /* Root key for pure major/minor and
USER scales */
ubyte    Midi_Out_Chan; /* MIDI transmit channel for this
PART */
byte     Midi_Prog_Num; /* MIDI prog# to xmit when PART
selected, -1 =off) */
byte     Sus_Enable;  /* Sustain Pedal enable/disable */
uword    Delay;      /* Delay value in milliseconds */
} part;

```

## 5.2 Patch Data Structure

```

/*      Individual Patch Data Structure */
/* This is the structure for data that is individual to the */
/* 1, 2, or 4 oscillators that make up a Patch.*/
/* Four of these structures are included in a Patch.*/

typedef struct
{
    byte    Wave_Coarse; /* Wave detuning in semitones*/
    byte    Wave_Fine;  /* Wave detuning in cents */
    ubyte   Wave_Bank;  /* Wave bank */
    uword   Wave_Num;   /* Wave number*/
    byte    Wave_Scale; /* Wave pitch scaling slope */
    ubyte   Lfo1_Rate;  /* LFO 1 Rate */
    ubyte   Lfo1_Amt;  /* LFO 1 Amount*/
    ubyte   Lfo1_Delay; /* LFO 1 Delay*/
    ubyte   Lfo1_Fade;  /* LFO 1 Fade in*/
    ubyte   Lfo1_Shape; /* LFO 1 Shape (bits 0-6)1-127*/
                                /* LFO 1 Sync (bit 7) */
                                /*1 = Sync on */
                                /*0 = Sync off*/

    byte    S1_Lfo1_R;  /* Mod Source to LFO 1 Rate pointer*/
    byte    S1_Lfo1_R_Amt; /* Mod Source to LFO 1 Rate amount*/
    byte    S1_Lfo1_A;   /* Mod Source to LFO 1 Amt pointer*/
    byte    S1_Lfo1_A_Amt; /* Mod Source to LFO 1 Amt amount*/
    ubyte   Lfo2_Rate;  /* LFO 2 Rate*/
    ubyte   Lfo2_Amt;   /* LFO 2 Amount*/
    ubyte   Lfo2_Delay; /* LFO 2-Delay*/
}

```



## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

```
ubyte    Lfo2_Fade;      /* LFO 2-Fade in*/
ubyte    Lfo2_Shape;    /* LFO 2-Shape (bits 0-6)1-127*/
                               /* LFO 2 Sync (bit 7) */
                               /* 1 = Sync on */
                               /* 0 = Sync off*/

byte     S1_Lfo2_R;     /* Mod Source to LFO 1 Rate pointer*/
byte     S1_Lfo2_R Amt; /* Mod Source to LFO 2 Rate amount*/
byte     S1_Lfo2_A;     /* Mod Source to LFO 2 Amt pointer*/
byte     S1_Lfo2_A Amt; /* Mod Source to LFO 1 Amt amount*/

ubyte    EG_Rate1;     /* Envelope 1 Rate 1 */
ubyte    EG_Rate2;     /* Envelope 1 Rate 2 */
ubyte    EG_Rate3;     /* Envelope 1 Rate 3 */
ubyte    EG_Rate4;     /* Envelope 1 Rate 4 */
ubyte    EG_Level0;    /* Envelope 1 Level 0 */
ubyte    EG_Level1;    /* Envelope 1 Level 1 */
ubyte    EG_Level2;    /* Envelope 1 Level 2 */
ubyte    EG_Level3;    /* Envelope 1 Level 3 */
ubyte    EG_Level4;    /* Envelope 1 Level 4 */

byte     Vel_EG_A;     /* Velocity to Env1 Amount Amt */
ubyte    AEG_Rate1;    /* Amplitude Envelope Rate 1 */
ubyte    AEG_Rate2;    /* Amplitude Envelope Rate 2 */
ubyte    AEG_Rate3;    /* Amplitude Envelope Rate 3 */
ubyte    AEG_Rate4;    /* Amplitude Envelope Rate 4 */
ubyte    AEG_Level0;   /* Amplitude Envelope Level 0 */
ubyte    AEG_Level1;   /* Amplitude Envelope Level 1 */
ubyte    AEG_Level2;   /* Amplitude Envelope Level 2 */
ubyte    AEG_Level3;   /* Amplitude Envelope Level 3 */

byte     Pitch_Mac;    /* Pitch Macro number*/
byte     Fil_Mac;      /* Filter Macro number*/
byte     Amp_Mac;      /* Amplitude Envelope Macro number*/
byte     Pan_Mac;      /* Pan Macro number*/
byte     Env_Mac;      /* Envelope 1 macro number*/
byte     Pw_Range;     /* Pitchwheel Range */
byte     S1_Pitch;     /* Modulation Source 1 to Pitch
                               pointer*/
byte     S1_Pitch_Amt; /* Modulation Source 1 to Pitch
                               Amount*/
byte     S2_Pitch;     /* Modulation Source 2 to Pitch
                               pointer*/
byte     S2_Pitch_Amt; /* Modulation Source 2 to Pitch
                               Amount*/

byte     Key_Filter;   /* Keyboard to Filter Cutoff Amount*/
byte     S1_Filter;    /* Modulation Source 1 to Filter
                               pointer*/
byte     S1_Filter_Amt; /* Modulation Source 1 to Filter
                               Amount*/
byte     S2_Filter;    /* Modulation Source 2 to Filter
                               pointer*/
byte     S2_Filter_Amt; /* Modulation Source 2 to Filter
                               Amount*/

byte     Vel_AEG_A;    /* Velocity to Amp Env Amount Amount*/
byte     Vel_AEG_R;    /* Velocity To Amp Env Attack Rate Amt*/
byte     Key_AEG_R;    /* Keyboard to Amp Env Decay Rate Amt*/
byte     S1_Amp;       /* Modulation Source 1 to Amp pointer*/
byte     S1_Amp_Amt;   /* Modulation Source 1 to Amp Amount*/
byte     S2_Amp;       /* Modulation Source 2 to Amp pointer*/
byte     S2_Amp_Amt;   /* Modulation Source 2 to Amp Amount*/
byte     Key_Pan_Amt;  /* Keyboard to Pan Amount*/
```

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

```

byte    Vel_Pan_Amt;    /* Velocity to Pan Amount*/
ubyte   Cutoff;        /* Filter Cutoff value */
ubyte   Filter_Exciter; /* Filter Exciter value */
byte    Vel_EG_R;      /* Velocity to ENV1 rate amount*/
byte    Key_EG_R;      /* Keyboard to ENV1 rate amount*/
byte    PEG_Amt;       /* Pitch Ramp amount*/
ubyte   PEG_Rate;      /* Pitch Ramp rate*/
byte    Vel_PEG_A;     /* Velocity to pitch ramp amount */
byte    Indiv_Level;   /* Velocity to pitch ramp rate amount*/
long    Lfo1_Inc;      /* Lfo fade in amount increment*/
long    Lfo2_Inc;      /* Lfo fade in amount increment*/
byte    Patch_Output;  /* Individual output routing */
byte    Wave_Num_Exp;  /* Wave number expansion to access
Expansion PCM data (Waves numbered
397 and over). This number is added
to the value of Wave_Num to determine
the actual wave number.*/

} indiv;

/* Patch data structure*/

typedef struct
{
    char    Patch_Name[16]; /* Patch name up to 16 characters*/
    ubyte   Mix_Rate1;      /* Mix envelope rate for segment 1 */
    ubyte   Mix_Rate2;      /* Mix envelope rate for segment 2 */
    ubyte   Mix_Rate3;      /* Mix envelope rate for segment 3 */
    ubyte   Mix_Rate4;      /* Mix envelope rate for segment 4 */
    uword   Mix_Count1;     /* Number of update cycles for env seg*/
    uword   Mix_Count2;     /* Number of update cycles for env seg*/
    uword   Mix_Count3;     /* Number of update cycles for env seg*/
    uword   Mix_Count3B;    /* Number of update cycles for env seg*/
    uword   Mix_Count2B;    /* Number of update cycles for env seg*/
    uword   Mix_Count1B;    /* Number of update cycles for env seg*/
    uword   Mix_Count4;     /* Number of update cycles for env seg*/
    long    Mix_XSlope1;    /* Increment size for env seg 1 */
    long    Mix_XSlope2;    /* Increment size for env seg 2 */
    long    Mix_XSlope3;    /* Increment size for env seg 3 */
    long    Mix_XSlope4;    /* Increment size for env seg 4 */
    long    Mix_YSlope1;    /* Increment size for env seg 1 */
    long    Mix_YSlope2;    /* Increment size for env seg 2 */
    long    Mix_YSlope3;    /* Increment size for env seg 3 */
    long    Mix_YSlope4;    /* Increment size for env seg 4 */
    ubyte   Mix_X0;         /* Mix Envelope Point 0 level */
    ubyte   Mix_X1;         /* Mix Envelope Point 1 level */
    ubyte   Mix_X2;         /* Mix Envelope Point 2 level */
    ubyte   Mix_X3;         /* Mix Envelope Point 3 level */
    ubyte   Mix_X4;         /* Mix Envelope Point 4 level */
    ubyte   Mix_Y0;         /* Mix Envelope Point 0 level */
    ubyte   Mix_Y1;         /* Mix Envelope Point 1 level */
    ubyte   Mix_Y2;         /* Mix Envelope Point 2 level */
    ubyte   Mix_Y3;         /* Mix Envelope Point 3 level */
    ubyte   Mix_Y4;         /* Mix Envelope Point 4 level */
    ubyte   Mix_Repeats;    /* Number of repeats of mix envelope*/
    ubyte   Mix_Env_Loop;   /* Start segment of Mix Envelope loops*/
    ubyte   S1_MixAC;       /* Modulation Source 1 to MixAC
pointer*/
    byte    S1_MixAC_Amt;   /* Modulation Source 1 to MixAC Amount*/

```

#### APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

```
ubyte   S2_MixAC;           /* Modulation Source 2 to MixAC
                             pointer*/
byte     S2_MixAC_Amt;      /* Modulation Source 2 to MixAC Amount*/
ubyte   S1_MixBD;           /* Modulation Source 1 to MixBD
                             pointer*/
byte     S1_MixBD_Amt;      /* Modulation Source 1 to MixBD Amount*/
ubyte   S2_MixBD;           /* Modulation Source 2 to MixBD
                             pointer*/
byte     S2_MixBD_Amt;      /* Modulation Source 2 to MixBD Amount*/
byte     Number_Of_Waves;   /* Number of WAVES/WAVESEQS in Patch*/
ubyte   Hard_Sync;         /* Hard Sync Flag*/
byte     Bank_Exp;          /* Bit 7 = 1; Second Exp Bit set for Wave D
                             if Wave_Bank = 0 --> Wave D uses ROM7 wseq
                             if Wave_Bank = 1 --> Wave D uses ROM8 wseq
                             if Wave_Bank = 2 --> Wave D uses ROM9 wseq
                             if Wave_Bank = 3 --> Wave D uses ROM10 wseq*/
/* Bit 6 = 1; Second Exp Bit set for Wave C
                             if Wave_Bank = 0 --> Wave C uses ROM7 wseq
                             if Wave_Bank = 1 --> Wave C uses ROM8 wseq
                             if Wave_Bank = 2 --> Wave C uses ROM9 wseq
                             if Wave_Bank = 3 --> Wave C uses ROM10 wseq*/
/* Bit 5 = 1; Second Exp Bit set for Wave B
                             if Wave_Bank = 0 --> Wave B uses ROM7 wseq
                             if Wave_Bank = 1 --> Wave B uses ROM8 wseq
                             if Wave_Bank = 2 --> Wave B uses ROM9 wseq
                             if Wave_Bank = 3 --> Wave B uses ROM10 wseq*/
/* Bit 4 = 1; Second Exp Bit set for Wave A
                             if Wave_Bank = 0 --> Wave A uses ROM7 wseq
                             if Wave_Bank = 1 --> Wave A uses ROM8 wseq
                             if Wave_Bank = 2 --> Wave A uses ROM9 wseq
                             if Wave_Bank = 3 --> Wave A uses ROM10 wseq*/
/* Bit 3 = 1; First Exp Bit set for Wave D
                             if Wave_Bank = 0 --> Wave D uses ROM4 wseq
                             if Wave_Bank = 1 --> Wave D uses ROM5 wseq
                             if Wave_Bank = 2 --> Wave D uses RAM3 wseq
                             if Wave_Bank = 3 --> Wave D uses ROM6 wseq */
/* Bit 2 = 1; First Exp Bit set for Wave C
                             if Wave_Bank = 0 --> Wave C uses ROM4 wseq
                             if Wave_Bank = 1 --> Wave C uses ROM5 wseq
                             if Wave_Bank = 2 --> Wave C uses RAM3 wseq
                             if Wave_Bank = 3 --> Wave C uses ROM6 wseq*/
/* Bit 1 = 1; First Exp Bit set for Wave B
                             if Wave_Bank = 0 --> Wave B uses ROM4 wseq
                             if Wave_Bank = 1 --> Wave B uses ROM5 wseq
                             if Wave_Bank = 2 --> Wave B uses RAM3 wseq
                             if Wave_Bank = 3 --> Wave B uses ROM6 wseq */
/* Bit 0 = 1; First Exp Bit set for Wave A
                             if Wave_Bank = 0 --> Wave A uses ROM4 wseq
                             if Wave_Bank = 1 --> Wave A uses ROM5 wseq
                             if Wave_Bank = 2 --> Wave A uses RAM3 wseq
                             if Wave_Bank = 3 --> Wave A uses ROM6 wseq */

byte     Dummy141;         /* Extra for future use */
indiv    waveA;            /* Individual parameters for WAVE A */
indiv    waveB;            /* Individual parameters for WAVE B */
indiv    waveC;            /* Individual parameters for WAVE C */
indiv    waveD;            /* Individual parameters for WAVE D */
} patch;
```

### 5.3 Multi Mode Setup Data Structure

This data includes the first 16 of the 32 multisets in a stripped-down version compatible with the Wavestation keyboard. Multiset names and channel panning are not included, and references to RAM3 and ROM 4-10 are changed to ROM11.

```

/*      Data structures of the multi-set map which*/
/*      specifies the initial program on each track.*/
/*      There are 16 setups. Each one holds bank/prog */
/*      numbers for each MIDI channel. */

typedef struct
{
    ubyte  Multimap_Chan_Enable; /* MIDI channel enable/disable */
    ubyte  Multimap_Bank;      /* Bank number of this program */
    ubyte  Multimap_Prog;     /* Program number of this program */
    ubyte  Multimap_Level;    /* Performance level */
} multimap;

typedef struct
{
    ubyte  Multiset_FX_Chan; /* Effects control channel number*/
    ubyte  Fx_Multi_Block[21]; /* Space for effects parameters*/
    multimap Multiset_Map[16]; /* Bank and program numbers */
} multiset;

typedef struct
{
    multiset          multisets[16];
    byte             spare_multiset_byte;
} multiset_block;

```

### 5.4 Multi Mode Setup Expanded Data Structure

This data includes the first 16 of the 32 multisets in a stripped-down version compatible with the Wavestation A/D. References to ROM4-10 are changed to ROM11, as in the normal Multi Mode Setup structure above, but references to RAM3 are allowed.

### 5.5 Multi Mode Setup SR Expanded Data Structure

This data includes all 32 Multisets, along with names and channel panning. References to RAM3 and ROM 4-10 are allowed.

```

typedef struct
{
    multiset  multisets[16];          /* Original Multisets */
    multiset  multisets[16];          /* Expanded Multisets */
    ubyte     Multi_Names[16][32];    /* 15 Char Multiset Names + NULL*/
    ubyte     Multi_Output[16][32];  /* 16 Channels of Multiset Pan */
    byte      spare_multiset_byte;
} multiset_sr_extended_block

```

## 5.6 Wave Sequence Data Structure

```

/* This is repeated for the number of wave sequences in the bank. */

typedef struct
{
    uword   WS_Link;           /* Pointer to Wave Sequence Start Step */
    uword   WS_Slink;         /* Pointer to Startmod Start Step */
    ubyte   WS_Loop_Start;    /* Step number of WAVESEQ Loop Start
                               Point
                               step*/
    ubyte   WS_Loop_End;      /* Step number of WAVESEQ Loop End Point
                               step*/
    ubyte   WS_Loop_Count;    /* - Loop repeat count
                               (bits 0-6)1-127*/
                               /* 0=OFF */
                               /* ~ 127=1NF */
                               /* Loop Direction (bit 7)*/
                               /* 0 = FOR */
                               /* 1 = B/F */
    ubyte   WS_Start_Step;    /* Startmod starting step number*/
    ubyte   WS_Mod_Src;       /* Controller number to use for
                               startmod */
    byte    WS_Mod_Amt;       /* Startmod sensitivity */
    word    WS_Dyno_Mod;      /* (Total_Time * Mod_Amt)/255 */
    uword   WS_Start_Time;    /* Cumulative time up to start step */
    uword   WS_Time;         /* Total time of Wave Sequence */
} waveseq;

/* Data structure of each STEP in a WAVE SEQUENCE */

typedef struct
{
    uword   WS_Flink;         /* Step number of step in WAVSEQ after
                               this one */
    uword   WS_Blink;         /* Step number of step in WAVSEQ before
                               this one */
    uword   WS_Llink;         /* Pointer to loop start (0xFFFF except
                               last step) */
    uword   WS_Wave_Num;      /* Wave number of this step in wave
                               sequence */
    byte    WS_Coarse         /* -24 to 24: Coarse tuning of wave */
                               /* 25 to 47: illegal values
                               /* 48 to 96: subtract 72 for actual coarse
                               tuning and use expanded PCM, adding 365
                               to WS_Wave_Num value for actual PCM wave
                               number. */
    byte    WS_Fine;         /* Fine tuning of wave */
    uword   WS_Xfade;         /* Crossfade time of wave */
    uword   WS_Duration;      /* Duration of wave */
    ubyte   WS_Level;        /* Level of wave */
    ubyte   WS_Mod_Index;     /* Modulation Index */
} wavestep;

typedef struct
{

```

```

    char    Wave_Seq_Name[8];
} ws_name;

/* This is the entire structure which is transmitted */

typedef struct
{
    waveseq  waveseq_block[32]; /* 32 wavseq locations */
    waystep  wavstep_block[501]; /* 501 wave seq steps */
    ws_name  ws_name_block[32]; /* 32 wave seq names */
} ws_block;

```

## 5.7 Micro Tune Scale Data Structures

```

typedef struct
{
    byte     c key;      /* Offset from equal tempered for C note */
    byte     cs key;    /* Offset from equal tempered for C# note */
    byte     d key;     /* Offset from equal tempered for D note */
    byte     ds key;    /* Offset from equal tempered for D# note */
    byte     e key;     /* Offset from equal tempered for E note */
    byte     f key;     /* Offset from equal tempered for F note */
    byte     fs key;    /* Offset from equal tempered for F# note */
    byte     g key;     /* Offset from equal tempered for G note */
    byte     gs key;    /* Offset from equal tempered for G# note */
    byte     a key;     /* Offset from equal tempered for A note */
    byte     as key;    /* Offset from equal tempered for A# note */
    byte     b key;     /* Offset from equal tempered for B note */
} mtune;

typedef struct
{
    mtune     mtunes[12];
    byte     spare_mtune_byte;
} mtune_block;

```

## 5.8 System Setup Data Structure

```

typedef struct
{
    ubyte    current_multi;      /* CURRENT MULTISSET */
    ubyte    current_tune;      /* CURRENT _MTUNE */
    byte     master_tune;      /* MASTER TUNE */
    byte     effects_enable;    /* EFFECTS ENABLE */
    ubyte    pitch_bend_range;  /* PITCH BEND RANGE */
    ubyte    velocity_response; /* VELOCITY RESPONSE */
    byte     midi_mode;        /* MIDI MODE */
    ubyte    midi_base;        /* MIDI BASE CHAN */
    ubyte    num_mono_chans;    /* NUM MONO CHANS */
    byte     key_num_offset;    /* KEY NUM OFFSET */
    byte     param_enable;     /* MIDI PARAM ENABLE */
    byte     midi_1;           /* CONTROLLER 1 */
    byte     midi_2;           /* CONTROLLER 2 */
    byte     xmit_mode;        /* XMIT MODE */
    byte     local_kbd;        /* LOCAL_KBD */
    byte     xmit_program_enable; /* XMIT PROG CHANGE */
    byte     xmit_pressure_enable; /* XMIT AFTERTOUCHE */

```

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

```
byte    xmit_pitch_enable;    /* XMIT PITCH BEND */
byte    xmit_control_enable;  /* XMIT CONTROLLERS*/
byte    rec_program_enable;   /* REC PROG CHANGE */
byte    rec_pressure_enable;  /* REC AFTERTOUCH */
byte    rec_pitch_enable     /* REC PITCH BEND */
byte    rec_control_enable;   /* REC CONTROLLERS*/
byte    note_enable;         /* REC NOTE ON OFF*/
byte    alloff_enable;       /* REC ALL NOTES OFF*/
byte    progmap_enable;      /* PROGMAP ENABLE */
ubyte   foot_damper_function;
ubyte   foot_damper_polarity;
ubyte   foot_assign_1_function;
ubyte   foot_assign_1_polarity;
ubyte   foot_assign_2_function;
ubyte   foot_assign_2_polarity;
ubyte   ws_midi_clock;
byte    spare_system_byte;
} system;
```

### 5.9 System Setup Expanded Data Structure

This contains data not supported by the original Wavestation keyboard, including various MIDI remapping features, local transpose, and analog inputs parameters for the Wavestation A/D.

```
typedef struct
{
    ubyte    prog_to_multi_fx;
    ubyte    change_multi_with;
    ubyte    remap_to_joy_x;
    ubyte    remap_to_joy_y;
    ubyte    remap_to_fx_switch;
    ubyte    local_xpose;
    ubyte    analog_setup_number;
    byte     analog_bus_macro;
    ubyte    analog_lev_1;
    ubyte    analog_lev_2;
    byte     analog_chan_1;
    byte     analog_chan_2;
    ubyte    analog_1_bus;
    ubyte    analog_2_bus;
    ubyte    analog_1_filter;
    ubyte    analog_2_filter;
    ubyte    analog_1_exciter;
    ubyte    analog_2_exciter;
    ubyte    analog_input_disable;
    byte     spare_system_byte;
} system_ext;
```

### 5.10 System Setup Expanded SR Data Structure

This contains data specific to the Wavestation SR.

```
typedef struct
{
    ubyte    sysex_xmit_type;    /* Type of System Exclusive Transfer */
    ubyte    perf_midi_mode;    /* MIDI Mode when in Performance mode */
}
```

```

ubyte      multi_midi_mode;    /* MIDI Mode when in Multi mode */
ubyte      current_demo;      /* The Demo sequence number */
ubyte      perf_mode;         /* 1=Performance Mode 0=Multi Mode */
ubyte      num_multi_chans;   /* Like num_mono_chans for Multi Mode */
ubyte      reset_act_sens_control; /* 1=NOTES OFF 0=Notes + Contlrs */
ubyte      rec_bank_enable;   /* 0=OFF, 1=ON */
byte       spare_system_byte;
} system_ext_sr;

```

## 5.11 Performance Map Structures

In this data, references to RAM3 and ROM 4-10 are changed to ROM11 for compatability with the keyboard.

```

typedef struct
{
    ubyte      Perfmap_Bank;    /* Bank number of this performance */
    ubyte      Perfmap_Prog;    /* MIDI Program Change number of this
                                performance */
} perfmap;

typedef struct
{
    perfmap    perfmaps[128];
    byte       spare_perfmap_byte;
} perfmap_block;

```

## 5.12 Performance Map Expanded Structures

In this data, references to RAM3 are allowed, but ROM 4-10 are changed to ROM11 for compatability with the Wavestation A/D. It is otherwise the same as the normal Performance Map structure above.

## 5.13 Performance Map SR Expanded Structures

In this data, references to RAM3 and ROM 4-10 are allowed. It is otherwise the same as the normal Performance Map structure above.

## 5.14 All Data Structure

```

typedef struct
{
    system                system_all;
    multiset_block       multiset_all;
    mtune_block          mtune_all;
    perfmap_block        perfmap_all;
    performance          perf_ram1[50];
    performance          perf_ram2[50];
    patch                patch_ram1[35];
    patch                patch_ram2[35];
    ws_block             ws_ram1;
    ws_block             ws_ram2;
} all_data;

```



## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

### 5.15 Parameter Number Table

enum /* Parameter numbers. */		/* 58 */	PART_PATCH_NUM,
{		/* 59 */	PART_PATCH_NAME,
/* 0 */	CURRENT_BANK,	/* 60 */	PART_MODE,
/* 1 */	CARD_NAME,	/* 61 */	PART_VOLUME,
/* 2 */	CURRENT_PROG,	/* 62 */	PART_OUTPUT,
/* 3 */	PROG_NAME,	/* 63 */	PART_KEY_LIMIT_LOW,
/* 4 */	MIDI_MODE,	/* 64 */	PART_KEY_LIMIT_HIGH,
/* 5 */	MIDI_BASE_CHAN,	/* 65 */	PART_VEL_LIMIT_LOW,
/* 6 */	NUM_MONO_CHANS,	/* 66 */	PART_VEL_LIMIT_HIGH,
/* 7 */	KEY_NUM_OFFSET,	/* 67 */	PART_TRANSPOSE,
/* 8 */	MIDI_PARAM_ENABLE,	/* 68 */	PART_DETUNE,
/* 9 */	CONTROLLER_1,	/* 69 */	PART_SUS_ENABLE,
/* 10 */	CONTROLLER_2,	/* 70 */	PART_DELAY,
/* 11 */	XMIT_MODE,	/* 71 */	PART_UNI_NOTE_PRIORITY,
/* 12 */	LOCAL_KBD,	/* 72 */	PART_MTUNE_TAB,
/* 13 */	XMIT_PROG_CHANGE,	/* 73 */	PART_MTUNE_KEY,
/* 14 */	XMIT_AFTERTOUCH,	/* 74 */	PART_MIDI_XMIT_CHAN,
/* 15 */	XMIT_PITCH_BEND,	/* 75 */	PART_PLAY_MODE,
/* 16 */	XMIT_CONTROLLERS,	/* 76 */	PART_PROG_CHANGE_XMIT,
/* 17 */	REC_PROG_CHANGE,	/* 77 */	PATCH_STRUCTURE,
/* 18 */	REC_AFTERTOUCH,	/* 78 */	PATCH_HARD_SYNC,
/* 19 */	REC_PITCH_BEND,	/* 79 */	CURRENT_WAVE,
/* 20 */	REC_CONTROLLERS,	/* 80 */	PATCH_PITCH_MACRO,
/* 21 */	REC_NOTE_ON_OFF,	/* 81 */	PATCH_FILTER_MACRO,
/* 22 */	REC_ALL_NOTES_OFF,	/* 82 */	PATCH_AMP_MACRO,
/* 23 */	PROGMAP_ENABLE,	/* 83 */	PATCH_PAN_MACRO,
/* 24 */	PROGMAP_CHANGE_NUM,	/* 84 */	PATCH_ENV_MACRO,
/* 25 */	PROGMAP_PROG_BANK,	/* 85 */	PATCH_PITCH_BEND_RANGE,
/* 26 */	PROGMAP_PROG_NUM,	/* 86 */	PATCH_PITCH_RAMP_AMT,
/* 27 */	PROGMAP_PROG_NAME,	/* 87 */	PATCH_PITCH_RAMP_RATE,
/* 28 */	CURRENT_MULTISSET,	/* 88 */	PATCH_PITCH_VEL_AMT,
/* 29 */	MULTISSET_FX_CONTROL_CHAN,	/* 89 */	PITCH_SOURCE_1,
/* 30 */	MULTISSET_CHAN,	/* 90 */	PITCH_SOURCE_1_AMOUNT,
/* 31 */	MULTISSET_CHAN_ENABLE,	/* 91 */	PITCH_SOURCE_2,
/* 32 */	MULTISSET_LEVEL,	/* 92 */	PITCH_SOURCE_2_AMOUNT,
/* 33 */	MULTISSET_PROG_BANK,	/* 93 */	FILTER_MOD_CUTOFF,
/* 34 */	MULTISSET_PROG_NUM,	/* 94 */	FILTER_MOD_TRACKING,
/* 35 */	MULTISSET_PROG_NAME,	/* 95 */	FILTER_EXCITER_AMOUNT,
/* 36 */	SYSEX_PATCH_BANK,	/* 96 */	FILTER_MOD_SOURCE1,
/* 37 */	SYSEX_PATCH_NUM,	/* 97 */	FILTER_MOD_SOURCE1_AMT,
/* 38 */	SYSEX_ALL_BANK,	/* 98 */	FILTER_MOD_SOURCE2,
/* 39 */	SYSEX_WAVESEQ_BANK,	/* 99 */	FILTER_MOD_SOURCE2_AMT,
/* 40 */	SYSEX_PROG_BANK,	/* 100 */	GP_ENV_LEVEL_0,
/* 41 */	SYSEX_PROG_NUM,	/* 101 */	GP_ENV_LEVEL_1,
/* 42 */	MASTER_TUNE,	/* 102 */	GP_ENV_LEVEL_2,
/* 43 */	EFFECTS_ENABLE,	/* 103 */	GP_ENV_LEVEL_3,
/* 44 */	MEM_PROTECT_INTERNAL,	/* 104 */	GP_ENV_LEVEL_4,
/* 45 */	MEM_PROTECT_CARD,	/* 105 */	GP_ENV_RATE_1,
/* 46 */	PITCH_BEND_RANGE,	/* 106 */	GP_ENV_RATE_2,
/* 47 */	VELOCITY_RESPONSE,	/* 107 */	GP_ENV_RATE_3,
/* 48 */	SAVE_DATA_TYPE,	/* 108 */	GP_ENV_RATE_4,
/* 49 */	SAVE_SOURCE_BANK,	/* 109 */	GP_VEL_ENV_AMT,
/* 50 */	SAVE_SOURCE_NUM,	/* 110 */	AMP_ENV_LEVEL_0,
/* 51 */	SAVE_SOURCE_NAME,	/* 111 */	AMP_ENV_LEVEL_1,
/* 52 */	SAVE_DEST_BANK,	/* 112 */	AMP_ENV_LEVEL_2,
/* 53 */	SAVE_DEST_NUM,	/* 113 */	AMP_ENV_LEVEL_3,
/* 54 */	SAVE_DEST_NAME,	/* 114 */	AMP_ENV_RATE_1,
/* 55 */	SAVE_PLAY,	/* 115 */	AMP_ENV_RATE_2,
/* 56 */	CURRENT_PART,	/* 116 */	AMP_ENV_RATE_3,
/* 57 */	PART_PATCH_BANK,	/* 117 */	AMP_ENV_RATE_4,
		/* 118 */	AMP_MOD_VEL_ENV_AMOUNT,
		/* 119 */	AMP_MOD_SOURCE_1,
		/* 120 */	AMP_MOD_SOURCE_1_AMOUNT,

**APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT**

```

/* 121 */ AMP_MOD_SOURCE_2,
/* 122 */ AMP_MOD_SOURCE_2_AMOUNT,
/* 123 */ AMP_MOD_VEL_ATTACK_RATE,
/* 124 */ AMP_MOD_KBD_DECAY_RATE,
/* 125 */ LFO1_RATE,
/* 126 */ LFO1_INITIAL_AMOUNT,
/* 127 */ LFO1_SHAPE,
/* 128 */ LFO1_SYNC,
/* 129 */ LFO1_DELAY,
/* 130 */ LFO1_FADE_IN,
/* 131 */ LFO1_DEPTH_MOD_SOURCE,
/* 132 */ LFO1_DEPTH_MOD_SRC_AMT,
/* 133 */ LFO1_RATE_MOD_SOURCE,
/* 134 */ LFO1_RATE_MOD_SRC_AMT,
/* 135 */ LFO2_RATE,
/* 136 */ LFO2_INITIAL_AMOUNT,
/* 137 */ LFO2_SHAPE,
/* 138 */ LFO2_SYNC,
/* 139 */ LFO2_DELAY,
/* 140 */ LFO2_FADE_IN,
/* 141 */ LFO2_DEPTH_MOD_SOURCE,
/* 142 */ LFO2_DEPTH_MOD_SRC_AMT,
/* 143 */ LFO2_RATE_MOD_SOURCE,
/* 144 */ LFO2_RATE_MOD_SRC_AMT,
/* 145 */ PAN_VELOCITY_AMOUNT,
/* 146 */ PAN_KEYBOARD_AMOUNT,
/* 147 */ WAVEA_BANK,
/* 148 */ WAVEA_NUM,
/* 149 */ WAVEA_NAME,
/* 150 */ WAVEA_LEVEL,
/* 151 */ WAVEA_TUNE_COARSE,
/* 152 */ WAVEA_TUNE_FINE,
/* 153 */ WAVEA_TUNE_SLOPE,
/* 154 */ WAVEB_BANK,
/* 155 */ WAVEB_NUM,
/* 156 */ WAVEB_NAME,
/* 157 */ WAVEB_LEVEL,
/* 158 */ WAVEB_TUNE_COARSE,
/* 159 */ WAVEB_TUNE_FINE,
/* 160 */ WAVEB_TUNE_SLOPE,
/* 161 */ WAVEC_BANK,
/* 162 */ WAVEC_NUM,
/* 163 */ WAVEC_NAME,
/* 164 */ WAVEC_LEVEL,
/* 165 */ WAVEC_TUNE_COARSE,
/* 166 */ WAVEC_TUNE_FINE,
/* 167 */ WAVEC_TUNE_SLOPE,
/* 168 */ WAVED_BANK,
/* 169 */ WAVED_NUM,
/* 170 */ WAVED_NAME,
/* 171 */ WAVED_LEVEL,
/* 172 */ WAVED_TUNE_COARSE,
/* 173 */ WAVED_TUNE_FINE,
/* 174 */ WAVED_TUNE_SLOPE,
/* 175 */ WAVE_SEQ_NUM,
/* 176 */ WAVE_SEQ_BANK,
/* 177 */ WAVE_SEQ_NAME,
/* 178 */ WAVE_SEQ_STEP,
/* 179 */ WAVE_SEQ_WAVE_BANK,
/* 180 */ WAVE_SEQ_WAVE_NUM,
/* 181 */ WAVE_SEQ_WAVE_NAME,
/* 182 */ WAVE_SEQ_COARSE,
/* 183 */ WAVE_SEQ_FINE,
/* 184 */ WAVE_SEQ_LEVEL,
/* 185 */ WAVE_SEQ_DURATION,
/* 186 */ WAVE_SEQ_XFADE,
/* 187 */ WAVE_SEQ_LOOP_START,
/* 188 */ WAVE_SEQ_LOOP_END,
/* 189 */ WAVE_SEQ_REPEATS,
/* 190 */ WAVE_SEQ_START_STEP,
/* 191 */ WAVE_SEQ_MOD_SRC,
/* 192 */ WAVE_SEQ_MOD_AMT,
/* 193 */ MIX_ENV_POINT,
/* 194 */ MIX_ENV_RATE,
/* 195 */ MIX_ENV_X,
/* 196 */ MIX_ENV_Y,
/* 197 */ MIX_PERCENT_A,
/* 198 */ MIX_PERCENT_B,
/* 199 */ MIX_PERCENT_C,
/* 200 */ MIX_PERCENT_D,
/* 201 */ MIX_ENV_LOOP,
/* 202 */ MIX_ENV_REPEATS,
/* 203 */ MIX_MOD_X_SOURCE1,
/* 204 */ MIX_MOD_X_SRC1_AMT,
/* 205 */ MIX_MOD_X_SOURCE2,
/* 206 */ MIX_MOD_X_SRC2_AMT,
/* 207 */ MIX_MOD_Y_SOURCE1,
/* 208 */ MIX_MOD_Y_SRC1_AMT,
/* 209 */ MIX_MOD_Y_SOURCE2,
/* 210 */ MIX_MOD_Y_SRC2_AMT,
/* 211 */ COPY_MACRO_MODULE,
/* 212 */ COPY_MACRO_SOURCE_WAVE,
/* 213 */ COPY_MACRO_SOURCE_BANK,
/* 214 */ COPY_MACRO_SOURCE_NUM,
/* 215 */ COPY_MACRO_SOURCE_NAME,
/* 216 */ COPY_MACRO_DEST_MODULE,
/* 217 */ COPY_MACRO_DEST_WAVE,
/* 218 */ COPY_MACRO_DEST_BANK,
/* 219 */ COPY_MACRO_DEST_NUM,
/* 220 */ COPY_MACRO_DEST_NAME,
/* 221 */ COPY_DEST_PART,
/* 222 */ COPY_DEST_PART_PATCH_BLANK,
/* 223 */ COPY_DEST_PART_PATCH_NUM,
/* 224 */ COPY_DEST_PART_PATCH_NAME,
/* 225 */ COPY_WS_SOURCE_FROM_STEP,
/* 226 */ COPY_WS_SOURCE_FROM_BANK,
/* 227 */ COPY_WS_SOURCE_FROM_NUM,
/* 228 */ COPY_WS_SOURCE_FROM_NAME,
/* 229 */ COPY_WS_SOURCE_TO_STEP,
/* 230 */ COPY_WS_SOURCE_TO_BANK,
/* 231 */ COPY_WS_SOURCE_TO_NUM,
/* 232 */ COPY_WS_SOURCE_TO_NAME,
/* 233 */ COPY_WS_DEST_BANK,
/* 234 */ COPY_WS_DEST_NUM,
/* 235 */ COPY_WS_DEST_NAME,
/* 236 */ COPY_WS_DEST_AFTER_STEP,
/* 237 */ COPY_WS_DEST_AFTER_BANK,
/* 238 */ COPY_WS_DEST_AFTER_NUM,
/* 239 */ COPY_WS_DEST_AFTER_NAME,
/* 240 */ COPY_WS_DEST_BEFORE_STEP,
/* 241 */ COPY_WS_DEST_BEFORE_BANK,
/* 242 */ COPY_WS_DEST_BEFORE_NUM,
/* 243 */ COPY_WS_DEST_BEFORE_NAME,
/* 244 */ MTUNE_C,
/* 245 */ MTUNE_CS,
/* 246 */ MTUNE_D,

```

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

```

/* 247 */ MTUNE_DS,
/* 248 */ MTUNE_E,
/* 249 */ MTUNE_F,
/* 250 */ MTUNE_FS,
/* 251 */ MTUNE_G,
/* 252 */ MTUNE_GS,
/* 253 */ MTUNE_A,
/* 254 */ MTUNE_AS,
/* 255 */ MTUNE_B,
/* 256 */ CURRENT_MTUNE,
/* 257 */ FX_PLACEMENT,
/* 258 */ FX1_PROG,
/* 259 */ FX2_PROG,
/* 260 */ FX_MIX_3,
/* 261 */ FX_MIX_4,
/* 262 */ FX_MOD_3,
/* 263 */ FX_MOD_4,
/* 264 */ FX_MOD_AMT_3,
/* 265 */ FX_MOD_AMT_4,
/* 266 */ CURRENT_FX,
/* 267 */ FX_PROG,
/* 268 */ FX_FOOTSWITCH_ENABLE1,
/* 269 */ FX_FOOTSWITCH_ENABLE6,
/* 270 */ FX_LFO_SHAPE,
/* 271 */ FX_MOD1,
/* 272 */ FX_MOD2,
/* 273 */ FX_MOD3,
/* 274 */ FX_MOD4,
/* 275 */ FX_MOD5,
/* 276 */ FX_MOD6,
/* 277 */ FX_MOD7,
/* 278 */ FX_MOD8,
/* 279 */ FX_MOD10,
/* 280 */ FX_LFO_RATE1,
/* 281 */ FX_LFO_RATE3,
/* 282 */ FX_LFO_RATE4,
/* 283 */ FX_LFO_RATE5,
/* 284 */ FX_LFO_RATE6,
/* 285 */ FX_LFO_RATE7,
/* 286 */ FX_SPLIT_POINT2,
/* 287 */ FX_SPLIT_POINT3,
/* 288 */ FX_SPLIT_POINT10,
/* 289 */ FX_DELAY_FACTOR7,
/* 290 */ FX_TOP_DELAY3,
/* 291 */ FX_WG_JUCT_MIX10,
/* 292 */ FX_EQ_FREQ_LOW0,
/* 293 */ FX_EQ_FREQ_MID2,
/* 294 */ FX_EQ_FREQ_HIGH7,
/* 295 */ FX_EQ_WIDTH6,
/* 296 */ FX_100_WET_DRY0,
/* 297 */ FX_100_WET_DRY3,
/* 298 */ FX_100_WET_DRY4,
/* 299 */ FX_10_WET_DRY0,
/* 300 */ FX_10_WET_DRY3,
/* 301 */ FX_10_WET_DRY4,
/* 302 */ FX_UPARAM0,
/* 303 */ FX_UPARAM1,
/* 304 */ FX_UPARAM2,
/* 305 */ FX_UPARAM3,
/* 306 */ FX_UPARAM4,
/* 307 */ FX_UPARAM5,
/* 308 */ FX_UPARAM6,
/* 309 */ FX_UPARAM7,
/* 310 */ FX_UPARAM8,
/* 311 */ FX_UPARAM9,
/* 312 */ FX_UPARAM10,
/* 313 */ FX_UPARAM11,
/* 314 */ FX_UPARAM12,
/* 315 */ FX_UPARAM13,
/* 316 */ FX_PARAM0,
/* 317 */ FX_PARAM1,
/* 318 */ FX_PARAM2,
/* 319 */ FX_PARAM3,
/* 320 */ FX_PARAM4,
/* 321 */ FX_PARAM5,
/* 322 */ FX_PARAM6,
/* 323 */ FX_PARAM7,
/* 324 */ FX_PARAM8,
/* 325 */ FX_PARAM9,
/* 326 */ FX_PARAM10,
/* 327 */ FX_PARAM11,
/* 328 */ FX_PARAM12,
/* 329 */ FX_PARAM13,
/* 330 */ FX_DEST_TYPE,
/* 331 */ FX_DEST_PROG,
/* 332 */ FX_DEST_FX_NUM,
/* 333 */ FX_DEST_PLACEMENT,
/* 334 */ FX_DEST_FX1,
/* 335 */ FX_DEST_FX2,
/* 336 */ WAVE_MUTE,
/* 337 */ WAVESEQ_WAVE,
/* 338 */ WAVE_SEQ_LOOP_DIR,
/* 339 */ WAVESEQ_COMPAND_SCALE,
/* 340 */ FOOT_DAMPER_FUNCTION,
/* 341 */ FOOT_DAMPER_POLARITY,
/* 342 */ FOOT_ASSIGN_1_FUNCTION,
/* 343 */ FOOT_ASSIGN_1_POLARITY,
/* 344 */ FOOT_ASSIGN_2_FUNCTION,
/* 345 */ FOOT_ASSIGN_2_POLARITY,
/* 346 */ BANK_COPY_TYPE,
/* 347 */ ENV1_MOD_VEL_RATE,
/* 348 */ ENV1_MOD_KBD_RATE,
/* 349 */ WS_MIDI_CLOCK,
/* 350 */ VIEW_BANK,
/* 351 */ VIEW_PERF_NUM,
/* 352 */ VIEW_PERF_NAME,
/* 353 */ COPY_FX_SOURCE_BANK,
/* 354 */ COPY_FX_SOURCE_NUM,
/* 355 */ COPY_FX_SOURCE_NAME,
/* 356 */ FX_11_WET_DRY0,
/* 357 */ FX_11_WET_DRY3,
/* 358 */ FX_11_WET_DRY4,
/* 359 */ FX_RAMP5,
/* 360 */ SOURCE_CARD_NAME,
/* 361 */ DEST_CARD_NAME,
/* 362 */ WAVEA_BUS_A,
/* 363 */ WAVEA_BUS_B,
/* 364 */ WAVEA_BUS_C,
/* 365 */ WAVEA_BUS_D,
/* 366 */ WAVEB_BUS_A,
/* 367 */ WAVEB_BUS_B,
/* 368 */ WAVEB_BUS_C,
/* 369 */ WAVEB_BUS_D,
/* 370 */ WAVEC_BUS_A,
/* 371 */ WAVEC_BUS_B,
/* 372 */ WAVEC_BUS_C,

```

## APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT

```

/* 373 */ WAVEC_BUS_D,
/* 374 */ WAVED_BUS_A,
/* 375 */ WAVED_BUS_B,
/* 376 */ WAVED_BUS_C,
/* 377 */ WAVED_BUS_D,
/* 378 */ COPY_PART_SOURCE_BANK,
/* 379 */ GLOBAL_UTIL_DEST_BANK,

```

Parameter numbers 380 - 406 are sent as Parameter Change Messages Expanded. Parameters 380-404 are ignored by the Wavestation EX keyboard.

```

/* 380 */ REMAP_TO_JOY_X,
/* 381 */ REMAP_TO_JOY_Y,
/* 382 */ REMAP_TO_FX_SWITCH,
/* 383 */ PROG_TO_MULTI_FX,
/* 384 */ CHANGE_MULTI_WITH,
/* 385 */ ANALOG_LEV_1,
/* 386 */ ANALOG_LEV_2,
/* 387 */ ANALOG_CHAN_1,
/* 388 */ ANALOG_CHAN_2,
/* 389 */ ANALOG_1_BUS_A,
/* 390 */ ANALOG_1_BUS_B,
/* 391 */ ANALOG_1_BUS_C,
/* 392 */ ANALOG_1_BUS_D,
/* 393 */ ANALOG_2_BUS_A,
/* 394 */ ANALOG_2_BUS_B,
/* 395 */ ANALOG_2_BUS_C,
/* 396 */ ANALOG_2_BUS_D,
/* 397 */ FX_BUS0,
/* 398 */ FX_BUS2,
/* 399 */ ANALOG_BUS_MACRO,
/* 400 */ ANALOG_1_FILTER,
/* 401 */ ANALOG_2_FILTER,
/* 402 */ ANALOG_1_EXCITER,
/* 403 */ ANALOG_2_EXCITER,
/* 404 */ ANALOG_INPUT_DISABLE,
/* 405 */ COMP_CONTROL0,
/* 406 */ LOCAL_XPOSE,

```

Parameter numbers 407 and greater are sent as Parameter Change Messages SR Expanded. These are ignored by the Wavestation keyboard and A/D.

```

/* 407 */ SYSEX_XMIT_TYPE,
/* 408 */ SYSEX_XMIT_BANK,
/* 409 */ SYSEX_XMIT_NUM,
/* 410 */ WAVE_BANK,
/* 411 */ WAVE_NUM,
/* 412 */ WAVE_NAME,
/* 413 */ WAVE_LEVEL,
/* 414 */ WAVE_TUNE_COARSE,
/* 415 */ WAVE_TUNE_FINE,
/* 416 */ WAVE_TUNE_SLOPE,
/* 417 */ WAVE_BUS_A,
/* 418 */ WAVE_BUS_B,
/* 419 */ WAVE_BUS_C,
/* 420 */ WAVE_BUS_D,
/* 421 */ MIX_ENV_RATE_1,
/* 422 */ MIX_ENV_RATE_2,

```

```

/* 423 */ MIX_ENV_RATE_3,
/* 424 */ MIX_ENV_RATE_4,
/* 425 */ PART_SOLO_STATUS,
/* 426 */ WS_STEP_SOLO_STATUS,
/* 427 */ PERF_MIDI_MODE,
/* 428 */ MULTI_MIDI_MODE,
/* 429 */ CURRENT_DEMO,
/* 430 */ CURRENT_DEMO_NAME,
/* 431 */ WAVE_WAVE,
/* 432 */ MULTISSET_NAME,
/* 433 */ MULTISSET_OUTPUT,
/* 434 */ NUM_MULTI_CHANS,
/* 435 */ RESET_ACT_SENS_CONTROL,
/* 436 */ REC_BANK_CHANGE,
/* 437 */ KSD_ENABLE,
/* 438 */ VERSION_NUM,
/* 439 */ VERSION_DATE,
/* 440 */ ERROR_NUMBER,
/* 441 */ TASK_NUMBER,
/* 442 */ STATUS_REGISTER,
/* 443 */ CRASH_LEVEL,
/* 444 */ PROGRAM_COUNTER,
/* 445 */ C_PROGRAM_COUNTER,
/* 446 */ STACK_POINTER,
/* 447 */ USER_STACK_POINTER,
/* 448 */ POOL_LEVEL,
/* 449 */ POOL_LEVEL_MAX,
/* 450 */ BOGUS_PARAM,
/* 451 */ EXECUTE_PLAY_DEMO,
/* 452 */ EXECUTE_SOLO_PART,
/* 453 */ EXECUTE_INIT_PART,
/* 454 */ EXECUTE_COPY_PART,
/* 455 */ EXECUTE_COPY_MODULES,
/* 456 */ EXECUTE_COPY_FX_ALL,
/* 457 */ EXECUTE_COPY_FX_PARAMS,
/* 458 */ EXECUTE_COPY_FX_MIX,
/* 459 */ EXECUTE_INSERT_WS_STEP,
/* 460 */ EXECUTE_DELETE_WS_STEP,
/* 461 */ EXECUTE_ZONE_KEY_LAYER,
/* 462 */ EXECUTE_ZONE_KEY_SPLIT,
/* 463 */ EXECUTE_ZONE_VEL_SWITCH,
/* 464 */ EXECUTE_ZONE_VEL_LAYER,
/* 465 */ EXECUTE_SOLO_WS_STEP,
/* 466 */ EXECUTE_WRITE,
/* 467 */ EXECUTE_COMPARE,
/* 468 */ EXECUTE_INIT_PATCH,
/* 469 */ EXECUTE_CENTER_POINT,
/* 470 */ EXECUTE_SYSEX_XMIT,
/* 471 */ EXECUTE_SYSEX_MULTI_DUMP,
/* 472 */ EXECUTE_BANK_MOVE,
/* 473 */ EXECUTE_FORMAT_CARD,
/* 474 */ EXECUTE_WAVESEQ_COMPAND,
/* 475 */ EXECUTE_WAVESEQ_INIT,
/* 476 */ EXECUTE_WAVESEQ_COPY,
/* 477 */ EXECUTE_WAVESEQ_STEP_COPY,
/* 478 */ EXECUTE_ENABLE_SHOW,
/* 479 */ EXECUTE_INIT_RAM,
/* 480 */ EXECUTE_LOAD_DIAG,
/* 481 */ EXECUTE_SAVE_DIAG,
/* 482 */ EXECUTE_EXIT_LEVEL,
/* 483 */ EXECUTE_INIT_PERF,
/* 484 */ PARAM_END /* Must be last */
};

```

## INDEX

This index includes citations from both the Player's and Reference Guides. Page numbers from the Player's Guide are marked by *Play*; those from the Reference Guide are marked by *Ref*.

### A

A-B PAN page *Ref* 2-4  
 About This Reference Guide *Ref* 1  
 Aftertouch *Play* 24  
     MIDI Enable/Disable *Ref* 98  
 AMP ENV page *Play* 84-85; *Ref* 5-7  
 AMP MOD page *Play* 85-86; *Ref* 8-9  
 Audio Connection *Play* 17  
 Auxiliary Outputs - *see* Outputs 3/4

### B

BACKUP page *Ref* 10-11  
 Banks *Play* 2-3  
     MIDI Bank Select *Play* 23-24; *Ref* 122  
     Turning Off Bank Select *Ref* 98  
 BUS ASN page *Ref* 12-13

### C

CARD FORMAT page *Ref* 14  
 Cards *Play* 25-26  
     Formatting *Play* 25; *Ref* 14  
     Memory Protect *Ref* 89, 148  
     Moving Data between Card and RAM *Play* 25;  
       *Ref* 10-11  
     Name *Ref* 112-113  
     PCM *Play* 5, 13-14, 26  
     Program *Play* 13, 25-26  
 Channel Receive Status - *see* MIDI STATUS page  
 Chorus Effects  
     Chorus - Stereo Delay - EQ *Play* 69; *Ref* 70-71  
     Crossover Chorus *Play* 68; *Ref* 58-59  
     Delay/Chorus, Dual Mono *Play* 69; *Ref* 74-75  
     Harmonic Chorus *Play* 68; *Ref* 59-60  
     Quadrature Chorus *Play* 67; *Ref* 57-58  
     Stereo Chorus *Play* 67; *Ref* 57-58  
 Compare *Play* 10; *Ref* 147  
 Compressor-Limiter/Gate Effect *Play* 70; *Ref* 82-83  
 Copy  
     Effects  
       All *Play* 34-35; *Ref* 32  
       Mix *Ref* 38  
       Parameters *Ref* 39  
     Part *Ref* 114  
     Patch Params *Ref* 117-118

Single Performance *Play* 55-58

Wave Sequence *Ref* 139

Wave Sequence Step *Ref* 140-142

Cross-Timbral Modulation Synthesis using the Vo-  
 coders *Play* 76

Cursor Keys *Play* 11-12

### D

Delay Effects

Chorus - Stereo Delay - EQ *Play* 69; *Ref* 70-71

Delay/Chorus, Dual Mono *Play* 69; *Ref* 74-75

Delay/Distortion - filter, Dual Mono *Play* 70; *Ref*  
 77

Delay/Flanger, Dual Mono *Play* 69; *Ref* 76

Delay/Hall, Dual Mono *Play* 69; *Ref* 73-74

Delay/Overdrive - filter, Dual Mono *Play* 70; *Ref*  
 77

Delay/Phaser, Dual Mono *Play* 70; *Ref* 78

Delay/Room, Dual Mono *Play* 69; *Ref* 73-74

Delay/Rotary Speaker, Dual Mono *Play* 70; *Ref*  
 79

Dual Mono Delay *Play* 67; *Ref* 52

Flanger - Stereo Delay - EQ *Play* 69; *Ref* 72-73

Mod Pitch Shifter - Delay *Play* 70; *Ref* 81-82

Multi-Tap Delay - EQ 1 *Play* 67; *Ref* 53-54

Multi-Tap Delay - EQ 2 *Play* 67; *Ref* 54-55

Multi-Tap Delay - EQ 3 *Play* 67; *Ref* 55-56

Ping-Pong Delay *Play* 67; *Ref* 50-51

Stereo Delay *Play* 67; *Ref* 49-50

Stereo Vocoder - Delay 1/2 *Play* 71; *Ref* 85-87

DEMO SEQUENCE page *Ref* 15

Distortion Effects

Delay/Distortion - filter, Dual Mono *Play* 70; *Ref*  
 77

Delay/Overdrive - filter, Dual Mono *Play* 70; *Ref*  
 77

Distortion - Filter - EQ *Play* 68; *Ref* 64-65

Overdrive - Filter - EQ *Play* 68; *Ref* 64-65

### E

Edit - *see* Effects, Multisets, Patch, Performance,  
 Scales, and Wave Sequence

EDT MULT page *Ref* 16-18

EDT PERF page *Play* 49-51; *Ref* 19-22

Effects *Ref* 43-87

- (see also individual effects names)
- Changing via MIDI *Play* 104; *Ref* 41-42; *Ref* 101
- Dual Mono Effects *Play* 74-75
- Enable/Disable, Global *Play* 47; *Ref* 88
- Mix *Ref* 34-37
- Modulation *Play* 36-37
- Effects Mix *Ref* 36-37
  - FX Control Channel (In Multi Mode) *Play* 35-36; *Ref* 41
  - Modulation Sources *Play* 63-64; *Ref* 43-44
  - Remapping the FX Switch *Ref* 100
- Multiset Channel FX Bus *Play* 32-33
- Multiset Effects *Play* 33-34
- Part FX Bus *Play* 64-65
- Troubleshooting *Play* 113
- Wavestation keyboard and expanded effects *Ref* 157
- Enhancer-Exciter - EQ Effect *Play* 68; *Ref* 63-64
- ENV1 page *Play* 87; *Ref* 23-25
- ENVIMOD page *Ref* 26-27
- Envelopes - see ENV1 and AMP ENV
- EQ - see Parametric EQ Effect
- EXIT page *Ref* 28
- F**
- FILTER page *Play* 86; *Ref* 29-31
- Flanger Effects
- Crossover Flanger-EQ *Play* 68; *Ref* 62-63
  - Delay/Flanger, Dual Mono *Play* 69; *Ref* 76
  - Flanger - Stereo Delay - EQ *Play* 69; *Ref* 72-73
  - Stereo Flanger-EQ 1 and 2 *Play* 68; *Ref* 60-61
- FX ALL COPY page *Play* 34-35; *Ref* 32
- FX MIX COPY page *Ref* 38
- FX MIX page *Play* 62-63; *Ref* 34-37
- FX PARAMS COPY page *Ref* 39
- FX SELECT page *Play* 33-34, 65; *Ref* 40
- FX1 (2) page *Play* 36-37, 71-72; *Ref* 43-87  
(see also individual effects names)
- G**
- GLOBAL page *Ref* 88-89
- Guitar Controllers *Play* 103-105
- H**
- Hard Sync *Ref* 116
- Help - see Troubleshooting
- J**
- Joystick, Remapping MIDI Controllers to *Ref* 100
- K**
- Key and Velocity Zones - see ZONES page
- Key Combination Shortcuts - see Shortcuts
- Keyboard Tracking
- Amp Envelope *Ref* 9
  - Envelope 1 *Ref* 27
  - Filter Cutoff *Ref* 30
  - Patch A-B Pan *Ref* 3
- L**
- Layering the Keyboard *Play* 51-53; *Ref* 152-154
- LCD Display *Play* 13
- LFO 1 (2) *Ref* 90-92
- M**
- MACROS page *Play* 83-84; *Ref* 93-95
- Memory Protect
- Card *Ref* 89, 148
  - Internal *Ref* 88, 148
- Microtones - see Scales
- MIDI *Play* 42-47; *Ref* 96-102
- Basic Channel *Play* 20, 21; *Ref* 96
  - In Multisets *Play* 29-30
  - Connecting MIDI *Play* 17-18
  - Controllers *Play* 24
    - Enable/Disable *Ref* 98
    - MIDI Pan *Play* 32-33; *Ref* 18
    - MIDI Volume *Ref* 17, 98
    - Remapping *Ref* 100  - Controllers 1/2 *Play* 43-44
  - MIDI Indicator LED *Play* 13
  - MIDI Modes *Play* 19-20, 29; *Ref* 96
  - MIDI Thru Jack *Play* 15
  - Multi-timbral Receive - see Multisets
  - Receive *Ref* 98-99
    - MIDI In jack *Play* 15  - System Exclusive
    - Data Receive *Ref* 131
    - Data Transmit *Ref* 129-130
    - Parameter Transmit/Receive *Play* 46-47; *Ref* 97
    - to Sysex Recorders and T-Series *Play* 106-107
    - to Wavestation keyboard *Ref* 155-157
    - Transmit
      - MIDI Out jack *Play* 15
      - Troubleshooting *Play* 108-110, 111
- MIDI page *Ref* 96-97
- MIDI RECEIVE page *Ref* 98-99
- MIDI REMAP page *Play* 43-44; *Ref* 100-101
- MIDI STATUS page *Play* 42-43; *Ref* 102
- MIX ENV page *Play* 87-90
- MIXENV page *Ref* 103-107
- MIXENVMOD page *Ref* 108-109
- Modulation Matrix *Play* 79-80  
(see also Aftertouch, Effects, Joystick, Keyboard Tracking, Modulation Wheel, Pan, Patch Amplitude Envelope, Patch Envelope 1, Pitch Bend, Velocity, Wave

Sequence)  
 Effects Modulation Sources *Play* 63-64; *Ref* 36-37;  
*Ref* 43-44  
 Patch Modulation Sources *Ref* 94-95  
 Modulation Wheel *Play* 24  
 MIDI Enable/Disable *Ref* 98  
 Monophonic Voice Assignment *Ref* 20-21  
 MULTISSET page *Ref* 110-111  
 Multisets *Play* 6, 28-41  
   and 3/4 Outputs with Parallel Effects *Play* 72-75  
   Changing via MIDI *Play* 30; *Ref* 101, 110-111  
   Channel Panning/FX Bus *Play* 32-33; *Ref* 18  
   Channel Volume *Play* 32  
   Effects in Multisets *Play* 33-34  
   Name *Play* 37-39; *Ref* 112-113  
   Sysex transmit to Wavestation keyboard, A/D  
     *Ref* 155  
   Write *Ref* 147-149

**N**

NAME page *Play* 37-38; *Ref* 112-113

**O**

Oscillator  
   Hard Sync *Play* 81; *Ref* 116  
   Structure *Play* 77, 81  
   Waves Page *Ref* 132-134  
 Outputs 3/4 *Play* 16, 72-75  
 Overdrive - *see* Distortion  
 Overflow - *see* MIDI RECEIVE page, *Play* Notes parameter

**P**

Pan *Play* 79  
   Bus A-B Pan *Ref* 2-4  
   FX MIX page *Ref* 34-37  
   Keyboard Modulation of *Ref* 3  
   Multiset Channel FX Bus *Play* 32-33; *Ref* 18  
   Part FX Bus *Play* 64-65; *Ref* 17-18; *Ref* 20  
   Patch FX Bus Assignment *Ref* 12  
   Stereo Pan Effects *Play* 69; *Ref* 68-69  
   Velocity Modulation of *Ref* 3  
 Parametric EQ Effect *Play* 69; *Ref* 69-70  
 Part  
   (*see also* EDIT PERF page)  
   Initialize *Ref* 22  
   Key and Velocity Zones *Play* 51-53; *Ref* 152-154  
   Part FX Bus *Play* 64-65  
 PART COPY page *Ref* 114  
 Patch *Play* 4-5, 77-91  
   (*see also* Vector Synthesis)  
   Amp Envelope *Ref* 5-7  
   Modulation *Ref* 8-9  
   Bus A-B Pan *Ref* 2-4

Bus Assignment *Ref* 12  
 Envelope 1 *Ref* 23-24  
   Env Mod *Ref* 26-27  
 Filter *Play* 79; *Ref* 29-31  
 FX Bus Assignment *Ref* 12  
 Initialize *Ref* 116, 151  
 LFOs *Ref* 90-92  
 Macros *Ref* 93-95  
 Mix Envelope *Ref* 103-107  
   Mix Mod *Ref* 108-109  
 Modulation Sources *Ref* 94-95  
 Name *Ref* 112-113  
 Patch Macros *Play* 83  
 PATCH page *Play* 81-82; *Ref* 115-116  
 Pitch *Ref* 123-126  
 Structure *Ref* 115-116  
   Write *Play* 90; *Ref* 147-149  
 PATCH page *Play* 81-82; *Ref* 115-116  
 PATCH PARAMS COPY page *Ref* 117-118  
 PCM Waves *Play* 5  
   (*see also* WAVES page and Wave Sequence)  
   PCM Cards *Play* 14, 26  
   Wavestation keyboard and expanded PCM *Ref*  
     155  
 PERF button *Play* 10  
 PERF MAP page *Play* 45-46; *Ref* 119-120  
 PERFORM page *Play* 21-22; *Ref* 121-122  
 Performance *Play* 4, 48-55  
   Changing Performances *Play* 12  
   In a Multiset *Play* 31  
   MIDI Bank Select *Play* 23-24; *Ref* 122  
   Turning Off Bank Select *Ref* 98  
   MIDI Enable/Disable *Ref* 98  
   On the PERFORM page *Play* 21-22; *Ref* 121-  
     122  
   Performance Select Map *Play* 45-46; *Ref* 119-  
     120  
   Copying a Single Performance *Play* 55-58  
   EDT PERF page *Play* 49-51; *Ref* 19-22  
   Initialize *Ref* 22  
   Layering and Splitting *Play* 51-53; *Ref* 152-154  
   Name *Ref* 112-113  
   PERFORM page *Ref* 121-122  
   Write *Ref* 147-149  
 Performance Select Map *Play* 45-46; *Ref* 119-120  
 Phaser Effects  
   Delay/Phaser, Dual Mono *Play* 70; *Ref* 78  
   Stereo Phaser 1 and 2 *Play* 68; *Ref* 65-66  
 Pitch Bend *Play* 24  
   MIDI Enable/Disable *Ref* 98  
   Range, Global *Ref* 89  
   Range, Patch *Ref* 123  
 PITCH page *Ref* 123-126  
 Pitch Ramp *Ref* 124

## Pitch Shifter Effects

- Mod Pitch Shifter - Delay *Play 70; Ref 81-82*
- Stereo Pitch Shifter *Play 70; Ref 80*

**R**Recall - *see* Compare

## Reverb Effects

- Changing Performances without disrupting *Play 102*
- Delay/Hall, Dual Mono *Play 69; Ref 73-74*
- Delay/Room, Dual Mono *Play 69; Ref 73-74*
- Early Reflections *Play 66-67; Ref 46-47*
- Gated Reverb *Play 67; Ref 48*
- Halls, Rooms, Plates, and Spring *Play 66; Ref 45-46*

Rotary Speaker Effects *Play 68-69*

- Delay/Rotary Speaker, Dual Mono *Play 70; Ref 79*
- Rotary Speaker *Ref 67-68*

**S**Samples - *see* PCM Waves, WAVES page, and Wave SequenceSave - *see* WRITE pageSCALE page *Ref 127-128*

## Scales

- EDT PERF page *Ref 21*
- SCALE page *Ref 127-128*
- Using Wave Slope for Microtones *Ref 128*
- Write *Ref 147-149*

Shortcuts *Play 12, 22; Ref 1*

- NAME page *Play 38; Ref 113*

Split Keyboard *Play 51-53; Ref 152-154*

## Stereo Pan Effects

- Quadrature Mod - Pan - EQ *Play 69; Ref 68-69*
- Stereo Mod - Pan - EQ *Play 69; Ref 68-69*

## Sustain Pedal

- Part Enable/Disable *Ref 21*

SYSEX DATA XMIT page *Ref 129-131*System Exclusive - *see* MIDI System Exclusive**T**

## Transpose

- Global Transpose *Play 26-27; Ref 88*
- Part Transpose *Ref 20*

Troubleshooting *Play 108-113*

- Audio *Play 108*
- MIDI *Play 108-110*
- Wave Sequences *Play 112*

## Tuning

- (*see also* Transpose)
- Master Tune *Play 26; Ref 88*
- Part Detune *Ref 20*
- Troubleshooting *Play 110-111*

Wave *Ref 133*Wave Sequence *Ref 137*Wave Slope *Ref 133***V**Vector Synthesis *Play 78, 87-90; Ref 103-109*

## Velocity

- Key and Velocity Zones - *see* ZONES page to Amp Envelope Amount *Ref 8*
- to Amp Envelope Attack *Ref 9*
- to Envelope 1 Amount *Ref 27*
- to Envelope 1 Attack *Ref 27*
- to Pitch Ramp *Ref 124*
- to Wave Sequence Step *Ref 145-146*
- Velocity Response Curve *Ref 89*

## Vocoder Effects

- Cross-Timbral Modulation Synthesis *Play 76*
- Small Vocoder 1/2/3/4 *Play 70-71; Ref 83-84*
- Stereo Vocoder - Delay 1/2 *Play 71; Ref 85-87*

## Volume

- Amp Envelope *Ref 5-7*
- Amp Envelope Modulation *Ref 8-9*
- Master Volume Knob *Play 9*
- Multiset Channel Level *Play 32; Ref 17*
- Part Volume *Ref 20*
- Wave Level *Ref 133*
- Wave Sequence Step Level *Ref 137*

**W**Wave Sequence *Play 5, 92-99; Ref 135-138*Copy *Ref 139*Copy Steps *Ref 140-142*Initialize *Ref 151*MIDI/Internal Sync *Play 100, 112; Ref 97, 136*Modulation *Ref 145-146*Name *Ref 112-113*Rhythmic Wave Sequences *Play 99-100*Troubleshooting *Play 111, 112*WAVES page *Play 82-83; Ref 132-134*WAVESEQ COPY page *Play 95; Ref 139*WAVESEQLOOP page *Play 98; Ref 143-144*WAVESEQMOD page *Play 98; Ref 145-146*

Wavestation Keyboard, A/D

compatibility with *Ref 155-157*WAVSEQ STEPCOPY page *Ref 140-142*Wind Controllers *Play 101; Ref 20*WRITE page *Play 38-39, 54-55, 90-91; Ref 147-149*WRITE/COMPARE button *Play 10; Ref 147*WS UTILITY page *Play 97; Ref 150-151*WSEQ page *Play 94-95, 96-98; Ref 135-138***Z**ZONES page *Play 51-53; Ref 152-154*



#### NOTICE

KORG products are manufactured under strict specifications and voltages required by each country. These products are warranted by the KORG distributor only in each country. Any KORG product not sold with a warranty card or carrying a serial number disqualifies the product sold from the manufacturer's/distributor's warranty and liability. This requirement is for your own protection and safety.

**KORG** KORG INC.

15-12, Shimotakaido 1-chome, Suginami-ku, Tokyo, Japan.